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CO-DEVELOPING A CEREAL NETWORK IN PAJOTTENLAND, BELGIUM

A Participatory Action Research to Empower Farmers within a
Region

Lucas Van den Abeele

Master of Science in Agroecology

Note to the reader

This document has been written both as an internship report and as a Master's thesis. The internship consisted of the creation of a cereal network in the region of Pajottenland, Belgium, between farmers and processors. The conducted research thus had a double objective: co-developing the incipient cereal network from a practical point of view and assessing its relevance from an academic perspective. The practical outcomes for the farmers and the network have been taken as the primary goal, from the point of view that practical relevance takes precedence over theoretical relevance.

The farmers, the processors and the entire cereal network have shaped and collaborated in this research. Even though there is only one author of the document, it is written in plural to include all the stakeholders that have actively participated in the research. However, whenever the explicit role of the author is discussed – and in order to improve readability – the first form singular is used.

ABSTRACT

In Belgium only 15% of wheat for human consumption and less than 4% of barley used by national breweries are grown on Belgian territory. In order to overcome this shortage, farmers and processors joined hands in the region of Pajottenland, Belgium, to shape a cereal network and reorganise the local food system. Through the means of participatory action research, we studied the involvement of the farmers in co-developing the incipient network in such a way that would answer their needs and help them to overcome the lock-ins they are confronted with. The methodology was structured in three parts: learning from the past, experimenting in the present and preparing for the future. Therefore, a Farming History of Pajottenland was co-constructed with key informants, a Farmer Field School was set up and networking activities were organised. The identified lock-ins are of technical, institutional, economic, social, psychological and cognitive nature; but in addition numerous interlinkages were observed, laying bare a cluster of intertwined lock-ins within the dominant industrial food system. Different pathways to overcome these lock-ins were defined together with the farmers. Some of these were directly put into practice within the emerging cereal network, such as farmer to farmer collaboration and knowledge exchange, improving social interactions, re-establishing trust among farmers and processors, strengthening the region's identity, and a better remuneration for all stakeholders in the cereal chain. Through our research we have shown the potential for creating a cereal to the benefit of the participating farmers and we have documented the first steps in doing so. However, after one year, we notice the vulnerability of the network in its initial phase, being highly dependent on the commitment of its early participants and its coordinator.



FIG 1: FARMER TIM SHOWING HIS TRADITIONAL WHEAT LANDRACES
IMAGE BY FREDERIC VANWALLEGHEM

Tell me and I'll forget
Show me and I'll remember
Involve me and I'll understand
Step back and I'll act

Confucius or Kung Zi
(551 B.C. – 479 B.C.)
adapted by Mette Vaarst

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ABBREVIATIONS

- ABS:** Algemeen Boerensyndicaat (General Farmers Union – 2nd Flemish farmers union)
- BB:** Boerenbond (Farmers Union – main Flemish farmers union)
- CAP:** Common Agricultural Policy
- CETA:** Comprehensive Economic and Trade Agreement
- CSA:** Community Supported Agriculture
- CUMA:** Cooperative d'Utilisation de Machines Agricoles (Cooperative for the use of agricultural machinery)
- EEC:** European Economic Community
- FFS:** Farmer Field School
- MAP:** Mestactieplan (Manure Action Plan)
- NAC:** Nationaal Agrarisch Centrum (National Agrarian Center – part of ABS)
- PAR:** Participatory Action Research
- RQ:** Research Question
- TTIP:** Transatlantic Trade and Investment Partnership
- UPA:** Union Professionnelle Agricole (Professional Agricultural Union)
- VAC:** Vlaams Agrarisch Centrum (Flemish Agrarian Center)
- WTO:** World Trade Organisation

PROLOGUE: TWO SEEDS AS A PROMISE FOR A CEREAL NETWORK

POWER OF A SHARED VISION
A PARABLE THAT IS TURNING INTO REALITY THROUGH AGROECOLOGY

A couple of seeds falling in the same fertile soil formed the base of what would become a cereal network in the region of Pajottenland in Flanders, Belgium.

The **first seed** was brought by a **cooperative mill**, settled in an old windmill bought in 2016, renovated and milling again since September 2017. The vision of the cooperative is to reunite different stakeholders from the cereal and bread chain within one cooperative, with the old windmill at its centre. Bit by bit, curious neighbours approached the crazy man who had come up with the idea of bringing new life to the old mill. When things started running, more people came by and offered their hands and brains. The cooperative started approaching farmers and bakers from the region with the aim of creating a network of people collaborating closer together. One of them was farmer Tim, passionate about organic agriculture, peasants' identity and local production. They contacted him because of his enthusiasm and his far-reaching network, asking his help to create the network they had in mind.

The **second seed** emerged from a little **brewery** not far away, which aims to protect and revalue traditional brewing techniques from the region. Their main goal is quality, not quantity nor time efficiency. For ages and ages, the *Lambic breweries*, brewing traditional naturally fermented beer, were part of the region's landscape and economy. Using exclusively local products – barley, wheat, hops and wild yeasts for fermentation – the breweries were strongly embedded in local culture. However, by the end of the 1960s, local crop varieties were being replaced by modern, high-yielding varieties, and not much later, the whole production of barley, wheat and hops had shifted to other countries. Following the objective of re-embedding their beer in the local economy, the brewers were confronted with the disappearance of traditional wheat landraces used in previous years. At the same time, farmer Tim was looking to re-establish traditional wheat landraces from the region on his fields. He contacted the brewery to find out if they had any old stocks of cereals, but when they understood his quest, they also proposed to collaborate. As a consequence, they asked him if he could locate the relevant landraces and if he could find a group of farmers from the region who would be ready to grow them.

Tim felt the promise these two seeds bore, but he knew he would not have the energy nor the time to let both of them grow into beautiful plants. Nurturing the idea of letting these two seeds be the basis of a **big seed family**, he looked for help in the domain of agroecology. Professor Marjorie and a master student in agroecology joined the project and formed the core team with farmer Tim. Together they developed the basis of what would become the **cereal network** in the region of Pajottenland.

1. INTRODUCTION

This research is centred around the co-development of an emerging cereal network between farmers and processors within a given region. One of the network's objectives is to empower the farmers and to strengthen their position. Before describing the research questions and the methodology, we will introduce the different lock-ins farmers are confronted with and how farmers networks can enable them to overcome these lock-ins.

1.1 AGRICULTURAL PATH DEPENDENCIES AND LOCK-INS

In recent years, actors within the cereal food chain have been disconnected from one another due to the industrialisation and homogenisation of the farming and food system (Milestad et al., 2010). Consequently, farmers are growing increasingly isolated, both from each other and from consumers and processors. The economic squeeze between increasing input costs and fluctuating output prices is so extreme that farmers are trapped in an economic system that creates high competition and increasing mistrust among farmers (Fares et al., 2012; Louah et al., 2015; van der Ploeg, 2008). In addition, the concentration of certain activities, such as storing, milling, malting or retailing prevents many cereal farmers from collaborating with small scale local processors.

These developments reveal several lock-ins or path dependencies confronted by farmers. Lock-ins may occur in different domains and have different characteristics, ranging from technological and socio-technological (Fares et al., 2012; Lamine et al., 2012) to formative, juridical, economic and physical or biotic (Wigboldus et al., 2016), institutional and research-based (Vanloqueren and Baret, 2008), or cognitive (Louah et al., 2017). Fares et al. (2012) argue that structure and hierarchy within a sector or food chain may represent a lock-in in itself if it inhibits the actors in the sector to shift to more sustainable practices.

Furthermore, a food system drifting apart is counterproductive to trust building among its actors, because they become strangers to each other (Milestad et al., 2010). In addition, trust among actors within a food chain is negatively correlated to the amount of rules and regulations the same actors have to comply with. Wielinga and Vrolijk (2009) state that the development of control mechanisms increases administrative burden, inhibits creativity and innovation, hinders the adoption of agroecological practices (van der Ploeg, 2008) and is often perceived by farmers as lacking common sense (Oreszczyn et al., 2010). It can therefore be seen as an institutional lock-in.

Looking at knowledge transfer, a trend of knowledge privatisation has emerged from the 1970s onwards. Private companies started controlling knowledge transfer through extension services, becoming more dominant than state-organised advisory services (Klerkx and Leeuwis, 2008; Rosenfeld, 2017; Vanloqueren and Baret, 2008; Wielinga and Vrolijk, 2009). This form of private counselling thus induces

an institutional and technical lock-in as farmers receive lopsided technical information by companies' salesmen (Meynard et al., 2012).

Due to a strong decrease in number of farmers in Belgium and all over the western world, farmers tend to get more isolated from each other. This isolation has a severe effect on farmers' lives, on their social relationships and on how they behave in society. Some studies even state that social isolation is one of the driving forces behind farmer suicides, together with financial and administrative pressures (Gregoire, 2002; Judd et al., 2006).

1.2 FARMERS NETWORKS TO OVERCOME LOCK-INS

Despite these lock-ins caused by path dependencies, multi-actor networks have proven to be efficient in empowering farmers and regaining independence towards the processing industry and the fluctuating world market prices (Oerlemans and Assouline, 2004; Pimbert, 2011; Vaarst, 2007; van der Ploeg, 2008). The *Zeeuwse Vlegel*, a farmers network in the south of the Netherlands, is growing *sustainable* (not organic) and high quality baking wheat, while improving the interactions between producers and consumers (Wiskerke, 2003). By processing and marketing the wheat themselves, exchanging knowledge and techniques among farmers and improving contact to consumers, farmers became independent from industrial wheat processors, retailers and private counselling companies (Oerlemans and Assouline, 2004). Hence they have been successful in overcoming certain lock-ins. A second network that reunites the different stakeholders around the cereal and bread chain is the recently created *Li Mestère* network in Belgium. *Li Mestère* is ancient Walloon for meslin, a mixed crop of wheat and rye. The network focuses on the conservation of wheat landraces and their uses by farmers, millers and bakers (Li Mestère, 2018). This young network has generated several outcomes: “(1) testing novelties on-farm, (2) creating safe-learning spaces, favouring the involvement of isolated farmers and (3) revealing the challenges and opportunities of the collaborative management of cultivated diversity” (Baltazar et al., 2016). However, due to volunteer-based coordination and the distance between stakeholders, members are confronted with the difficulty of organising regular meetings and setting up a proper governance (personal communication, 19/03/'18).

Even though both these networks can be considered success stories, Oerlemans and Assouline (2004) state that social cohesion, shared vision, approach and goals, and dedicated network facilitation are key to ensure a network's longevity. Farmers need to feel responsible for the common goals within the network, they need to be able to negotiate and take collective action (Pimbert, 2011). On the other hand, Van Dam et al. (2017) note how small the margin often is between flourishing and exhaustion for initiators and early participants of farmers networks. The survival of these networks often relies too much on the commitment of their early participants, especially when its governance lies in the hands of a few. It is therefore important to search for sustainable pathways, ensuring the longevity of a network without asking too much from its participants.

Farmers networks have shown to enable agricultural innovations to spread more easily among farmers (Chantre, 2011; Darré, 1996; Delobel, 2014; Klerkx and Leeuwis, 2008; Meynard et al., 2012). Geels (2002) adds that the innovation capacity of a group depends highly on its structure, its density and the way people relate in the group. Under the right conditions, networks indeed have the potential to improve social learning and increase the social capital of the farmers – the resources a person has through their social relations (Lefèvre et al., 2014; Mathijs, 2003; Munasib and Jordan, 2011). As a specific case of farmers networks, Farmer Field Schools (Table 1) have proven highly effective in enhancing knowledge sharing among farmers and empowering them to take ownership over their problems and solutions (Vaarst, 2007). In the same way, many farmers have expressed their preference towards gaining new insight and knowledge from their peers rather than from advisory services or consulting companies (Kerkhove, 1993; Rosenfeld, 2017; van der Ploeg, 2008; Wood et al., 2014). However, in order to do this, farmers must grow to understand that they are the real experts and that their knowledge and experiences are valuable. Making the shift from *learner* to *expert* is often one of the biggest challenges in farmer exchange groups (Vaarst et al., 2007). Therefore, it is crucial to create a safe learning space for farmers to share knowledge (Louah et al., 2015). When farmers become aware about their own strengths and what they have to offer, and if, in addition, they improve their mutual collaboration, they can empower themselves, gain independence from selling and retailing industries, and thereby lessen the economic squeeze (van der Ploeg, 2008).

TABLE 1: FARMER FIELD SCHOOL

The **Farmer Field School (FFS)** is a tool to empower farmers, first used among small scale rice farmers in Indonesia at the end of the 1980s. It was developed to foster learning through sharing knowledge and experiences about a given topic or issue by organising practical on-farm meetings (Braun and Duveskog, 2011). In general, farmers are more confident in the field than in a classroom, that is why in FFS, the teacher becomes the field, enabling farmers to immediately put the theory into practice (Gallagher, 2003). By doing so, farmers link theory to their personal reality and will develop the knowledge that they deem necessary (Vaarst, 2007; Henriksen et al., 2015). FFS encourages farmers to take the role of experts themselves and thus become independent from external advice (Vaarst, 2007). However, an external facilitator, guiding the learning process but not lecturing, is key to obtain the desired results. Kevin Gallagher, one of the leading advocates of FFS, describes the concept as follows: “the Farmer Field School is not about technology, it is about people’s development” (Khisa, 2003).

Mathijs (2003) has studied the effect of social capital on the adoption of sustainable farming practices. He argues that social capital can both enhance and inhibit innovation, as a group of people can be both progressive or conservative. On the other hand, community involvement has a positive effect on farmers adopting new practices and enhances social responsibility (Munasib and Jordan, 2011). Finally, many farmers networks claim to be as much a social asset as a technical or economic asset (Anil et al., 2015; Lilja and Dixon, 2008; Vaarst et al., 2011). However, a network will only function properly when

there is trust between the different stakeholders, generating a feeling of belonging. It is only by valuing the persons, their knowledge and experiences, that a network will find its reason of being and will manage to sustain itself (Wood et al., 2014).

1.3 RESEARCH QUESTIONS (RQ)

Numerous farmers networks have proven to be beneficial, but how do farmers themselves perceive the benefits a network could bring them and what is their motivation for joining or leaving a network? The literature on this seems scarce. Henriksen et al. (2015) have assessed farmers' perception of stable schools, a Danish variant of FFS, but they limit their work to the benefits it is perceived to bring in terms of animal welfare. Others have assessed farmers' motivation to adopt sustainable practices, whether related to their social capital or not, but without explicit involvement in a farmers network (Menozzi et al., 2015; Munasib and Jordan, 2011).

None of the aforementioned studies took into account the farmers' identity within a region from a historical perspective and how that influences their decision making. None looked at the factors that make and/or break an incipient network. The exact combination of factors of success might be very contextual depending on the specific farming history and identity of the locality, who exactly is in charge and what exactly happened in the very early stages of network development.

Since August 2017, we have been involved in the startup of a cereal network in Pajottenland, a fertile tradition farming region close to Brussels. Looking back at this first year, we frame our research question as follows:

- RQ1 (Retrospectively): To which extent does the Farming History of Pajottenland and the geography of the region form an enabling environment for creating a cereal network between farmers and processors?
- RQ2 (Currently): In which way does setting up a Farmer Field School foster trust building among early participants?
- RQ3 (Prospectively): How do early participating farmers perceive the creation of a cereal network as a way to overcome the lock-ins they are confronted with?

Even though three research questions are asked, the first two serve as a means to better answer the third and most important question. The rationale behind the first question is that farmers' perception and motivation is influenced by their identity and their past. Properly understanding their perception thus requires to take a closer look at the farming history in the region. Furthermore, farmers' trust is built by what they see and experience, less by what they hear or imagine. They will only be able to judge the effects of joining a network when they have experienced or seen the concrete process within a network. Therefore, the second question aims at embedding the incipient network in the farmers' reality. Finally, the third and main research question gives the chance to the farmers to express how they perceive the effects a cereal network might have on their lives and their work. Even though this network will not only consist of farmers,

but processors, households and even researchers too, the main focus of the research will be the farmers and the situation they find themselves in. Hence, the research aims at finding solutions and creating a network *with* farmers, not just *for* farmers. In order to better understand their position, a concise background will be provided on the situation of the cereal chain in Belgium and on the region of Pajottenland.

2. BACKGROUND

Before explaining the methodology, we will provide some background on the research context. First of all, we look at the Belgian cereal chain, how it evolved over time and in which situation we find ourselves today. Secondly, the case area of Pajottenland and its farmers will be presented. Finally, we present research that has been conducted in the region and that is of relevance to our study.

2.1 BELGIAN CEREAL PRODUCTION

Belgian cereal production has been largely influenced by overseas cereal import since the mid-19th century. The mainly U.S. import was privileged by large cereal growing areas, producing big batches of homogenous and high quality cereals. Belgium specialised in transforming these cheap overseas cereals into quality products such as meat, dairy and eggs, but also bread and pastries (Beukenkamp, 1945). In 1880, cereals were grown on 50% of Belgium's arable land, while in 1895 this proportion had already fallen to 30%. During the same timespan (1880-1895) cereal import increased from 400.000 T to 1,6 million tonnes per year (Demblon and Aertsen, 1990) and at the start of the first world war, 85% of the cereals used for baking came from overseas. The trend was set and Belgian cereal farmers were increasingly persuaded by the processing industry that, due to the humid climate, they were unable to produce cereals with high baking quality. On the other hand, several farmer-baker initiatives have proven that growing and processing Belgian cereals is possible by applying adapted processing techniques such as long fermentation and sourdough baking (Baltazar et al., 2016). Even though industrial baking criteria are adjusted from time to time, they are generally close to the following values: minimum 10,5 to 11,5% of protein, minimum falling number of 200 seconds, minimum weight of 77 kg/hl and maximum humidity of 14% (Verbeke, 2015). Until 2015, the Belgian millers federation paid a premium to those farmers who managed to reach the required baking qualities, but when they stopped paying this premium, farmers lacked the incentive to grow baking cereals (Eos Tracé, 2018). The vast majority of the Belgian cereals is thus transformed to feed and fuel instead of food, supplying the fodder, biofuel and starch industries (Delcour et al., 2014). Today only 15% of the wheat processed by Belgian mills is homegrown. The situation in the brewery domain is even more blatant, as less than 4% of the barley used for brewing is of Belgian origin (Delcour et al., 2014). This is due to strict criteria set for brewing barley. In addition, only six malting plants remain in Belgium among which only two are still independent. However, even these independent malting plants need large batches of homogenous barley, something which hinders the development of local production (Delcour et al., 2014).

Belgian cereal in- and outflows from 2011 are illustrated in Figure 2, giving an idea of its scale and destination.

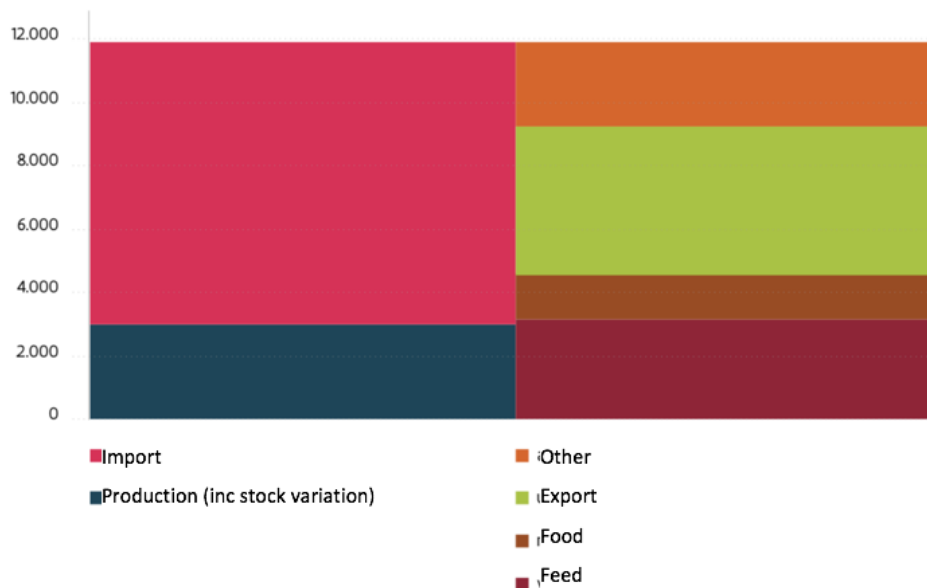


FIG 2: CEREAL SUPPLY BALANCE IN 1.000 TONNES, BELGIUM 2011
SOURCE: PLATTEAU ET AL., 2016

Looking at organic cereals in Belgium, only 15.000 tonnes are being processed for food and 30.000 tonnes for feed. 5-10% and 30% of those quantities, respectively, are grown in Belgium (Verbeke, 2015). The organic sector is in general more developed in Wallonia (southern Belgium) than in Flanders (northern Belgium): 10,4% and 1,2%, respectively, of the total agricultural area is certified as organic (Goffin and Beaudelot, 2018). The shortage in organic cereal production in Flanders is even more significant: in 2017, for instance, only 42,8 ha of organic wheat (both winter and spring wheat) were grown and 75,5 ha in conversion to organic (Timmermans and Van Bellegem, 2018). Four reasons are mentioned for the underdevelopment of the Belgian and Flemish organic cereal market: “(1) the lack of a proper coordination of supply and demand, (2) the difficulties farmers encounter to produce large batches of homogenous cereals as required by large-scale industrial processing, (3) the strict baking criteria required by the processing industry and (4) the lack of knowhow among bakeries in how to process cereals that do not meet the required baking quality” (Verbeke, 2015). Only a handful of official baking courses exist, but none of them pay particular attention to alternative baking techniques such as sourdough or long fermentation. Courses are mainly focused on industrial *time-efficient* baking, and using flour mixes and additives to improve baking properties (Baltazar et al., 2016; Plateau and Holzemer, 2016). Many bakers thus lack the required knowhow to handle pure flour from locally grown cereals.

2.2 CASE AREA: REGION OF PAJOTTENLAND



FIG 3: REGION OF PAJOTTENLAND ON THE MAP OF BELGIUM



FIG 4: IMAGE OF PAJOTTENLAND. IMAGE BY KOEN DE LANGHE

The region of Pajottenland is located some 10-30 km southwest from the city of Brussels, in the Belgian province of Vlaams-Brabant (Figure 3). The municipalities close to Brussels are more urbanised than those located in the south of the region. As shown in Figure 4, the region is characterised by a semi-natural hilly landscape. Despite its heritage as the traditional food basket of Brussels, Pajottenland got more isolated from the capital. This is only partly due to the language barrier: Brussels has become mainly French speaking, whereas Pajottenland is Dutch speaking. The proximity of a sprawling city inflates the prices of agricultural land and exacerbates the economic squeeze on farms (Meert et al., 2005). In addition, many people seek employment in the city at the expense of economic activity in the region (Messely et al., 2010). On the other hand, increasing urbanisation influences local markets, creating new opportunities for farmers to market their products (Beauchesne and Bryant, 1999; van der Ploeg et al., 2004; Vandermeulen et al., 2006).

Not much farming-related research has been done in the region of Pajottenland. However, one publication is of particular interest to our study. In collaboration with the university of Wageningen, from 1992 to 1993, Greet Kerkhove conducted a socio-economic research on the agronomic situation in two isolated regions of Flanders, Pajottenland and Hagenland. In her book called *Sterk gemengd* (Strongly mixed) she defines together with the interviewed farmers five farming typologies in the region: large scale mixed farms, typically mixed farms, direct sellers, specialised family farms and integrated farmers. In Appendix I, five farming typologies are described and displayed on a graph, according to their degree of dependence from external technological advice and their degree of integration in the market. In her book, Kerkhove (1993) concludes that farmers continuously have to rethink their farming strategies in order to ensure their survival. However, farmers belonging to each of these five categories all have a distinct development approach and different pathways for adapting to their needs. The study serves as a reference typology of farming styles in Pajottenland. Talking about the same region, Meert et al. (2005) agree that there is a broad range of *survival strategies* for farmers, strongly dependent on available capital and

household structure. In addition, off-farm employment became widespread in Pajottenland as it appears to be the most accessible strategy to ensure the necessary income to maintain farm activities (Meert et al., 2005).

Looking at shaping a cereal network, the region of Pajottenland seems to bear the potential for developing a locally embedded food system. Therefore, inspiration can be found in the French concept of *terroir*, developing, promoting and protecting the identity of a given region and its natural and cultural heritage (Barham, 2003), or the newly emerging term of *Agroecology territories*. The latter encompasses three major domains: “adaptation of agricultural practices; conservation of biodiversity and natural resources; and development of embedded food systems” (Wezel et al., 2016).

3. METHODOLOGY

In order to answer the three research questions, the research has been designed within a time frame ranging from the past, through the present, and into the future. Before assessing the farmers’ perception and the lock-ins they are confronted with, it is important to get an overview of the region, its history and its inhabitants. That is why the first part, **Farming History of Pajottenland** explores how farming has evolved in the region and what we can learn from the past. In addition, we reinterpreted this history to sketch the lock-ins that were established through path dependencies, where they came from and how they became interlinked. Moving from the past to the present, the farmers were shown and involved in a network approach by setting up a **Farmer Field School**. Through this trial we tested a learning model for the network with the intention of learning by doing. The FFS revealed whether trust could be built among farmers being part of a collective approach in which learning took place, and whether or not they felt personally empowered on their farms. Finally, we looked at the common desired future among the actors within the emerging **Cereal Network**, and how we could cooperatively shape the network in order to move towards this wanted future situation. These three parts enabled farmers to get a concrete view on the network and its potentialities in order to ground their perception in reality. The research structure is summarised in Figure 5 below and the methodology for each of these stages will be discussed in the following sections.

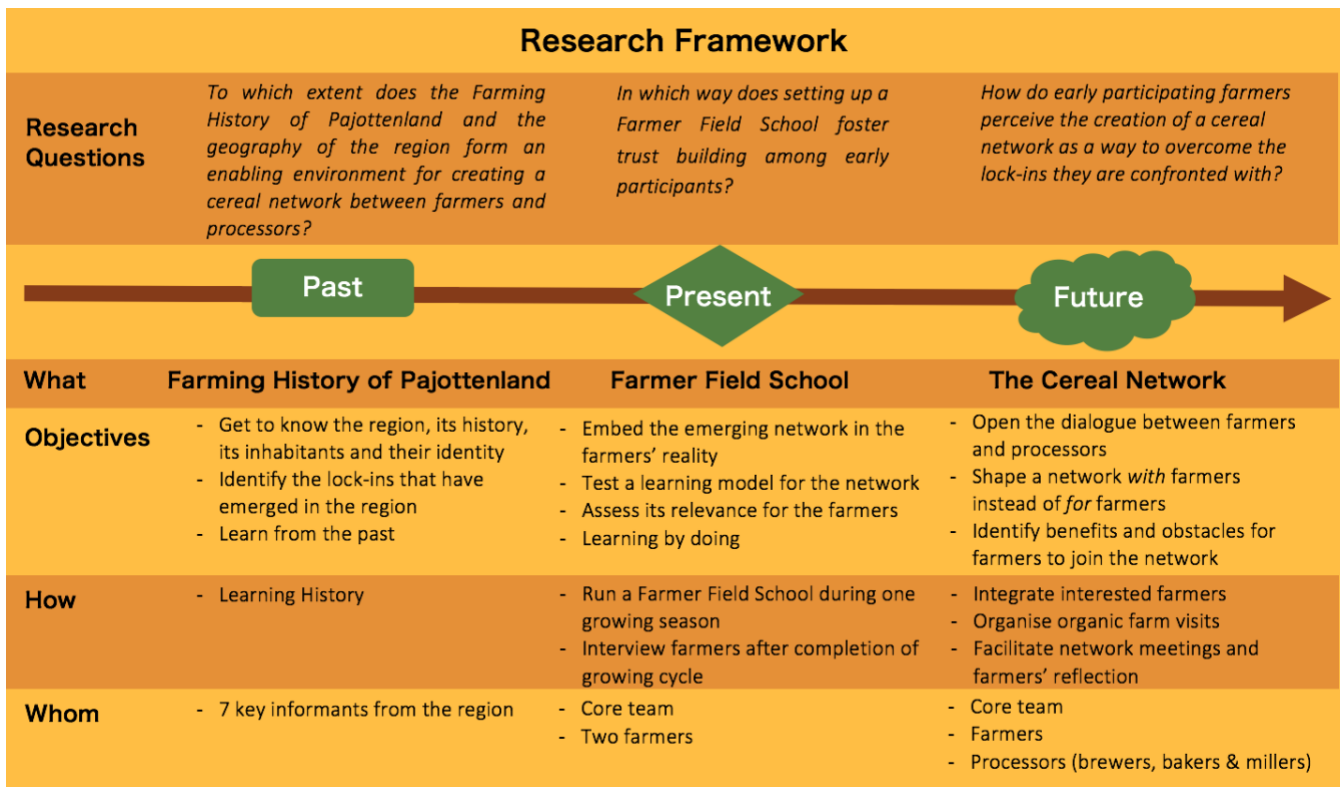


FIG 5: SCHEME OF THE RESEARCH FRAMEWORK

The overarching research framework throughout the study was that of a **Participatory Action Research (PAR)**. This type of research enables the participants, in this case the farmers, to be involved in and feel responsible for the design, the implementation and the interpretation of the conducted research

(Méndez et al., 2016). As Neef and Neubert (2011) state: “the research process may be seen as a continuous cycle of learning, reflection, and action, requiring regular feedback from actors and an occasional review of the relevance of research objectives and methods.” By using this methodology, we ensured concrete outcomes for the farmers by actively involving them in the development of the cereal network. We also made sure not to do so-called *extractivist* research – using participants to generate scientific results, but without returning anything concrete back to them (Baltazar and Visser, 2017). A small literature review and background was carried out on the topic of PAR and can be found in Appendix II.

3.1 PAST: FARMING HISTORY OF PAJOTTENLAND

In order to get an overview of the agricultural changes in the region from the 1950s until today, a historical research was conducted by the means of a **Learning History**. As defined by Kleiner and Roth (1996): “A Learning History presents the experiences and understandings of participants and tells the story in their own words, in a way that helps the rest of the organization move forward.” In our case, participants are key informants including retired farmers, consultants or citizens who have experienced the modernisation of agriculture over the last decades and who have an overview of the interactions and the trends in the region. The organisation, on the other hand, can be seen as the community of farmers within the region of Pajottenland. Building a Learning History encompasses six steps: planning, reflective interviews, distillation, writing, validation and dissemination (Roth and Kleiner, 1998). Hereunder every step will be developed individually.

The two main objectives during the **planning** phase were identifying the key informants to interview and preparing the reflective interviews. Identification was done by briefly presenting the objectives of the learning history to several people from the region – farmers, processors, researchers, others – asking them who they would recommend as key informants. Whenever the same potential key-informant was mentioned several times, (s)he was contacted by phone or per email and asked for his/her participation. In addition, an overview of who to interview was kept, ensuring that we got in touch with people from different backgrounds and with different opinions about agriculture. Table 2 lists the seven interviewed people, including the date of the interviews and their occupation.

TABLE 2: INTERVIEWED KEY INFORMANTS FOR THE FARMING HISTORY WITH DATE OF INTERVIEW AND OCCUPATION

	Date	Occupation
A	29/03/2018	Farmer (converting to organic), leading figure in the second biggest farmers union in Flanders (ABS)
B	03/04/2018	Farmer and miller’s son, worked for the agricultural ministry and very engaged in the region regarding farmer’s rights and access to land.
C	04/04/2018	Farmer (conventional), committed to self-processing and self-marketing of bread, pastries and dairy products
D	16/04/2018	Farmer (organic), leading figure for organic vegetable production and self-marketing
E	19/04/2018	Regional consultant on rural development
F	03/05/2018	Researcher, conducted a highly relevant socio-economical study during the 90s on farming styles in Pajottenland
G	15/05/2018	Farmer’s son and secretary of the main farmers union (Boerenbond)

An interview guide (Appendix III) was set up, listing the different topics to be discussed. This list enabled the interviewer to tick off the addressed topics during the interview, and to highlight remaining questions.

The **reflective interviews** were conducted as semi-structured interviews, using the interview guide as a frame for the needed information. During the interviews, the interviewer made sure that interviewees felt comfortable in telling their story, making them aware of its relevance for other farmers (Kleiner and Roth, 1996). All interviews were held in Dutch, the mother tongue of both interviewees and interviewer. Interviews lasted between 1h30 and 2h, were recorded with permission of the interviewees, and additional notes were taken in a research journal.

Once the interviews were transcribed, **distillation** was carried out by the student researcher to highlight the most important information. The interviews were compared between each other, similarities and contrasts were sought and recurring themes were identified. From distillation, three main periods and five themes could be distinguished. Interviews were compared on the basis of these themes, pointing out similarities and differences between them. This resulted in **writing** a first Learning History draft, based almost exclusively on the interview contents. Only a limited amount of external sources were added to clarify certain data. In addition, many citations have been used from the interviewees, written in italics and with their corresponding letter, referring to Table 2.

A first draft of the Learning History or Farming History of Pajottenland was presented to the seven interviewees for **validation**. For those who could be present, five out of seven, a meeting was organised on the 29th of May to discuss the draft, which had been sent to them by mail (Figure 6). During this meeting we conducted an exercise called *Timeline* from the PAR toolkit (Table 3), giving a framework to decide whether to validate or question what was written in the history. The outcomes from the timeline exercise are to be found in Appendix IV.



FIG 6: CARRYING OUT TIMELINE WITH SIX PARTICIPANTS 29/05/'18

Those who could not be present at the meeting commented on and/or verified the history by mail. In total three drafts were written before coming to a final version of the history.

Finally, the Farming History of Pajottenland was **disseminated** to all stakeholders within the network and to other interested persons. Some copies were printed and handed out, others were sent by mail. Farmers were specifically asked to reflect on whether they could identify with the history and if it was in tune with the evolution they experienced on their own farms.

TABLE 3: TIMELINE EXERCISE AND ITS METHODOLOGY

Timeline is a tool that is used to unite actors around a theme and let them tell the story over time, with the significant events or chronology they have experienced within a given period of development (Chevalier and Buckles, 2013). Timeline is conducted in four steps:

1. The topic and the time frame are defined for the exercise and the timeline is drawn by the participants on a flipchart.
2. Each participant thinks of what (s)he perceives as three major events and writes them down on individual cards.
3. Once all the participants have written down three things, all the cards are placed on the right spot on the timeline and each card is discussed within the group.
4. The timeline is analysed with the group and trends, patterns or mayor periods are identified. Additionally, actions can be defined for how to move towards a desired future and what to learn from the past.

The exercise is fully described in the Handbook for Participatory Action Research by Chevalier and Buckles (2013).

3.2 PRESENT: FARMER FIELD SCHOOL

A first scouting phase (Table 5) took place by mid-August 2017 in order to identify farmers who would want to participate in the network. The targeted farmers were those who were already adopting more sustainable practices, but without necessarily entirely committing to organic or agroecological farming. Criteria for selecting farmers from the region included their degree of adopting agroecological practices (van der Ploeg, 2008) and relying on their own understanding and experiences (Kerkhove, 1993). Farmer Tim listed five farmers who he thought may be potentially interested. He came along to the three first farm visits, introducing the student researcher in the region and showing how to relate to farmers. The miller from a restored heritage watermill in the neighbouring village provided another list of farmers who were milling their grain there and thus already involved in regional cereal processing. Finally, all visited farmers were asked if they had colleagues who might be interested in a network approach. According to the typology of farming styles as described in Appendix I, the visited farmers all belong to the first three categories (large scale mixed farms, typically mixed farms, direct sellers). For privacy, their names have been substituted to English names. A list of their farm descriptions and location can be found in Appendix V. In total eight farmers were visited out of whom two, James and Steve, accepted to take part in the project during the 2018 harvest season.

Together with Steve, a conventional farmer, and James, in conversion to organic, we proposed that our small group (James, Steve, Tim, Marjorie and myself) would form a Farmer Field School, sharing, generating and applying knowledge related to growing organic cereals. In practice, we proceeded by running through a full growing cycle of organic spring wheat on two fields. The objective of setting up a FFS was to test a learning model within the network and assess its relevance for the farmers. We continuously learned by doing at every step, adapting to changing conditions or newly revealed needs. At

the same time we assessed through observation and reflection how this model could benefit both the farmers and the network and how farmers behaved within the FFS.

The choice of spring wheat rather than winter wheat was made after visiting their fields for the first time, and assessing soil quality. Observing soil quality to be rather poor and the organic matter content low (1,08%), we decided to grow a cover crop during winter that could be ploughed under in spring. By doing so, we involved the farmers in assessing soil quality and we reduced the risk of crop failure. Before sowing, one meeting was organised to visit the cooperative mill with both farmers and to discuss the technical details for the cropping season: mowing the cover crop, ploughing, sowing spring wheat, harrowing and harvesting. As they did not have much organic farming experience, we handed out a technical sheet (Appendix VI) and discussed together what would be the best way to proceed. With regards to the PAR procedure and getting inspiration from the FFS approach, we invited the farmers to share their knowledge and experiences, enhancing mutual learning. In addition, we invited them to set up a field agenda (Table 4).

TABLE 4: FIELD AGENDA MENTIONING THE DATE OF THE GIVEN OPERATIONS

Operation	James	Steve
Fertilising	-	26/09/2017 (25 T/ha cow manure)
Sowing cover crop	24/09/2017	27/09/2017
Flail mowing cover crop	18/02/2018	-
Fertilising	24/03/2018 (25 T/ha cow manure)	22/03/2018 (14 T/ha cow slurry)
Ploughing	24/03/2018 and 08/04/2018	24/03/2018
Sowing	08/04/2018 (175 kg/ha)	25/03/2018 (175 kg/ha)
Harrowing	28/04/2018 and 10/05/2018	22/04/2018 and 10/05/2018
Harvesting	25/07/2018	24/07/2018

It was decided to use Epos spring wheat after consulting an organic cereal expert, a local bakery and a couple of farmers who had already cropped this variety. Moreover, the local bakery had previously made a special branding for the bread they made with the Epos variety and which was milled on an old nearby stone mill. The seed was bought from the cooperative mill that had one ton left from last year's harvest. After being cleaned, sieved and tested for germination rate, the seed was brought to both farmers in bags of 25 kg, enabling them to sow when conditions were optimal.

Weeding was done with a 6m wide tine weeder¹ borrowed from a neighbouring farmer. During the field visit on the 24th of April, field conditions were assessed and weeding techniques discussed. Preparations were made for a first harrowing trial, the day after the visit. In total, both fields were harrowed twice and field conditions were assessed before and after, both by the farmer and the student.

Finally, an agricultural contractor harvested both fields. The time of harvest was discussed with the student researcher beforehand so that farmer, student and contractor were all present during harvest. The grains of both farmers were temporarily stored in a wagon, belonging to Steve and weighed in order to determine the exact yield. The harvest of the traditional wheat landraces on Tim's fields was not part of the

¹ A tine weeder is a tool that is commonly used in organic farming for weeding entire fields mechanically.

FFS, but had its importance within the emerging network. Therefore, it will be briefly described in Table 5.

Once the growing cycle was completed, the grains stored and the farmers paid, Steve and James were asked in a last common interview to evaluate their experiences during the year in the Farmer Field School, what they had learned, what they would do differently, how to involve more farmers, etc. The interview was conducted in a semi structured way and by the means of guiding question, listed in Appendix VII. The interview lasted approximately one hour, was held in Dutch and was fully transcribed afterwards thanks to the voice recording.

3.3 FUTURE: THE CEREAL NETWORK

After setting up the Farmer Field School, it was important to keep other farmers informed about what was being done in the region to develop a cereal network. This made up the third part of the research: attracting interested farmers and reflecting together on how to shape the network.

Identification of potentially interested farmers was based on the same criteria as for the first scouting phase and farmer Tim provided an extended list of farmers to contact. Farms were visited during the second scouting phase between January and April 2018 (Table 5), presenting the newly emerging network and its objectives. The interested farmers were added to the network's list and informed whenever an activity or meeting was to be organised. Farmers were not immediately asked to join the network, but to consider what it could possibly offer them. Hence, the intention of the network was not to unite as many farmers as quickly as possible or to grow as many hectares of cereals as soon as possible, but to foster an improved and sustainable collaboration between farmers and processors.

TABLE 5: RESEARCH AGENDA MENTIONING WHAT WAS DONE, THE OBJECTIVES AND WHO WAS INVOLVED

Period	What	Objective	Who
August 2017	1 st scouting phase	Identify farmers for FFS	8 farmers
January – March 2018	2 nd scouting phase	Visit potential farmers for the network	12 farmers
02/02/'18	Cooperative mill's perspective meeting	Assess what we have accomplished up to now and discuss where we want to move from here	3 millers, 2 brewers, 6 farmers, 5 volunteers from the mill and 1 student
10/02/'18	Technical meeting and visit of the mill	Discuss how to proceed through the growing season and think about destination of the cereals	Core team, James, Steve, miller and baker
24/02/'18	Organic cereal farm Visit 1	Farm visit and discussion between conventional and organic farmers	Core team, 4 farmers and 2 bakers
28/03/'18	Organic cereal farm Visit 2	Farm visit and discussion between conventional and organic farmers	5 farmers, 2 students
21/04/'18	Field visit	Assess situation on the field and discuss weeding strategy	Core team + James and Steve
06/07/'18	Network meeting (in field and at brewery)	Present network's intentions, inform interested farmers and discuss how to improve network	26 people: farmers, brewers, millers and researchers
12/08/'18	Concluding interview	Assess how both farmers had lived the FFS, what they had learned	James and Steve

NETWORKING ACTIVITIES

Three activities were organised within the network: a perspective meeting for the cooperative mill, a farm visit to an organic cereal farm in the region, run by an experienced farmer, and a meeting with the entire network at the brewery to assess the current state and the desired state we want to move towards together.



FIG 7: DISCUSSION DURING THE PERSPECTIVE MEETING 02/02/2018
IMAGE BY CATHY SZAFRANSKI

After one year of milling within a cooperative, the time had come to take a breath and to think about what had been achieved and what was still to come. During the **perspective meeting** (Figure 7) all participants, including farmers, millers, bakers, consumers and other interested people, were invited to share thoughts and ideas on the cooperative mill. This was the ideal moment for inviting interested farmers and discussing the potential for a network. The farmers were encouraged to express their

hopes and doubts concerning the closer collaboration with the mill. Moreover, the brewers attended the meeting too, connecting for the first time with the millers and the farmers and pointing out their engagement in the network.

Visiting an experienced organic cereal farmer (Figure 8) had its relevance because the network brings together both conventional and organic farmers, both young and old. One of the network's objectives is to enable a dialogue between conventional and organic farmers within a safe learning space. The hosting farmer highlighted his experiences, his approach and the machinery he uses. Other farmers could compare and discuss the techniques and practices they use. This activity was organised a second time for interested farmers who did not have the chance to attend the first visit.



FIG 8: ORGANIC CEREAL FARM VISIT 24/02/'18



FIG 9: FIELD VISIT 06/07/'18

The third and last activity, the entire **network meeting**, was divided into three parts: (1) visit of the two field trials, (2) scope and vision of the network, presented by the brewers, and (3) a farmers' reflection on the pros and cons of the network and how to shape the network so that it benefits the farmers. The invitation that was sent out to the farmers and processors of the network can be found in Appendix VIII. During the **field visit** (Figure 9), both plots were visited and described by the responsible farmer; they explained the process and approach of the field trials, what they had learned from

it, and what to improve for the next growing season. This event provided a clear example to interested farmers of how we conducted a Farmer Field School and what results it gave in the field.

Secondly, the **scope and vision for the network** was developed by the processors in the brewery (Figure 10). Moreover, things were made concrete by the brewers in terms of the desired quantity and quality, the engagement of the processors and the price agreements. The brewers, millers and bakers outlined how they work and which requirements they have towards local cereals. In the meantime, farmers could enter into dialogue with the processors to make sure that they understood each other well and got to know better the conditions in which each of them operates.



FIG 10: NETWORK MEETING AT THE BREWERY 06/07/'18



FIG 11: FARMERS' REFLECTION 06/07/'18

Last, but not least, a **farmers' reflection** (Figure 11) was organised to reveal farmers' opinions and views of the network. In order to foster free exchange, the conversation was held only with farmers and with the help of a professional facilitator, urging everyone to express openly their doubts, hopes, fears or other feelings towards the proposed network. The methodology that was used for this conversation is called Max-Min (Appendix IX) and is an adapted version of the Force Field Analysis, developed by Frederick Lewin in 1947. In collaboration with the facilitator, the methodology was discussed and set up in such a way that it would both empower farmers in shaping the network and generate useful data for the research. The facilitation sheet that was made up by the facilitator can be found in Appendix X. The exact steps of how the Max-Min exercise was conducted are described in Table 6.

TABLE 6: MAX-MIN EXERCISE AND ITS METHODOLOGY

The objective of the **Max-Min** exercise, applied to our case, is to reveal which elements in the network attract and benefit the farmers and which ones are more of an obstacle to join the network. The process is conducted in four steps.

- Step 1: "Discuss with your colleague which personal chances or opportunities you see in joining the network". The revealed elements are discussed within the group and listed on a flipchart.
- Step 2: "Discuss with your colleague which obstacles or threats do you see in joining the network". The revealed elements are again discussed within the group and listed on a flipchart.
- Step 3: Each participant can rank the two elements in each list with highest priority.
- Step 4: "Pick one or more obstacles/threats in a group of three and discuss, based on you own experience, a possible solution or improvement." Suggestions are written on cards and added next to the obstacle it addresses. All suggestions are presented and discussed in the group.

PERSONAL TOOLKIT TO GO OUT TO THE FARMS

In my personal toolkit (Figure 12) for going out to the field and meeting new farmers, I carried the following objects: first of all, a **roadmap** of the region.

Secondary, I chose to wear **working clothes** and **solid shoes**, based on a notion that the way you are dressed might influence the perception your host has of you and thus the way (s)he will talk to you. Correspondingly, I tried to keep in mind that the first contact is crucial as there may not be a second chance. A proper way of gaining trust is to know the local language and nuances of expression, and possess some **local information** as for instance the weather predictions, regional news or



FIG 12: TOOLKIT TO GO OUT TO THE FARMS

recent events (Neef and Neubert, 2011). According to Levin and Ravn (2007), engaged research demands to merge partly into the world of the involved stakeholders so that they do not perceive you as an outsider or a potential threat but as a friend or a partner. The most important point was to always carry my notebook or **research journal** with me, in which I wrote down all useful information. In addition, to ensure good note taking, I always carried a couple of **pencils** and **pens** with me. Finally, I took a **camera** to document my observations in the fields or on the farms.

With this preparation, I was ready to launch into an engaged, appropriately aware, and productive field activity and information exchange with farmers. Although I was strongly committed to the goals and anticipated future improved situation, it was essential to allow the network and its objectives to grow from the participatory process with all stakeholders. Therefore, I had to commit even more to objectivity during the process, while also maintaining my role of coordinator and facilitator.

3.4 ANALYSING QUALITATIVE DATA

Throughout the research, the PAR specific **iterative process** (Figure 13) of observation, reflection, planning and action (McIntyre, 2007) was carried out, rethinking continuously the research process and adapting it to the current needs of the participants. Decisions were made by consensus and every step in the process was documented by the means of note taking, voice recording and photographs. In addition, information was continually collected and written down in a research journal.



FIG 13: PAR ITERATIVE CYCLE

SOURCE:

[HTTPS://WWW.MRSRICE.NET/RESEARCH](https://www.mrsrice.net/research)

Collected data was listed and analysed in order to bring up repeated ideas, common elements, contrasting ideas or meaningful observations. In this regard, the processing methodology is similar to that of a Grounded Theory, organising a collection of qualitative data into concepts and categories, giving birth to a new theory (Strauss and Corbin, 1997). However, the objective of this research was not to come up with a new theory, but rather to learn by doing and continuously improve the emerging network we are setting up, assessing its ability to empower and benefit farmers. In addition, mind maps were drawn in order to classify the collected data and to distinguish different themes and their interlinkages. An example of these mind maps can be found in Appendix XI.

A challenge that came up during data collection and processing was to treat data based on personal interpretation. For instance, according to Louah et al. (2017) many lock-ins are cognitive in nature, hence difficult to objectivise as they are subject to interpretation of the researcher. In order to ensure the integrity of the research, reflective distance and critical analyses were performed, separating the process of involvement from the accompanying reflexive process (Levin, 2012). Whenever confusion arose about an interpretation, it was checked, discussed and validated by the members of the core team (Tim, Marjorie and myself). Sometimes, observed facts needed to be handled with particular care and delicacy, for instance, when they were of emotional or personal relevance to a stakeholder. In this regard, collected data was processed with the highest respect, taking into account the integrity of the different stakeholders involved, and to avoid damaging the climate of trust established between the stakeholders and the student researcher. In this concern, Levin (2012) stresses the moral, ethical and professional responsibility participatory action researchers have towards the participants.

4. RESULTS AND DISCUSSION

During the different activities and within the three parts: past, present and future, numerous data were collected. The data have been processed as described above and will be presented in the following sections. In order to improve readability and comprehension of the entire document, we decided to merge results and discussion in the same chapter and to present the findings within the three parts and according to the different organised activities. At the end of each part, a small conclusion will be given, answering the corresponding research question and giving recommendations for future networks to develop, based on our experiences. Afterwards we will zoom out and take a look at the identified lock-ins and how they are interlinked, resulting in answering our third and main research question. Finally, we will finish with discussing the used methodology and the integrity of the results as well as giving recommendations for further research.

4.1 PAST: FARMING HISTORY OF PAJOTTENLAND

INTRODUCTION

From the middle of the 20th century onwards, the Farming History of Pajottenland can be divided into three main periods, as a result of the major events which shaped agriculture in the region. The first period (1950 – 1970) is marked by the transformation of the large landlord and peasant farms to the typical mixed family farms. During the second period (1970 – 1990), the farms are subject to industrialisation and expansion, both at the farm management level, and at the input and output levels. The third period, finally, describes farming from the 1990s to the present day. During this period farming is under pressure by stricter rules and confronted with the introduction of electronics and digitalisation, resulting in a further decreasing number of active farmers. In the following text, these three agricultural periods will be discussed more in detail through the elaboration of five themes: farm management, agricultural economics, rural and agricultural policies, agricultural unionism and knowledge exchange.

'50-'70: FROM PEASANT AND LANDLORD FARMS TO MIXED FAMILY FARMS

After the Second World War, the traditional farms undergo a set of serious and irrevocable transformations, driven by government policy and new technologies, influencing farming practices until today. Tractors and milking machines replace manual and family labour, soon taken over by a series of mechanised farming tools. Mechanisation amplifies the *zero hunger* policy driven by the trend of expansion and production maximisation.

FARM MANAGEMENT

Until the emergence of the tractor among farming families in the early '60s, agriculture in Pajottenland was defined by two farming types: on the one hand, large landlord farms with about 100 ha of land and a lot of workers coming from neighbouring villages, and on the other hand, self-sustaining family farms with a couple of cows and a small vegetable plot. *Here in Heikruis and Kester* (two villages), many

families had a cow or two and a big garden. I even saw families going out with their cows to let them graze along the streets (A). The workers who sustain their families on small plots become redundant when mechanisation is introduced, and are heavily impacted by the emergence of tractors and milking machines. Most of them quit farming and search for a job in neighbouring mills, larger dairies or workshops, but those who have the means expand their piece of land and start a small business, relying on a tractor and family labour. This is how the typical family farms emerge in the region. They will be the main food producers for the next 50 years.

At this time, a regular farm in Pajottenland is a mixed family farm with a wide range of activities. On average, they own between 5 and 20 dual-purpose cows, Holsteiners (typical milk breed) were not known yet at the time. They have a couple of meadows and a small number of plots where they cultivate wheat, barley, potatoes, beets and oats. *In former times, farmers were weeding, seeding and harrowing turnips by hand* (G). These are sown as a secondary crop, after the main harvest and are used, like barley, for animal fodder.

Farm sizes are very diverse within Pajottenland. In the South-West farms are far bigger than those in the North-East, closer to Brussels. The latter specialise in fruits and vegetables for the fresh market in the city. *Strawberries were a big business in the area. In former times, every farmer in Vlezenbeek (village close to Brussels) had about 10-20 acres of strawberries on his farm. [...] In the meadows too, fruit trees were grown: apples, pears, cherries... And cows were grazing under the trees* (C).

AGRICULTURAL ECONOMICS

During the '60s, agricultural production is still strongly embedded in the local market in terms of inputs and outputs. Farmers strive for a more or less autonomous business; they produce most of their animal feed themselves and sell their products, milk, potatoes and cereals to local processors. However, the number of dairies was already seriously reduced during the war and only the bigger ones survived. A couple of years later the mills undergo the same trend: *There were about two mills per village in former times. They weren't all milling flour, only one third did flour, the others made fodder. And each village had its bakery too* (A). Between the '70s and '80s, the mills are indeed strongly reduced in number and only few survive.

On-farm sales are common in the area and many products are sold at the farm or from door to door. *In the area, there have always been on-farm sales, already in former times. The farms had each their days where they had fresh milk, butter or buttermilk for sale. People didn't go to supermarkets yet; they knew where to go for good products. [...] Potatoes were sold that way too. They were stored in the basement and people came to get them at the farm* (G).

RURAL AND AGRICULTURAL POLICIES

After the war, countries aim at increasing their agricultural production in order to reach a *zero hunger* policy. On the 25th of March 1957, six countries sign the treaty of Rome: Italy, Belgium, Germany, France, the Netherlands and Luxemburg, resulting in the creation of the European Economic Community

(EEC) on the 1st of January 1958. Correspondingly, the Common Agricultural Policy (CAP) is created in 1962, opening up the market for six agricultural goods: cereals, pork, eggs, poultry, fruits, vegetables and wine. This policy is based on three main pillars (Relaes, 2011):

- Common market: no closed borders between the markets of the member states.
- Community preference: products from within the EEC are financially and economically privileged, compared to those coming from outside the common market.
- Financial solidarity: financing the CAP is done with European money.

The same year, Belgium establishes an agricultural investment fund that selectively supports those who plan to enlarge their farms. Therefore, modernisation and enlargement go hand in hand. In addition, Sicco Mansholt, a Dutch farmer and European agricultural minister in office from '58 to '72, reinforces this development and is viewed as the architect of the European agricultural policy. He sets out the lines of what will become the European trend in agricultural development over the following years and until today.

AGRICULTURAL UNIONISM

The agricultural unionism in Pajottenland has never been ruled by one single organisation or movement. Thanks to the landscape and fertile soil in the region, farmers have been able to establish strong family farms, to maintain soil fertility and secure their autonomy. In addition, their natural pride helps them to remain independent from farming organisations and associations that offer their support. Indeed, they are rather stubborn and like to do things their way. Moreover, their approach explains why Boerenbond (BB), the main Flemish farmers union, has never become dominant in Pajottenland as it has in other regions. *BB was only one of many actors in Pajottenland, not the main one. Historically, BB influenced only part of the farmers (E).*

Algemeen Boerensyndicaat (ABS), the second largest farmers union in Flanders, on the other hand, has been strongly embedded in Pajottenland from its start. They separate from BB in '62 by organising actions against the capitalist and corporate-oriented policy of BB. ABS handles a more liberal oriented policy through which they ensure the rights of the private farmers. In this manner, they are very similar to their Walloon colleagues of the Union Professionnelle Agricole (UPA) which had defended the rights of the farmers in the region, before ABS was established. It was the same UPA which organised the first farmers' demonstration in Leerbeek, 1959.

Some farmers even felt more Walloon than Flemish in their way of farming. There wasn't a closed border between Pajottenland and Wallonia. They had more affinity for Wallonia and Henegouwen (Walloon neighbouring province), than for West Flanders (Flemish province), for sure (F).

You could definitely feel the influence from the Walloon farmers in the region. Many Flemish farmers had moved to Wallonia and came back here to preach their passion. Eli Van den Keybus, a trendsetter within ABS, lived a couple of years in Wallonia for instance (A).

KNOWLEDGE EXCHANGE

Within Pajottenland, BB and UPA are the first unions to coordinate knowledge exchange among farmers in a more formal way. BB organises Farmers Guilds and study clubs in which farmers gather in

each village and each technical domain to share knowledge, receive new information within their domain and to ensure social cohesion. UPA too organises trainings and workshops for farmers. *In the region, UPA, the Walloon agricultural organisation, organised training for farmers which were given by Flemish-speaking professors. BB too, organised training, but they were less popular (A).*

Informal cooperation has never been a big topic in Pajottenland. Farmers may help each other during the harvest period or may exchange a machine when one is broken, but not on a regular basis. *Informal cooperation always existed among farmers, but farmers are getting more and more ingrained in a capitalist system, as a process that reinforces itself, turned them into competitors, whether they liked it or not (B).*

'70-'90: INDUSTRIAL BREAKTHROUGH

The small farmers all quit farming and the surviving ones all scaled-up between the '60s and 2000 to farms of about 20-25 ha and with 20-25 milking cows. Of course there were a couple of them a bit smaller or bigger, but that was the average (A).

The gradual industrial breakthrough brings a shift in farming management: certain farms aim at producing large quantities for industrial processors, compared to others who specialise in responding to the local demand for food. They add value to their products by processing on-farm and they sell on farmers markets or in farm shops.

FARM MANAGEMENT

The first major shift in farm management is the specialisation of farms; dairy cattle are separated from beef cattle, and animal farmers are separated from arable farmers and vegetable farmers. Side activities such as pigs or chicken keeping, making butter, or selling potatoes on the farm disappear bit by bit in order to give space to one or two remaining activities. A second shift is the emergence of maize production on the farms, substituting beets, barley and turnips in the crop rotation. *Maize replaced all the former grown winter fodders such as barley and cabbage (G).* In addition, the farmers develop their machinery, as growing crops becomes more and more mechanised: manure trucks, hoeing machines, spraying machines, potato harvesters, etc. *Until I was thirty years old (early '70s), we harvested potatoes by hand (G).* Initiatives such as machine sharing do not function properly in Pajottenland. Farmers prefer to own their own equipment or to have a farming enterprise do the job. From the '70s onwards, these farming enterprises become more common and influence largely farming practices.

AGRICULTURAL ECONOMICS

On the input side, farmers become more dependent on industrial products. They buy their seeds, fertilisers, pesticides and animal fodder from large enterprises and therefore, successively lose their farming autonomy. During the '70s and '80s large fodder enterprises enter the market and convince a significant amount of farmers to buy their fodders instead of producing it themselves. Many Dutch companies discover this new market and become leading players in Flanders. *The Dutch came here to sell their feed, went to Smeets (local mill) for a new carry of cereals and took it 200-300 km down to the Netherlands where they*

processed it to fodder and brought it back here at the end of the operation (A). The local cereal market loses its relevance and the whole cereal chain becomes bigger and more anonymous. Only a couple of local mills and dairies remain where farmers can deliver their products.

Besides the farms that commit to industrial production, another group of farmers undertake an opposite movement and commit to self-marketing and self-processing. These are not new phenomena, but are reinvented in some way and get a more particular attention within the farms' management. Farmers focus on citizens from Brussels who enjoy the countryside and like to visit the different on-farm shops, dairies, bakeries, etc. *Alongside the roads in Pajottenland you see signs everywhere for farm shops. The closer you come to Brussels, the more signs you see (F).* Generally speaking, the women ensure the on-farm processing, as it involves less physical work. Off-farm employment is socially still little accepted until the beginning of the 21st century, but this rapidly changes afterwards.

Lead by Boerengroep, a local farmers' collective, a new initiative takes off in 1981, the farmers market in Gaasbeek, one of the villages close to Brussels. It is the second farmers market initiated in Flanders, after the one in Baaigem, established in '78 by another collective. The farmers market reinforces the trend of self-marketing and self-processing and gives the farmers more esteem for their work. From the early beginning until today, they have a price commission, defining the price for each product at the start of the market and to which all farmers have to commit. *You cannot go under or above the defined price. Farmers like to have fixed prices, it tackles too heavy competition. Moreover, it increases the quality of the products as it is the only way of competition allowed (C).*

In '81 we started the farmers market in Gaasbeek. At least ten farmers gained a good living thanks to the market and are, financially speaking, stronger today than their colleagues who own 500 cows. They have more money and are more resilient. [...] For sure, these farmers all of a sudden had a better life. They didn't need to go to the bank any more, they took care of it themselves. [...] The farmers market in Gaasbeek is still pure, only farmers sell their products. This isn't the case for any other farmers market any more (C).

Different aspects merge on the farmers market: managing prices, calming down the trend of expansion, managing diversity, social interaction, direct contact with consumers, trust, etc. It is a mixture of different elements (B).

RURAL AND AGRICULTURAL POLICIES

After the first decade during which the CAP mainly commits to increasing production, Europe suddenly faces serious overproduction, starting in the early '70s. Hence, Europe introduces export subsidies in order to get rid of the enormous amounts of milk and butter, which pile up in the countryside. All of a sudden, farmers are not producing to sustain their own village, region or land any more, but become world producers. Having to sell their products on the world market, they are submitted to the vagaries of this new market. *As soon as the tractor appeared and the politic of Mansholt entered into force, farms could only grow bigger because they had to deliver the world market (A).*

Not surprisingly, 100.000 farmers from all over Europe gather in the streets of Brussels in '71 to demonstrate against the Mansholt Plan. They do not agree with the three main principles of the plan: remediation, investment support and subsidies linked to training. *Farm enlargement was required in order*

to benefit from financial and technical support. As a result, farms ended up being less mixed, there was more specialisation and fewer farms in general (B). More demonstrations follow and the indignation among farmers is obvious. The farmers unions take an active role in the negotiations and do not hesitate to call for action. *Our Farmers Guild took part in every demonstration. [...] There were farmers from different organisations and syndicates: BB, ABS, UPA, etc., marching side by side. Sometimes I would climb into a farmer's tractor linked to another syndicate, just to say that we got along very well* (G).

Furthermore, Belgium introduces the same year the VAT, which has serious implications for farmers. There had always been some sort of tax, but with less influence on direct sales. The emergence of VAT accelerates specialisation on farms and makes many farmers quit their side activities, such as strawberry or butter production. All of a sudden all activities are taxed in the same way and farmers are confronted with an increasing amount of administrative tasks. *More than half of the farmers in Vlezenbeek were growing strawberries, but once the VAT arrived many quit their side activities. After that, the warehouses came and farmers could only grow bigger and bigger* (C).

On the landscape level, many changes threaten the region during the '70s. First, the large hospital Erasmus is built in '71 on the border between the city of Brussels and Pajottenland. Secondly, plans emerge to build a new highway (A8) between Brussels and France, cutting Pajottenland in half. Farmers and citizens protest heavily in '75 against these plans and responsible politicians finally give in, building the highway further south. A planned scrapyard is also cancelled after protest from the local population, showing their reactions towards plans that threaten the area. However, the worst is yet to come. In '78 the Walt Disney Corporation presents the plan to create a Disney attraction park around the old castle in Gaasbeek, at that time still owned by the state. Luckily, a couple of politicians and heavy protest from Wallonia counters those plans. As Belgium is a federal state, the same amount of money has to go to Flanders and Wallonia, which would have been very difficult with such a large investment. Soon after, new regional plans are developed protecting agricultural land from being turned into industrial or housing land.

AGRICULTURAL UNIONISM

Agricultural unionism sees an unquestionable evolution during the period from 1970 to 1990. ABS broadens its activity in the region, establishes a proper secretary and has many active members. BB, on the other hand, reconsiders its internal organisation in '71. The three internal structures including farmers, farming women and farming youth are each divided in two parts, one focusing on technical aspects and the other on social issues. *For the social part, they discuss topics such as what to do with children on the farm, health, traffic, insurances, etc.* (G). Thanks to this, BB builds a strong sociocultural movement, bringing farmers closer to the remaining rural population. *The whole cultural aspect was overall the best thing BB did. They created cohesion among the population, but also linked them further to BB* (D).

Towards the end of the '70s, a couple of farmers gather and form the Boerengroep as a response to the liberal-oriented policy within ABS. They form a socially engaged informal group, to the example of the Boerengroep in Wageningen, and take part in several demonstrations. *ABS was rather corporatist, they*

defended the rights of the farmers, but weren't very socially engaged. They happened to be very conservative and anti-BB, but not necessarily progressive. They pleaded for private property, Boerengroep on the other hand was much more socially and communist inspired (B). Boerengroep never became a formal organisation or movement, but their biggest achievement was the farmers market they established in Gaasbeek in 1981.

The introduction of the European milk quota system in '84 creates tensions within ABS and finally leads to the separation and creation of the Flemish Agrarian Center (VAC), led by three leading farmers in '85 (Coppein, 2005). In the beginning, VAC carries three pillars within its organisation: a farmers union, a social movement (better collaboration among farmers) and a service centre, but only the latter survives.

In the beginning, there was much protest against BB and ABS and for a different agricultural policy, but as years went by and no other policy came into force, only the VAC service centre survived, helping the farmers to deal with the current policy. In that way, it became more of a form of assistance, rather than a farmers union (D).

Farmers do not mind the complex situation of the farmers unions in Pajottenland. They do not commit to one single farmers union, but shift from one to another when they like. *Some of them have a membership in three different organisations in order to get the best out of it: to benefit from insurance at BB, part of VAC for the services they provide, and ABS because their neighbour is part of it (D).* Even within families, men and women are sometimes divided: *In certain families the man would be absolutely against BB and the woman would be part of the women's association of BB, nothing exceptional in Pajottenland (E).* Farmers know very well where to obtain the best information or the most effective support, they rather choose what fits best their needs.

KNOWLEDGE EXCHANGE

The UPA organises training until '75, after which they quit their activity in the region. In '78 the ABS takes over these tasks and creates the National Agrarian Centre (NAC). Not to be confused with the VAC, this emerging organisation also provides training, technical assistance and extension services, but which only becomes active in the region seven years later. Within BB, the Farmers Guilds are organised in different groups per municipality, specialised in particular topics: poultry, dairy, cereals, etc.

Farmers Guilds were about knowledge exchange, professional courtesy, farming excursions, technical magazines, reunions in groups or between several groups and with a guest speaker, or technical training during wintertime. [...] Training enabled farmers to get to know each other better and to ask questions: "did you already experience this or that, I'm confronted to this and that..." Such contact among farmers was at least as important as the technical knowledge they gained. What they got from each other was the most essential (G).

The ministry of agriculture organises assistance in different forms too. They create model farms where new varieties are tested and the most modern techniques are demonstrated to the interested farmers.

'90-'18: FROM FARMER TO ENTREPRENEUR

During the period from 1990 to 2018, agricultural industrialisation continues and drives the remaining family farms further apart from the industrialised farms. In addition, this period is characterised by a decreasing number of farmers, mainly due to growing administrative and economic pressure, increasing input prices and decreasing delivery prices. As a reaction to this trend, certain farmers continue self-processing and self-marketing their products, but even among them, many quit.

FARM MANAGEMENT

The modernisation of the farms, already initiated on certain farms during the previous period, now reaches all the farms. *Thanks to the conservatism and pride of the local farmers, certain traditional farming techniques remained longer in this area compared to other areas (E).* However, all of these techniques disappear during the '90s because of dominating modernisation. Moreover, the introduction of electronics and robotics, in the early 21st century, leads to an even greater shift from farmer to entrepreneur, having to deal with computer-managed machines. As a consequence, no space is left for diversity on the farm. The entire agricultural system tends toward a maximisation of production: dual-purpose cows almost totally disappear, they only remain on a handful of farms, fodder ratios are calculated in such a way that cows assimilate the food as quickly as possible and turn it into as much milk or meat as possible. Thanks to higher use of inputs, pesticides and fertilisers, crop rotation can be shortened to benefit specialisation. Even self-marketers specialise and search for niche markets to which they shape their entire production.

AGRICULTURAL ECONOMICS

Only a few local processors manage to survive within the trend of maximisation and industrialisation. They are overtaken by export-oriented processors such as the potato industry, dominated by Lutosa, or the vegetable freezing industry, coming over from West-Flanders but disseminating throughout the entire country. The remaining enterprises to which farmers sell their products are Aveve (retailer owned by BB), the sugar factory in Tienen, Dobbeleer Mills in Halle and Olympia dairy in Herfelingen. Potatoes are almost exclusively grown under contract and the cows go directly to the slaughterhouse. *It used to be all small business managers the farmers were dealing with on regional scale. Today only the big ones survive who have largely transcended province borders (E).* Most often, the same companies provide animal fodder, pesticides, fertilisers and seeds, and are at the same time buying up the harvest of the farmers. Sometimes they lock the farmer into an economic squeeze and when the farmer goes bankrupt, they take over the business. Of course, the farmer can stay on the farm, but only as an employee.

In former times, the farmer was dealing with economics, he marketed his products himself and was a price-maker. He sold his cows to the animal merchant, his cereals to the mill, etc. Today he doesn't know any more which price he will get for his milk or what his cow will be worth at the slaughterhouse, he becomes a price-taker (A).

Farmers became price-takers from the moment that industrialisation came into force at in- and output side. The farm remained a family business, squeezed by the industry (E).

Many farmers get into financial troubles as their salary is subject to high fluctuations due to heavy competition, the free market, shrinking delivery prices and increasing input prices. *Food wasn't more expensive in the 60s and 70s, but at least we gained a living from it. [...] Food becomes too cheap. A farmer doesn't get a single euro any more for a kilogram of pork. The problem is that the pigs aren't owned by the farmers any more, the fodder industry owns it all. Chicken, beef and milk will most likely be the next ones to follow that trend* (C). Farmers have to choose between a continuous expansion and product maximisation of their farms, or a radically opposed way: self-processing, self-marketing, organic production or any other niche where they can ensure a proper living. *Indeed, many farmers quit. And when their sons take over, they do it as a secondary job because you don't make a living any more with 20-30 ha. Only the ones who remained small started to grow organic or who reached a niche market by growing vegetables. [...] For me, farmers like us aren't paid enough. After all, we ensure people's health* (D).

Things got much better after we joined the farmers market in Gaasbeek and we started our own on-farm dairy and bakery. Now my kids own a proper salary, and me too (C).

RURAL AND AGRICULTURAL POLICIES

In the year 1992 the CAP undergoes its first reform, shifting from market-driven support to production-driven support. Moreover, it encourages farmers to produce in a more environmentally friendly way. Only from 2003 onwards, the production-driven support (coupled support) is slowly transformed into direct payments (decoupled support), according to quality rather than quantity of production. Rising environmental awareness leads to the establishment of the Nitrates Directive in 1991, giving birth to the Belgian Mestactieplan (MAP) emerging in 1993. Following the new directive, farmers are bound to a certain amount and frequency of fertilisers or manure they can bring out in the fields. *Helicopters were flying round to check whether farmers would be using fertilisers when they weren't allowed to* (G).

Farmers are more heavily controlled on their practices and are obliged to accomplish a continuously increasing amount of administrative work. *This is one of the reasons why farmers got sick of their job. Even those whose farm was running well, suffered from never ending administrative tasks as they had never followed any administrative training. They were running in circles with their documents and couldn't keep track of what was happening* (G). In addition, fines become higher for those who are not in line with the rules: *taking away their subsidies was a heavy punishment as these were essential for their survival. Farmers didn't understand why they would lose their subsidies if they weren't in line with the fertilisation regulations. Actually, it was a means of the government to control the farmers, making them dependent on subsidies. It gave rise to moral stress and discontent among farming families and made farming become less attractive to potential farm successors* (G).

Things get even more complicated with the introduction of nature reserves and management agreements, aiming at a nature-inclusive way of farming. *Not a single farmer was happy with these measurements, it only increased the number of rules and regulations each was confronted to. They wouldn't accept the fact that an external body would come and tell them how they had to farm in order to preserve*

the environment and the landscape. According to the farmers, they were dealing the best with the landscape, and this since many centuries (F).

The biggest farms proportionally get the most governmental support, even though it is mostly these farmers having the largest impact on the environment. The politicians, bankers and industrial managers keep on promoting expansion and production maximisation. *What I don't understand is why the big ones always got all of the attention instead of the family farms as ours, and there were so many in Flanders at that time. We never asked for any financial help, we were managing on our own, whereas those big farms always needed more support. A farm of 500 cows isn't profitable neither, that's what I can't believe (C).*

I know a farmer in Kester and he tells me that his son wants to take over. They had 40-50 cows and he says he will renew his old barn and build one for 60 cows. I tell him that if he takes care of it, he'll perfectly manage to earn good living. However, going to the bank, they say they'll only give him money if he builds a barn for a hundred cows. I'm not joking. The farmer has no choice, he takes 100 cows, doesn't eat, doesn't know where to put so much manure and has a whole lot of problems. And that farm was running so well before, it's unbelievable how they managed to destroy it (C).

Those farmers with huge farms, you should photograph them today and then again in five years and compare how they evolve over time. They think they'll conquer the world with their cows, but it won't be true. I know many farms where there are problems because of too much work. We all believe we can do more than we really can (A).

Even though export is not directly subsidised any more, Europe is still aiming at export-oriented production. The GATT negotiations in '94 and the creation of the World Trade Organisation (WTO) in '95 illustrate this trend. Later followed by TTIP and CETA to improve and expand free trade. *Europe takes an important role in these negotiations. The farmer gets something in return, a small compensation, but in the end, he remains the main victim (G).*

AGRICULTURAL UNIONISM

The three main union movements within Pajottenland remain BB, ABS and VAC. The latter extends its activity during the '90s, mainly thanks to its proper extension services and accountancy support. The high farmers' involvement in farmers unions, as it was the case during '70-'90, is shrinking due to a decreasing number of farmers and hence an increasing distance between those who remain. Moreover, the new generation of farmers is less interested in farmers unions. *Young farmers are only to be found in professional associations within their domain, but apart from that, you won't see them any more (E).*

KNOWLEDGE EXCHANGE

This last period bears serious modifications in terms of knowledge exchange. From the early '90s onwards, extension services change from being state-organised to being dominated by the private sector. *Extension services organised by the ministry of agriculture has actually almost entirely disappeared due to a lack of funding (G).* After the introduction of the MAP, advisory services altered from technical and economic-oriented advice towards support to cope with the new and more complex regulations. These services become a means of supporting the farmers in how to deal with the growing amount of administrative tasks. The remaining technical advice has to be paid for, or is organised by companies selling

agrochemical products or animal fodder. The companies send out private consultants who must convince the farmers that their products are the best. *We're not deciding anything ourselves any more. A consultant with a university degree comes by and tells us what we need. Of course, you can refuse to buy their products, but then you'll have to deal with it yourself and find your own way. Each year their products change and you're not allowed to use the previous ones any more* (C).

On the other hand, a handful of agricultural research centres exist where farmers can get advice or take part in trainings. In the region, the centre for fruit production in Roosdaal/Pamel invites fruit growers and other farmers during for specific meetings or trainings. Other agricultural centres are situated in the main growing areas of Flanders but are, unfortunately, too far away from Pajottenland. Even the close by Walloon centre CARAH is not accessible for the farmers because of the language barrier, lessons being all in French.

The decreasing number of farmers has its effect on the Farmers Guilds within BB too. These are restructured and instead of organising a meeting in every village or small region, they have to cover larger areas and are therefore centralised to make their work more efficient. *Only few Farmers Guilds still organise individual accompaniment by organising four meetings a year. Today it is all organised by larger entities and one Farmers Guild takes the lead over a larger area* (G).

In certain cases, knowledge exchange happens directly among farmers. The farmers market in Gaasbeek is, for instance, a catalyser for knowledge exchange and stimulates more farmers to commit to self-processing and self-marketing. *We initiated a trend by organising the farmers market and now many farmers have followed our example. Some of them did better than others, but often the wife goes working outdoors* (C). On the other hand, self-processing and marketing is not accessible to everyone: *You have to be willing to process and market your products and the way you market them is crucial. You need to establish a good contact with the consumers* (C). Some farmers are more reluctant to copy their colleagues and the first organic farmers were, for instance, seen as outsiders, even though they earned a good living.

When I converted to organic, the other farmers definitely noticed, but they wouldn't come to visit my farm. They wouldn't copy what I do. [...] Although I have a good relationship with them and they approve what I do, they wouldn't get to the point of changing their practices. They wouldn't change and this has to do with them sitting on their tractor, they aren't connected to the ground any more. Actually, it is all about getting down from the tractor and getting your hands to the soil again (D).

We have lost our sensibility to the ground. Now everything is done mechanically and growing organic is viewed upon as going backwards (A).

CONCLUSION TO FARMING HISTORY OF PAJOTTENLAND

The farming history of Pajottenland sheds a light on the identity of the people from Pajottenland. However, their identity is not easy to grasp and is difficult to picture entirely. Some typical traits describing their identity, that came up during the interviews and the processing of the information are: creative, stubborn, independent, combative, conservative, self-taught, opportunistic, traditionalist, proud, does not like to be taken in tow, autonomous, unfathomable, self-righteous, quirky.

The typical people from Pajottenland are best to describe by the geuzen² attitude they take. Their mentality is close to that of the geuzen as they aren't loyal disciples of a certain ideology, they prefer to do it their way (E).

Both the people's mentality and its geographical situation explains how Pajottenland was partly saved from agricultural industrialisation as it happened in other regions of Flanders, in Europe and in the world. Led by their stubbornness and their mentality, the people from Pajottenland have continued to march against the expansion and production maximisation of their farms. Thanks to this, they maintained the decisional power over their lands. As a consequence, they managed, to a certain extent, to protect their family farms and they will continue doing so in the future. However, they are concerned about the future developments in the region and what will happen to their farms. Still, they will not let others take away the assets of their region: the fertile soil and the proximity to the city of Brussels. Even though industrialised farms and family farms get driven apart, the latter still hope to receive one day the recognition for the good work they did over centuries in terms of landscape conservation, food sovereignty, and social cohesion.

² Historically a group of Dutch nobles, opposing in 1566 the Spanish rule in the Netherlands during the Eighty Years' War. The term is later adopted in Flanders to design a quirky and rebellious mentality.

4.2 FROM PAST TO PRESENT

The Farming History of Pajottenland sheds light on how agriculture has evolved in the region and on the agricultural lock-ins that have emerged. In the following section, the Farming History will be discussed by putting it in relation to what has been experienced and observed with the farmers during the research. Whenever referring to the words of a farmer, citation is written in italics, followed by the farmer's substitute English name and the date on which (s)he spoke.

AGRICULTURAL INDUSTRIALISATION AND PRIVATISATION OF EXTENSION SERVICES

One of the major trends in the Farming History of Pajottenland is the **industrialisation** of the **farming** and **food system**. Both farmers and processors are encouraged to expand, aiming at production maximisation and homogenisation. This has put serious economic and financial pressure on farms and has forced many operators to quit farming or to search another job outside the farm. Hence it can be concluded that the economic squeeze between increasing input costs and fluctuating output prices is pushing many farmers out of production (Fares et al., 2012; Louah et al., 2015; van der Ploeg, 2008). In Flanders this is clearly illustrated by the decreasing number of farms (Figure 14) and their increasing average areas, from around 10 ha in 2001 to 25 ha in 2015 (Departement Landbouw en Visserij, 2015).

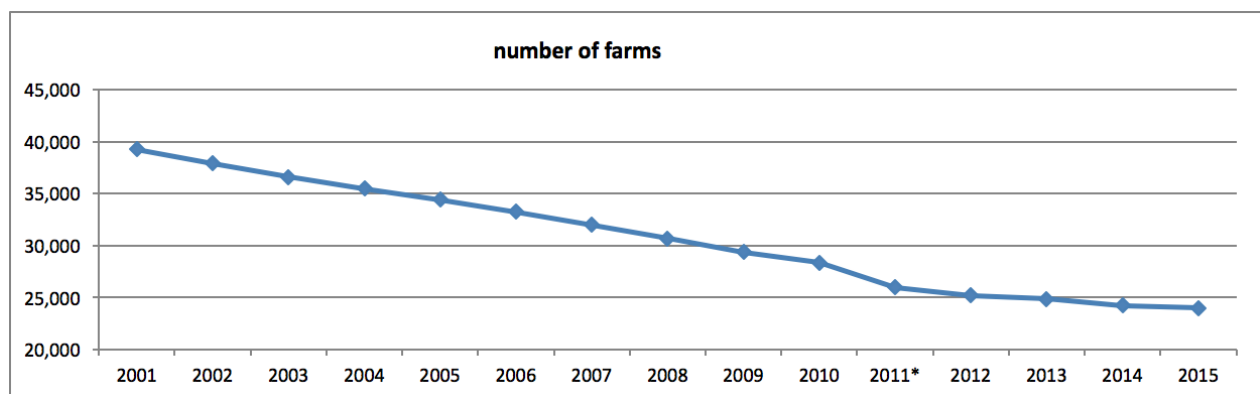


FIG 14: NUMBER OF FLEMISH FARMS BETWEEN 2001 AND 2015
SOURCE: DEPARTEMENT LANDBOUW EN VISSERIJ, 2016

Another trend that can be noted in the Farming History is the degradation of local knowledge due to increasing farmer's dependence on artificial inputs, following recommendations provided by the industry. This trend is reinforced by the privatisation of extension services and the disappearance of public agricultural knowledge infrastructure. Technical advising is often taken over by companies that sell pesticides and other agricultural inputs, locking in farmers institutionally and technically. This is not only the case in Pajottenland, but has been revealed by several authors as a general trend (Klerkx and Leeuwis, 2008; Meynard et al., 2012; Vanloqueren and Baret, 2008). In the Farming History, farmers agreed that if one refuses to listen to private counsellors, he has to search his own way to find the knowledge he deems necessary. In other countries, the lack of independent and *free* knowledge exchange gave birth to several farmers' initiatives such as the FFS (Vaarst, 2007).

BECOMING PRICE-MAKERS AGAIN

Dissatisfaction is growing among farmers about the stricter rules and regulations to which they must comply (see Farming History). Farmers feel hindered in their work and suffer from an increasing pile of administrative tasks. *Everything is decided by others, without asking our opinion. I'm fed up with working under more severe rules and criteria, but having to sell on the world market anyway. This is no longer possible any more* (Lonnie, 15/01/2018). Lonnie expresses his mistrust towards politics and the dichotomy that reigns between national regulations and norms of the world market. Just as Oreszczyn et al. (2010) state, farmers often perceive policies as lacking common sense. In addition to policies defining rules and regulations, processing industries define wheat criteria to which the farmers have to comply if they want to sell their products. *Last year I had for example a batch of excellent quality winter wheat, very high in protein. Yet, at the industrial mill, they decided it wasn't clean enough so they declassified it from food to feed. I don't want to continue this game any more; they're fooling around with us. That's why I contacted the cooperative mill, hoping they would be more respectful* (Lonnie, 15/01/2018).

From the Farming History too, we learn that producers and processors have grown apart over the years and became strangers to each other. Today the dialogue between them becomes more difficult and is almost non-existent, whereas in former times (Farming History) farmers and processors knew each other well and could discuss about prices and quality criteria. Furthermore, farmers are being encouraged to shift from being producers to being managers and marketers as a means to survive in a neo-liberal climate (Kerkhove, 1993; Klerkx and Leeuwis, 2008). Hence, relations became purely business-oriented and economic-oriented, not human-based any more. As a consequence, prices and criteria became rigid and equal for all farmers. Ron explains how this trend finally persuaded him to become organic: *Even though I was growing conventional, I tried to use as little pesticides as possible. However, it took more effort, the yield was lower and the price didn't change. At a certain point it didn't make sense any more as I wasn't rewarded for the efforts made, so I decided to convert to organic. Since that day, everything is going well and I'm happy I made that decision* (Ron 24/02/2018). The transition towards higher farmer's empowerment is a transition from **price-taker** to **price-maker**, enhancing mutual respect and trust between the actors in the food chain.

WAIT AND SEE WHICH WAY THE WIND BLOWS

The Farming History of Pajottenland suggests a strong identity and pride of the farmers from the region and their desire to remain independent from industry or external help. This attitude also helps to explain the reluctance several farmers showed towards the project. Young farmer John expressed his feelings when he was told about the network the first time: *As a farmer, I would prefer to remain independent from the mill and the brewery. I wouldn't want to work for them, but with them. Farmers want to protect their individuality, they don't want to become an integral part of something else* (John, 27/01/2017). He is not the only one with mixed feelings about the network. One of the farmer couples clearly state they do not want to attend any meetings any more: *We have joined so many initiatives and*

farmer groups in the past, but they never turned out in anything truly useful. We invested a lot of time, but at the end it's just talking and talking and nothing comes out of it (Gil, 13/02/2018). Her reaction was definitely the most radical one farmers emitted. A third farmer explains that on many farms the economic situation is so tight that they prefer to **wait and see which way the wind blows** before engaging in a new initiative. She says: *Rather than saying: "we would like to do this or this", you should say: "we will do this and this". Make it as concrete as possible if you want to involve farmers* (Annie, 07/03/2018). Her husband illustrates exactly what she means. He was not interested in the network at all and even before meeting the coordinator of the network, he did not believe a young person, not even from the region, could set up anything serious. However, when he accidentally met the miller from the cooperative mill at a local football game, he listened to his story in a different way and showed more interest. The position one speaks from and the way one addresses farmers determines their reaction. The described incident proves that a miller or a student speaking to a farmer will generate a different reaction.

BEING CRAZY, BUT CONFIDENT

Several actors in the network mentioned at one point how they had to deal with being different, and how other people would label them as **crazy**. According to van der Ploeg (2008), agroecological practices are often not understood and thus labelled as crazy or irrational. Both farmers and processors approved this statement. *When we converted to organic, in 1988, the people and farmers from the village would come and gaze at us from the street while we were working in the field. They made fun of us and couldn't believe how crazy we were to grow organic* (Monika, 02/02/2018). During harvest, Tim admits fearing that neighbouring farmers and agricultural contractors would judge him because he has four different wheat varieties on one plot and that the contractor would not be willing to harvest them separately out of time pressure (see Appendix XII). At the bakery, the story is similar: *Converting our bakery from conventional to artisan, we lost 80% of our clients. They thought we were crazy baking sourdough bread and using local flour. Today we built an entirely new clientele, coming from much further away to buy our bread* (Kate, 10/02/2018). And the brewers too were struggling to get the recognition for the exemplary work they did, valuing a slow and expensive, but high quality process, totally opposed to the rapid, cheap and ordinary products other breweries deliver. Justin, the miller from the cooperative mill concludes: *The engineers in the village thought I was crazy, they never believed the midget (old type of mill) could be fixed again. They used to call me the crazy Englishman. Today they see what we have managed and they gain more confidence. In this network we are all a bit the crazy men, that's why we have to instil each other with confidence, also James and Steve, the first farmers to join the FFS* (Justin, 10/02/2018).

In this regard, the farmers market in Gaasbeek, described in the Farming History, gave a proper opportunity for those were opposed to the industrialisation of the farming system to market their products. Farmers could not only sell their products for a decent price, they finally received the esteem they deserved for the quality products they produced. Moreover, the price commission prevented competition for prices, but enabled competition for quality. Hence, farmers were encouraged to increase quality rather than decreasing the price. Louah et al. (2015) express the importance of creating a **safe learning space** within

farmers networks. The safe learning space and the collective approach should empower farmers and make them less vulnerable to judgement by others, just because they are different. By improving collaboration and increasing respect between farmers and processors, the actors in the network are encouraged to become confident with being crazy.

CONCLUSION TO RQ 1

Having taken a closer look at the farming history of Pajottenland and the impact it has on today's farmers, we feel able to answer our first research question: *To which extent does the Farming History of Pajottenland and the geography of the region form an enabling environment for creating a cereal network between farmers and processors?*

Traditional mixed family farms are still present in the region, even though they no longer make up the majority of farms. Having maintained a certain degree of autonomy in decision making and production, these farmers seem to be more willing to participate in local initiatives. Secondly, discontent among these farmers is growing concerning the industrialisation of the farming and food system and the stricter rules and criteria they have to comply with. Thirdly, the strong identity of the farmers in the region makes that they will not easily let go of their lands. They want to farm it their way and do not accept much support from outside. On the other hand, we noticed they are uncertain about the future and doubt whether the way they have always farmed will survive. These four elements formed an enabling environment for setting up a cereal network.

In addition, we would like to reflect on what we have learned from this historical part and give recommendations for future networks to establish. Before taking off with the project and setting up a cereal network, we thought it necessary to get to know the region and the people we would be working with. Likewise, a farmer building a barn will first carefully assess the soil and the building material (s)he must work with before taking off with the work. If not, the foundations might not be stable enough and the barn may collapse after a couple of years. Our process of looking at the agricultural history within the region has proven to be a unique *reality check*, giving credibility to the history as it is written and providing a foundation for using the history to better understand decision making in the current social and political farming environment.

4.3 PRESENT: FARMER FIELD SCHOOL

In order to give an overview to the reader of the different outcomes from the FFS, we divided this section in three parts: observed interactions and information flows, concluding interview and what did we learn from setting up a FFS. The first part discusses the observations and reflections that were made by the core team during the process. The second part concentrates on the farmers' point of view and how they experienced the process of taking part in a FFS. The third part, finally discusses what we have learnt from setting up a FFS and what we can recommend. We will end this section by answering the related research question.

OBSERVED INTERACTIONS AND INFORMATION FLOWS

To our surprise, during the process of the Farmers Field School, interaction with the farmers happened very spontaneously. Although both farmers participating in the FFS were busy during the week, studying or working outdoors, they were eager to join the meetings we proposed and they did not show any sign of reluctance when it came to interaction or knowledge sharing.

During the technical meeting at the mill on the 10th of February, a technical sheet (Appendix VI) was handed out and practical steps were discussed to be sure that everybody knew what to do and how to proceed. Even though James and Steve did not have much experience with organic farming, we invited them to think of how to establish an organic trial. It turned out that they knew more about organic farming practices than we had expected. Hence, a dialogue took place in which several practices were discussed and the growing cycle was explored in detail.

During the following weeks, James would ask me questions related to farming practices: whether the soil was ready for ploughing, how deep to plough, at what density to sow or at what time, etc. His expectations of me having ready-made answers illustrated how he granted me the role of an expert. When I asked Tim what he would recommend to do and he did not have a clear answer either, it became clear to me that growing cereals is not simply following a recipe. Wielinga and Vrolijk (2009) describe the type of knowledge that offers ready-made answers as *accepted knowledge*. However the FFS's aim is to let farmers take ownership over their knowledge instead of receiving it ready-made from an external expert (Vaarst et al., 2007). In order to do so, James and Steve had to be made aware that they are the real experts on their fields, not the scientists. This revealed to be a mental challenge both for the farmers and for me, because it reversed the dominant roles and **ways of knowing** (Pimbert, 2011), hence taking down a cognitive lock-in. I told James to call Steve and ask his opinion about the best ploughing time. From then on, James had no hesitation in calling Steve to ask his opinion on other practices. As a farmer's son, Steve had a lot of knowledge and could ask his father whenever needed, whereas James did not have any farming family and had to deal with it all by himself.

Vaarst et al. (2011) agree that farmers have to be made aware of the fact that they, and not necessarily scientists, are the real **experts** on many practical issues in farming. To her concern, the facilitator of the FFS, in this case a student researcher, has to *decode* and refrain from being an expert in

order to commit to the role of facilitator. Although we did not divide roles as strictly in our case due to the restricted size of the group, we made sure to empower the farmers as much as possible in the process of knowledge sharing and taking ownership over the knowledge. As a consequence, Steve did not hesitate to share an invitation to a tine weeding demonstration he received or to share documentation on organic pest management. This shows how easily information was exchanged within the FFS.

Steve's biggest fear for carrying out an organic trial was not being able to prevent cereal **diseases**. Luckily the spring was dry and warm and only very few insect pests and pathogen-causing diseases appeared. At a certain point *Lema cyanella* was observed in James' field. It gave rise to a small discussion, but farmers rapidly concluded that damage would be insignificant, having observed the very low invasion rate. **Weeds**, on the other hand, had to be managed more carefully. As both farmers did not own a tine weeder, James asked a neighbouring organic farmer if he could use his weeder and he proposed Steve to tine weed together. The first test was efficient and both farmers gained confidence in the practice. Although, at a certain point Steve refused to tine weed a second time. Even though conditions were favourable, he believed the wheat was too big already and driving through it would bring too much damage. Again, I was confronted with the difficult position I was in, enhancing learning, without interfering too much. I called Tim and Ron, both more experienced with tine weeding to have their advice and forwarded it to Steve. In addition, when James told me he would tine weed a second time, I asked him to propose Steve to tine weed both fields together. At the end it worked out well and Steve contacted me to let me know that he did tine weed his field a second time with James.

The influence of **soil quality** on the growing crop has been clearly demonstrated on James' field. It was the first year he was cultivating the field, as he had recently purchased this property. However, until last year the field was divided in two, the lower part was a permanent pasture and the upper part an arable field. As the upper plot had been cropped by many different farmers and agricultural contractors, soil conditions were in a bad shape. The difference between lower and upper parts were thus obvious to any observer. The spring wheat on the lower half was growing well, standing tall and with beautiful spikes, whereas on the upper half the wheat was scattered, small and with few grains in the spikes. During harvest the lower part yielded almost twice as much as the upper part. Calvin, Steve's father, commented that this was not surprisingly, as the previous farmers had mined the soil. In addition, higher fields are often more prone to soil erosion, especially when they are not managed carefully, whereas lower fields tend to accumulate the loss of top soil from the higher fields. Calvin recommended James to add chalk and manure to the upper part, a couple of years in a row and assess how the soil would evolve. James plans to grow a grass-clover mixture over the next year(s) in order to give rest to the soil and build up again the organic matter content. These two different soil conditions within one field illustrate the agroecological approach of adapting techniques to site-specific conditions. Indeed, instead of setting up a general recipe to be applied uniformly on all the fields within a farm, farmers using an agroecological approach look at every niche within a farm and how they need to be managed differently (Altieri, 2002).

CONCLUDING INTERVIEW

During the concluding interview with James and Steve, different topics were addressed while assessing their experiences in the FFS. The main ones were their motivation for participation, the learning that took place, the price, their perception on organic farming and the cereal network. Each of these will be discussed next.

Asking James and Steve for their **motivation** to join the FFS, they both mentioned their curiosity for such a project. As Steve explains, he is always willing to try something new, however doing it on your own is too risky and you feel too isolated. Therefore, having a project which brings farmers together and which rewards them for taking the challenge was a reason enough to join. James' motivation was slightly different: *As I only started farming recently, I still have many things to learn. The FFS was thus the ideal opportunity for me to get in contact with other farmers and to improve my techniques. The technical input and help I received was very welcome* (James 12/08/'18). Even though only two out of eight farmers accepted the invitation to take part in the FFS, Steve did not see a big risk in joining the project. Working with local processors and having the certainty from the beginning to get a good price per tonne, should motivate many farmers, in his opinion. However, he adds that most farmers in the region are dairy farmers who often need their all of their fields to grow fodder for the cows. Out of the eight visited farmers during the 1st scouting phase, four are dairy farmers. This brings up the necessity to get to know the region and the farmers' situations well in order to target them more efficiently for a given project. Although Steve and James agree that young farmers would be more willing to participate in such a project, two young farmers all of a sudden withdrew from the project after having showed their initial interest. They did not give a clear explanation for their sudden withdrawal, but different clues made us understand that their fathers did not want them to join the project. We did not insist, but proposed them to come along whenever a meeting or a visit would be organised. They did not show up to any of the activities, but also did not ask not to be informed any more. Family relations can be a delicate topic and frictions between father and son are not unusual in farming circles. From these incidents we learned how difficult it is to predict whether or not a farmer might be interested to join such a project and that farmers' motivations need to be handled with delicacy. Social relations and related social lock-ins need to be handled even more carefully, especially family situations (e.g. father-son relations) which may appear to be a most difficult lock-in to overcome. We will not dig deeper into this issue out of respect for the farmers.

The first positive outcome from the FFS both James and Steve mentioned was the **learning that took place** (see Table 7). Being able to interact with other farmers, more experienced with organic cereal growing was helpful for both of them. They appreciated the input Tim gave during the meetings and were glad to have visited Ron's farm. Steve even recommended other conventional farmers to visit Ron and gain more insight into organic cereal farming. However, the most instructive event, both for James and Steve, was to test the tine weeder. *In the beginning I was a bit sceptical about the tine weeder. I didn't believe it*

would work, but after all, it went very well [...] The very first time I tined harrowed the field, I was very anxious about destroying the wheat. A couple days later, indeed, I didn't observe any damage any more (Steve 12/08/'18). Tine weeding is a rather delicate task as it has to be done at the right moment, at a very early stage of weed seedling emergence, under drying weather conditions, not too aggressively in order to preserve the wheat, but not too soft either in order to take out enough weeds. Steve explained that fine tuning the tine weeder is difficult, but once it is done, it does its job properly. Therefore, both agreed that tine weeding together was very efficient as one could walk behind it and comment while the other was driving. Steve looked for more information on the internet and James asked for advice when borrowing the tine weeder from his neighbouring farmer, but testing it was the best way for both to master the technique. Furthermore, being so satisfied with the results and by doing it together, they are willing to accompany other farmers managing this technique in the future. In this way farmers networks and collective learning have the potential of making the agricultural and food system more sustainable (Lamine et al., 2012).

At the beginning of the project, the farmers had the option between a **price** per tonne or per hectare. Both chose a price per tonne. *Payment per tonne is the fairest for the producer and for the buyer. If harvest is bad, that means the farmer didn't do a good job* (Steve 12/08/'18). James agrees that a payment per tonne is the normal way of doing and the one everybody feels most comfortable with. *The farmer indeed has a lot of responsibility, but that's also what we do it for. Otherwise we could just sow the field and not care about it any more, we would receive a payment per hectare anyway, that wouldn't be fair* (Steve 12/08/'18). They are definitely not in favour of a price per hectare, James adds that everybody wants to produce good quality, as long as they get a good price. As we read in the Farming History, farmers depend too heavily on subsidies to make a living. *Farmers don't like subsidies, they don't want them. Europe pays subsidies in order to have cheap food, but give the farmer a reasonable price and the problems will be solved* (Steve 12/08/'18). In addition, wheat prices on the world market became independent from the conditions in a given region or country. Belgian conditions do not influence wheat prices any more. *Today the price is high*

TABLE 7: ILLUSTRATION OF OBSERVED LEARNING

An illustration of learning that took place was the **dead crow** found on James' field (Figure 15), shortly after the first common field visit. As sowing was recently done, we discussed the issue of crows and doves picking out the seeds. One of the farmers mentioned the apparently highly effective, but not commonly used technique of putting a dead crow in the middle of the field. The dead crow would scare off other crows and the seeds would be safe. We did not go more into detail and James did not inform anybody later about putting it into practice, but soon after a dead crow was located in his field. It shows the open mindedness of the young farmer towards locally adapted or agroecological practices. He is not yet totally committed to traditional practices, and thus is willing to try whatever works.



FIG 15: DEAD CROW IN THE FIELD

because yields were low both in Europe and Russia. In Belgium we have no influence on the price at all, we just have to undergo the fluctuation (Steve 12/08/'18). Coming back to the trials, James and Steve were surprised how little investment it took to grow organic spring wheat: *There was the leasing cost for the field, the sowing and the harrowing, that's it* (James 12/08/'18). Even though Steve's organic fields yielded half as much as his conventional fields, he made more or less the same money in both systems thanks to the absence of inputs and the higher price he received for his organic cereals. However, remunerating the farmers' labour is another issue. *Which hourly wage should a farmer ask, what is an hour of farming labour worth?* (James 12/08/'18). Steve explains that farmers are not used to count their working hours: *We get the price we get and when there is money left after paying back the debts, the better it is* (Steve 12/08/'18). Ultimately, we would like to assist the farmers of the network in calculating and to determine the true cost of a product, taking into account investments, inputs and the farmer's wage.

Asking them how their **perception of organic agriculture** changed after the experience, Steve explains he understands better now what it means to grow organic. However, he will not change practices on his conventional fields. *When something goes wrong in organic, you have to undergo the consequences, whereas in conventional you can always try to redress the situation. That's why in organic you follow up better the crops* (Steve 12/08/'18). Steve touches upon something the farmers mentioned in the Farming History too: organic is about going back to the soil, it is about getting your hands dirty again. James, on the other hand, was already more experienced with organic farming as he is converting his fields to organic. *I had a pretty clear idea on organics as I had already worked on organic farms before. But what struck me the most is the overall organic approach and how different it is from the conventional approach* (James 12/08/'18). James experienced how different growing conditions were between the upper and the lower parts of his field. For him, observing field conditions and being able to discuss them with other farmers was highly relevant for his personal learning. *In school we don't learn a lot about organic farming and we don't learn to read the landscape or assess soil quality ourselves. That's why the FFS was so important to me* (James 12/08/'18). Finally, James adds that if we had to redo the FFS next year, he would prefer to grow winter wheat instead of spring wheat. This year's reduced sowing period due to the climatic conditions caused him some stress for ploughing and seeding in time. Winter wheat has a longer possible sowing period and has a higher yield.

Steve observes an overall trend of conventionalisation and industrialisation of organic agriculture. Just as James, he therefore values the **network's** approach in local production and processing. *To me, working with local processors added value to the project as it is in tune with my vision on organic farming and short food supply chains* (James 12/08/'18). Visiting the mill and the brewery gave credibility to the project, because it revealed the interest some processors show in locally grown cereals. Both farmers are in favour of bringing more farmers to the network, although Steve immediately adds they should not be too many either. He does not think more can be done to attract farmers. *You did a good job inviting all the farmers to the different activities. Now farmers have to decide themselves whether or not to take part in the network* (Steve 12/08/'18). Steve himself, however, is not sure yet whether to participate again in next

year's FFS. He says it is not fair that conventional and organic farmers get the same price for a tonne of wheat. *Organic farmers have managed soil fertility over years, whereas I have residues of chemical fertilisers and herbicides in my field from the previous crop* (Steve 12/08/'18). Therefore, he would rather withdraw from the project and give the chance to new farmers for coming in. James replies he does not mind being paid the same as a conventional farmer as there is so much more going on than just producing cereals. The knowledge exchange, the discussions, visits and experiments that took place, all had their value and are even more significant because both organic and conventional farmers were involved.

WHAT DID WE LEARN FROM SETTING UP A FFS?

The FFS we set up with two farmers enabled us to test the FFS approach a first time before potentially conducting it with a larger group of farmers during the following growing season. Even though we only worked with a select group of farmers, which might not be as relevant for other farmers networks, it helped us to gain insight from and experiment with how to conduct a FFS. Below certain elements we learned from our experience are discussed.

We experienced how crucial it is in a FFS to establish a relation of **trust** among the participants. Without trust the participants will not feel confident and might feel hindered in interacting or exchanging knowledge. According to Kolleck and Bormann (2014), trust is essential in a network because “it absorbs uncertainties, reduces the need for control and allows autonomy, promotes motivation and learning, and supports innovation”. In addition, we argue that trust among the participants plays an important role in making them confident with being different. We agree with Vaarst et al. (2011) that a FFS is as much a social asset as a way of gaining technological insights. The project was created to empower and strengthen the farmers, primarily by enabling them to take **ownership** over the FFS. It was presented to them as an experience they could take part in, something to try and to learn from.

As mentioned, the **human aspect** was very important within the project and the personality of every participant had to be valued and respected. Wenger (1998) approves that taking into account a sense for identity in a group or network is crucial for the common learning. Sometimes I thought farmers were rather reluctant towards certain topics or ideas, but only afterwards I understood they were actually very interested. From those experiences I learned not to jump too quickly to conclusions. It was a difficult task not wanting to control everything and not defining beforehand which path we had to follow. The most important issue was to create a **safe learning space** in which farmers could feel free to express their opinions (Louah et al., 2015). As Pretty (1995) argues: “the focus is less on what we learn, and more on how we learn and with whom”. I could not take ownership over their learning, but had to be aware of my own learning. Many authors have shown that a collective approach benefits both participants' and researchers' learning (Méndez et al., 2016; Meynard et al., 2012; Vaarst, 2007). What we have learned, for instance, is how valuable it was to merge young and old, conventional and organic farmers in the FFS. In the beginning we thought this might be a hindrance, but after all, it served to enhance common learning and understanding of each-other's position. In the same way, I had to respect the farmer's reaction when

inviting new farmers to the network. Even though I had strongly hoped that the two young farmers, who finally withdrew, would join the network, I could not force them to do so. It was crucial that farmers joined the network freely and did not perceive any pressure of having to be there. As mentioned in the methodology, the intention of the network is not to unite as many farmers as quickly as possible, but to foster an improved and sustainable farmer-to-farmer and farmer-to-processor collaboration.

Finally, we experienced how crucial the role of a **coordinator** is for the longevity of the FFS and the network. The coordinator organised the meetings, put people into contact and kept an eye on the development within the FFS. He has the role of organising and facilitating, but should not be seen as an expert (see observed interactions and information flows). According to Wielinga and Vrolijk (2009) “networks require a free actor: someone who has the overview, the position and the capacity do what appears to be necessary to keep the network healthy”. In the context of multi-actor innovation networks, other authors talk about the involvement of innovation brokers as a key to foster food system redesign (Klerkx and Leeuwis, 2008; Louah and Visser, 2016; Oreszczyn et al., 2010). In order to do so, the coordinator needs to be able to navigate in unknown areas, and he needs to be able to **expect the unexpected**, link the knowing to the unknowing, and handle the situation appropriately (Wielinga and Vrolijk, 2009; Pimbert, 2011; Wood et al., 2014). As a consequence, we learned that setting up and conducting a FFS is not following a recipe, it requires creativity and flexibility. The iterative process within the action research cycle, as described in the methodology, helped us to assess the development within the FFS and shift the process in order to meet the needs of the participants. The responsibility for decision taking did not lie only with the coordinator, but with the core team. As important as the role of the coordinator was the complementary composition of the core team, a farmer, a professor and a student. Each of them had their angle of view, their background and their commitment, which made them a very effective steering committee. Without the social capital and the practical approach of farmer Tim and the academic perspective of professor Marjorie, the project would definitely have turned out differently. What is important to understand is not to rely on one’s own viewpoint to coordinate a network, but to merge it with viewpoints from others and broaden up to a wider perspective. In order to do so, the general knowledge paradigm or ways of knowing (Pimbert, 2011) had to be questioned and participants had to feel comfortable to ask questions. Or as Marjorie Parker (2016) says: “dare to put yourself in the place of *not knowing*”. Finally, Wielinga and Vrolijk (2009) bring up the reflection of who should pay the coordinator. At the end, farmers benefit most of his work, but they cannot be asked to pay for it. According to Vaarst et al. (2011), farmers sometimes refuse to pay for a facilitator if he does not bring any *expert knowledge*. On the other hand, relying on government funding might not be a truly sustainable option neither. Therefore, it was important that the processors (the brewery and the cooperative mill) funded the project.

CONCLUSION TO RQ 2

Looking back after one year of initiating and conducting a FFS, we can answer our second research question: *In which way does setting up a Farmer Field School foster trust building among early participants?*

Most important for building trust was to prove our commitment to the farmers and to make things happen. The meetings, field trials, visits and other activities that were organised brought the participants closer together and enabled them to share knowledge and collaborate in the field. In addition to organising these activities, ensuring a proper price for the farmers and putting them in contact with the local cereal processors increased the credibility of the project towards the participating farmers. The observed interactions, the outcomes and the concluding interview has proven that we were able to build trust among the early participants by setting up a FFS.

In the previous section we mentioned the importance of assessing the soil and building material before building a barn. Consequently, the farmer cannot wait for the barn to be built by others, (s)he will have to come up with the first stone if (s)he wants to build the barn together. Likewise, we had to turn our words into deeds and start acting in order to gain the farmers' confidence. Levin and Ravn (2007) already mentioned the importance for an engaged researcher to partly merge into the world of the participants. Therefore, a researcher should be willing to make his/her hands dirty and step in the shoes of the farmers, however without becoming a farmer. Generally, farmers rather trust those who are involved in practice. This was illustrated in the previous section (4.2 Wait and see which way the wind blows), by a student and a miller talking to the same farmer. The second being more involved in practice compared to the first, his words had a clearly distinct effect on the farmer.

4.4 FUTURE: THE CEREAL NETWORK

Three main activities were organised within the broader network in order to approach new farmers and make the network known in the region: a perspective meeting in the cooperative mill, an organic cereal farm visit and a network meeting at the brewery. Both meeting the farmers individually and bringing them together, were ways to observe their unique situations and understand their opinions about the network and the lock-ins they are confronted with. During the activities several group discussions took place, which are summarised and discussed below.

PERSPECTIVE MEETING

During the perspective meeting at the cooperative mill, six farmers, two brewers, three millers, five volunteers and the student researcher came together to discuss during three hours about the further development of the cooperative mill and the emerging cereal network. Farmers openly expressed their feelings and doubts towards the mill and the network. In this section the elements that came up and the discussion that arose around them are summarised.

What is the level of **wheat quality** the mill and the brewery are looking for, and which price are they willing to pay for it? Wheat quality is a complex topic as many parameters define the true quality of the cereals (see background). The mill is mainly looking for selling to artisan bakers, working with pure organic flour, without additives, and adapting to locally grown cereals. Generally speaking, baking is easier when protein content is high (above 11%), in contrast to brewing where protein content has to be below 10%. The brewery and the bakeries are thus complementary for the required wheat quality and create therefore two distinct markets with different quality needs. This opens up more options for farmers, as wheat quality depends on the year and the weather and is difficult to predict in advance. As a consequence, the network is looking for processors who are willing to adapt their processing techniques to the conditions of the flour, instead of adapting the flour (e.g. adding additives) to the fixed processing techniques which is the case in industrial bakeries and breweries (Baltazar et al., 2016). For the network, the most important criterion is locally produced organic cereals, while protein content or other quality elements are only secondary.

The **price** is another issue and all actors in the network agreed upon the fact that whoever works in the bread or beer chain - farmer, miller, baker and brewer - should be able to earn a good living from it. After dialoguing about a fair price, we finally concluded that €400/T would be the target price, but which would be re-assessed every year. However, Monika argued: *today we get 380€/T for organic triticale and the demand is high. Moreover, triticale is far easier to grow than wheat as it covers the soil better and leads to less weed pressure. For these reasons, we are not willing to grow wheat for only €400/T* (Monika 02/02/2018).

Before being able to pay a decent price, the cooperative mill needs to establish a **proper market** for its products. They are currently lacking enough bakeries who order flour on a regular basis and take

down the remaining stocks. They mainly sell flour to consumers in organic shops and at the mill, but in too little quantities to earn a good living and to pay the price they would want to pay to the farmers. In addition, they are stuck between the big industrial mills, milling at a much higher and more efficient rate, and the restored heritage water- and windmills, often milling with volunteers and thus selling cheap, but high quality flour. On the other hand, the cooperative mill is only running for one year and still needs time to develop. Nevertheless, in the meantime farmers need to be able to sell their cereals. This is why the brewers proposed buying part of the wheat stocks if these would not be sold in time.

The biggest issue for setting up the network will be the **storage of the grains**. Neither the mill, nor the brewery are equipped with appropriate storing facilities. At the moment, storage thus happens on the farms, but they are not always equipped with the correct structures either. Storage does not need to be very complex, but there is always a risk of pests and rodents. Therefore, the mill proposed to pay a reward per month and per stored tonne of grains. In the long run, the network would want to establish common cleaning, sieving and storage facilities for the benefit of all. In Wallonia, south of Belgium, a new farmers' cooperative was recently founded in order to promote short food supply chains with a particular focus on storage facilities. With the help of regional subsidies, they established small batch storing facilities to enhance regional processing and local farmer-processor collaboration (CultivAé, 2018). A first contact has been established with this cooperative in order to learn from their experience and gain insight from their approach.

Today both the mill and the miller are **bottlenecks** for the network. Whenever a technical issue would appear and the mill would be out of order, or whenever the miller would be out of duty for a given reason, this would have serious implications for the farmers and the bakers. Therefore, a second miller should be trained who could take over whenever a problem appears. The befriended miller, running the heritage watermill in the neighbouring village is available for help whenever this is needed.

The farmers expressed feeling **responsible for the food chain** and being proud of the products they produce. Therefore, they are looking for processors who handle the products they use with respect and turn them into high quality end products. A closer farmer-processor collaboration with an emphasis on bread and Lambic beer could strengthen the region's identity and increase the esteem consumers have for their work. According to van der Ploeg (2008), a farmers network indeed needs aware processors or consumers who treat the products they buy with respect and who understand what it took to produce them. In this regard, the cereal network could become the basis of an **embedded food system**, similar to the French concept of *terroir* (Barham, 2003) or the *Agroecology territories* (Wezel et al., 2016).

The non-organic farmers expressed their **lack of knowhow** for growing organic and their fear to become isolated from other farmers when they would convert to organic. They asked for social and technical support, sharing machinery, organising knowledge exchange and visiting experienced organic cereal farms. With this they confirmed the need for a FFS and improved knowledge exchange among the farmers. Hence, they were invited to the farm visit, later that month.

ORGANIC CEREAL FARM VISIT

In total ten farmers, two bakers, a professor and two students attended both visits, which lasted two hours approximately. Hosting farmer Ron explained how he established the farm and the development he went through over the last years. First he was a conventional farmer baker, growing cereals, baking bread and selling it on the market. Although he used as little pesticides as possible, he was not better rewarded and was confronted with a yield decrease. As a consequence, he decided to convert the entire farm to organic in 2012. However, this seriously increased the work load and by 2016 he decided to stop the bakery and commit entirely to farming. Converting to organic and lacking animals on the farm obliged him to substitute the mineral fertiliser he used to use. Hence, he set up a longer crop rotation, adding leguminous crops and temporary pasture (grass-clover mixture) to the cereals and the cash crops he produced. *The biggest issue I'm confronted to in growing organic cereals is the lack of nitrogen in the soil, far more than disease or weed pressure (24/02/2018)*. Hence he explained he recently purchased a vinasse spreader (Figure 16), enabling him to add more nitrogen to the fields.



FIG 16: FARMERS DISCUSSING BETWEEN THE TINE WEEDER (LEFT) AND VINASSE SPREADER (RIGHT). 28/03/2018
IMAGE BY RAPHAEL BOUTSEN.

Talking about converting to organic farming, farmer Lonnie replied: *I'm not smart enough to grow organic, it's too complex for me and I'm too old to deal with it. I'm not spraying much pesticides and I'm doing agroforestry, but I don't dare to grow organic. I wouldn't want to take the risk of losing everything when there's a bad year and nothing can be done to prevent losses (Lonnie 24/02/2018)*. Even though Lonnie does a very good job on his farm, it seems he is driven by fear. He fears harvest losses, poor wheat quality, bad contact with processors, not producing enough food to feed the world, diseases, pests, weeds, etc. In Ron's fields, he distinguished small weeds and made a big deal out of it, fearing severe consequences at harvest, whereas the other farmers did not see the problem. In addition, he offers the reflection that organic agriculture cannot feed the world and that farmers need to be able to make a living by producing affordable food. Farmer Tim replies: *In my opinion, the farmers should not be responsible for feeding the world population and restoring the disrupted food system, torn apart by industrialisation. As farmers we should not worry about the world's population, we should care about the people and the problems that arise in our region (Tim 24/02/2018)*. This case illustrated the psychological lock-in in which certain farmers are trapped. The conviction of having to produce enough food to feed the world withholds them from changing their agricultural practices.

Finally, Ron showed the machines he uses for cultivating cereals, especially the tine weeder and the rotary hoe, both used for weeding. As most conventional farmers merely commit to chemical weeding, both machines became unfamiliar to them. Whereas in organic farming, the first one is still largely used, but the second one is less known. Both machines require precise knowhow for using them and avoiding

destroying the cereals. In order to know when is the best time to harrow, John explains to put a transparent square of plastic, about 0,5m², on the edge of the field to heat up the soil and accelerate germination. Once weeds start growing underneath the plastic, accelerated by the greenhouse effect, the time is right to harrow. Indeed, tine weeding needs to be done at very early germinating stage of the weeds. Once more an example of locally adapted agroecological practices.

NETWORK MEETING

26 participants, out of whom nearly half were farmers, attended the network meeting on the 6th of July. Among the other participants were millers, bakers, brewers, researchers and other interested people. The farmers first visited the fields of James and Steve, getting to know what the FFS had enabled on their fields. One of the farmers expressed his astonishment: *This looks like a conventional field, I can't believe it's organic, it's so well maintained* (Wayne 06/07/'18). After James and Steve had explained how they managed their fields, the remaining farmers asked many questions and a dialogue started on the different techniques that had been used or that could be used in the future. The conventional and organic farmers both compared the visited fields to their own fields and commented on their observations. At the end, they all approved the results and agreed that it had been a good year for growing wheat.

Discussing how to shape the network with the processors at the brewery, we invited the farmers to a reflection during which they could express the chances or opportunities they saw in joining the network. In addition, we asked them to score³ the different chances they listed in order to get an overview of the most important ones. The elements the farmers came up with are summarised in Table 8, followed by a score the farmers gave and a short explanation.

TABLE 8: LISTED CHANCES AND OPPORTUNITIES DURING FARMERS' REFLECTION

Chances and Opportunities	Score	Explanation
Added value	7	Adding value to the produced cereals by processing them locally
Regional branding	5	Creating a brand and a publicity for quality products from Pajottenland
Exchange knowledge	2	Exchanging knowledge on practices, techniques, varieties, etc.
Exchange experiences	2	Farmers exchanging what they have already experiences on their farms
Reward for being pioneers	2	Recognizing and rewarding pioneers for their innovative efforts
Sharing risk	1	Risk sharing between producer and processor
Learning	1	Learning new techniques on organic farming
Different remuneration	1	Rethinking how farmers are remunerated for their work. Price/T, price/ha, price/hour...
Exchange/share seeds and machinery	1	Improving exchange of what is needed in organic farming: adapted varieties, adapted machinery...
Common storage of the grain	0	Sharing storage facilities between farmers and processors
Direct marketing	0	Direct selling to processors

³ Every farmer was asked to choose the two most important elements, scoring them with 1 or 2 points. However, they were not obliged to score the elements, which explains why the sum of the elements is not equal in every exercise .

Coordinated and cost-effective experiments	0	Coordinating experiments on the different farms so that everybody can learn from each other and new effective techniques are tested
Inspiring farmers for closer collaboration	0	Decreasing reluctance from farmers towards closer collaboration by showing the benefit it brings
Strengthen solidarity in the region	0	Getting to know each other better and the conditions everyone works in. What does it mean to be a farmer, a miller or a brewer? Improving contact to consumers.
Strengthen local identity	0	Knowing as a farmer where his/her cereals go to, by whom they are processed and where they are sold

The above mentioned elements that scored the highest will be summarised below. In addition, the elements that generated particular discussion among farmers and have not been raised in previous discussions will be summarised as well.

The chance or opportunity farmers appreciated the most is **adding value** to the products they deliver. Adding value to the products generates funds to better reward the different actors in the network, provided that the total added value is properly distributed among them. In addition, adding more value can go hand in hand with **regional branding**, fostering thus the local economy and the region's identity. This is related to the emergence of a locally embedded food system discussed during the perspective meeting. van der Ploeg (2008) agrees that empowering small and medium sized food processors, instead of food monopolies, is a way to foster agroecological agriculture.

Just as during the perspective meeting, the farmers mentioned the need for an improved **knowledge exchange** among farmers. The Farming History of Pajottenland revealed how knowhow on farming practices has degraded over the past years, due to the homogenisation of practices and privatisation of extension services. In addition, Delobel (2014) and van der Ploeg (2008) argue that many farmers have forgotten how to farm without industrial inputs and have ignored the indigenous knowledge their ancestors have transmitted for centuries. However, conducting a FFS has shown that more traditional knowledge remains in farming families than one would expect. Therefore, it is important to enable farmers to share knowledge and increase their collective knowhow. Lucas et al. (2016) add that knowledge exchange among farmers can empower them to become independent from industrial inputs. In the same way, farmers are enabled to **exchange experiences** they did on their farms, in order to help other farmers benefit from what they have learned.

Farmer Tim puts a particular emphasis on being rewarded within the network for the **pioneer work** he delivers. Over recent years he committed to searching the region's traditional wheat landraces, multiplying and growing them on his farm. This is a particular job for which he prefers to become an expert first before showing other farmers. However, managing the techniques of growing and multiplying landraces is an intensive and time-consuming job. That is why he would like to be rewarded through the network for the invested energy. Similarly, other farmers could appropriate other techniques and carry out other experiments which later can be transmitted to the group through a technical dialogue. By carrying out **coordinated and cost effective experiments**, the group of farmers will move forward more easily and

adapt to the local conditions and needs. Several case studies have shown that farmers networks or interactions among farmers fosters adoption of new practices and generates innovation (Chantre, 2011; Darré, 1996; Delobel, 2014; Klerkx and Leeuwis, 2008; Meynard et al., 2012).

Many farmers are reluctant to embrace closer **farmer to farmer collaboration**, as they believe it is not possible due to increasing competition or the stubbornness of the farmers. John explains: *I'm part of Groene Kring (the youth farmers association of BB) for the social interaction it offers, but the climate is very distrustful and there's a lot of rumours going round. They all have their point of view on agriculture and wouldn't change it for a dime. Farmers' sons are sometimes even more radical than their fathers. The pioneers, those who dare to do it differently have to be strong, they have to brave the distrust and rumours in order to show the others that it can work differently too* (John 27/01/2018). That is why John has the ambition to show his colleagues through this network that closer collaboration is possible and benefits farmers. Therefore, the network should aim at reducing the reigning mistrust by creating a **climate of trust and solidarity**.

After listing the chances or opportunities, the same exercise was done for the obstacles or threats farmers saw in joining the network. These are listed in Table 9, as well with scores and explanations.

TABLE 9: LISTED OBSTACLES AND THREATS DURING FARMERS' REFLECTION

Obstacles or Threats	Score	Explanation
Fair price	9	Fair price for fair work
Increased workload in organic production	4	Organic production is demanding more manual and mechanic work. Farmer needs to be more flexible in his time management
Sufficient income	3	Increasing workload needs to be well remunerated
Individualism	2	Disappearing social bounds between farmers need to be rebuilt
Market saturation	2	Many farmers converting to organic production may induce market saturation
Climate	0	Increasing risk of crop failure due to unpredictable climate
Transparency in accounting	0	Keeping track of every single accountancy detail is a burden for farmers
Sharing machinery	0	Sharing machines becomes complex once farmers grow bigger or more farmers join in. In addition, farmers often need the same machine at the same moment

In the following text, the obstacles and threats farmers saw in joining the network will be explained and discussed. The two topics climate and transparency in accounting have been mentioned by the farmers, but have not raised any further discussion. They will hence not be discussed further.

The concept of a **fair price** has already been raised during the perspective meeting and in the paragraph on adding value and will thus not be addressed more in detail.

Growing organic cereals demands a **higher workload** than growing conventional cereals and requires farmers to adapt practices to the weather conditions. An example is the tine weeding technique discussed in FFS subchapter. The vast majority of the farmers we approached for the network have an off-farm employment and can only commit to their farm after hours or in the weekend. This means that the

increased workload in organic and the required flexibility in time-management are critical factors to deal with.

Individualism is an item that came up frequently in the Farming History of Pajottenland. As many farmers quit, only a few of them remain and become thus more isolated from each other. Therefore, the network gains in importance because it enables the farmers to gather together, exchange knowledge, discuss relevant topics and hence strengthen their social capital. Moreover, van der Ploeg (2008) argues that when the entire food chain is brought closer together, it will shed another light on the farmer's position within society. Farmers in general become anonymous for both processors and consumers, nor do the farmers know where their products end up. With the help of initiatives such as the cereal network, farmers hopefully can be again better appreciated for the work they do.

A major threat of many farmers converting to organic is the **market saturation**. It is hence crucial that the market remains demand driven, not to induce downward price pressure. Several authors have shown the effectiveness of demand driven direct selling, benefitting farmer's income thanks to the trust it shapes between producer and buyer (Kerkhove, 1993; Milestad et al., 2010; Vandermeulen et al., 2006). In order to ensure a proper demand, we approached several regional breweries and bakeries to inform them about the emerging network and check whether they are interested in our approach. Most of them replied positively and were enchanted when we contacted them with such an interesting offer. However, we told them immediately the importance of letting the network grow slowly, but that we would keep them informed about its development. In this way we can avoid market saturation to occur in the future, at least for the cereals. In addition, and as described in the background chapter, cereal production for food and especially organic cereal production are particularly low in Flanders, whereas the demand is increasing substantially.

Sharing machinery generates mixed feelings among farmers. Some of them are willing to share more machines, others categorically do not want to share any machine and want to own them all by themselves. Reasons for this are that the same machinery is needed at once by all farmers, the fear that shared machinery will not be taken care for in the same way as one's own machinery, and finally the logistical problem of getting the machinery to the right farmer at the right time. Furthermore, sharing machinery is more feasible on small scale farms, but once they grow bigger and they can afford to buy the machinery themselves, they would rather do so. In France for instance, one third of the farmers are part of a machine cooperative CUMA (Cooperative d'Utilisation de Machines Agricoles – Cooperative for the use of agricultural machinery), whereas in Belgium, machinery cooperatives are less common. This is partly due to the French culture in which cooperative structures among farmers are much more embedded (Lucas et al., 2016).

Finally, farmers were asked to pick one or two of the obstacles and discuss in a group of three possible solutions to overcome the obstacle. Table 10 summarises these solutions, clarifying in the first column which obstacle it refers to.

TABLE 10: LISTED SOLUTIONS CONCERNING THE OBSTACLES AND THREATS DURING FARMERS' REFLECTION

Obstacle or threat	Solution	Explanation
Fair price	Niche market	Local niche market for bread and beer, strengthening the region's identity and increasing farmers' pride
Fair price	True cost of products	Farmers need to know the true cost of their cereals, how much time and money they invested in producing
Sufficient income	Copy CSA model	Processors or consumers take a part in the farms and pay upfront of the growing cycle
Increased workload in organic production, sufficient income & fair price	Certainty for sales and remuneration	Farmers are sure to be able to sell their products for a fair price
Fair price & market saturation	Mapping local supply and demand	Increased transparency in local supply and demand so that farmers and processors can adjust their production
Increased workload in organic production	Network's agricultural contractor	A fix agricultural contractor for the network who can manage the required operation when farmers are not available.

The farmers were given the chance to discuss possible improvements for the network, helping to overcome the obstacles or threats they had identified. The solutions farmers came up with are explained and discussed in the following text.

The farmers stressed the relevance of creating a **niche market** for bread and beer in the region. The two main objectives farmers mention in creating a niche market are enhancing the region's identity by strengthening the local economy and better rewarding the work of the different actors in the food chain. Therefore, a close collaboration between farmers and processors is needed, based on human relationships and protected from the fluctuating world market. As outlined in the Farming History of Pajottenland, the region has a strong identity, but has to be protected and reinforced to prevent this from disappearing. Shaping a cereal network and rewarding all its actors would therefore strengthen the region's identity and vice versa. Creating a niche market is related to the concept of regional branding, discussed above.

Properly rewarding the farmers for their work requires knowing the **true cost** of the cereals they produce. Many farmers do not know what it really costs to produce one tonne of wheat. This issue has been addressed during the concluding interview of the FFS and the perspective meeting and will thus not be discussed more in detail.

Another model to ensure a decent income for the farmers would be to copy the **CSA model**. In the CSA concept, households buy a harvest share beforehand and receive their part of the harvest during the year. The farmer calculates how much money he would need for the entire season, including labour cost, and divides it proportionally by the number of people he will sell to. In this way consumers support the farmer in making the required investments before the growing season starts and they share both the risk of harvest losses due to climate change or other external factors, or benefits in a good growing year. The CSA model could hence provide a framework for defining a fair price within the network.

In addition to the true cost and the inspiration that can be achieved through the CSA model, farmers need to have the certainty to be able to **sell their products at a decent price**. Indeed, if the processors are

not ready to pay a better price, the network will not last long. Fares et al. (2012) agree that farmers will only shift to new practices when they have the support from financially sound buyers who encourage their transition. Enabling farmers to again make again a salary by farming, instead of working outdoors is a difficult task. Therefore, a market will need to be developed for the remaining products in the crop rotation, next to the cereals. Unfortunately, cereals do not bring in very much money per hectare, compared to other crops. Once better collaboration is established for cereals, other ways can be sought for marketing the remaining products in the crop rotation.

Coordinating the market for cereals as well as for other products can be done by **mapping the local supply and demand**. Therefore, mills, bakeries, breweries or other processors could announce their estimated needs for the following year, enabling farmers to tailor their production to the processor's needs. This would be a way to avoid shortages and surpluses, influencing heavily farmers' incomes. Mapping the local demand and supply would improve the regional economy and would stimulate local partnerships.

In order to manage certain organic farming operations on time (e.g. tine weeding) and taking into account the off-farm employment many farmers are bound to, the idea came up to employ a **fixed agricultural contractor** for the network. This should be a person the farmers trust and whom they can call whenever an operation needs to be done. The contractor would need to be well informed and experienced with organic farming practices in order to be able to exchange with the farmers and gain their confidence. Likewise, Lucas et al. (2016) explain that French machinery cooperatives seek to delegate tasks to a fixed agricultural contractor in order to take away time-pressure for farmers and allow them to invest time in other activities.

4.5 OBSERVED LOCK-INS

Throughout the research different lock-ins have been identified that confront the farmers. In order to get a better overview, they have been classified in six categories: institutional, technical, economic, social, psychological and cognitive. Figure 17 represents each of those categories, illustrated by observations and participants' input. Rather than discussing every category separately, they will be viewed from a broader perspective, indicating the interlinkages that exist between them.

Thanks to the Farming History of Pajottenland the cereal system has been shown to be torn apart due to the **industrialisation** of the **farming** and **food system**. Concentration of certain activities (e.g. storing, milling, malting, retailing) have appeared and form a typical bottleneck. As a consequence, many farmers and processors lost the ability and the knowhow to store, clean and sieve the grains themselves, resulting in a serious lock-in and hindering the development of the cereal network. In addition, the large scale baking industry defines the rules and criteria farmers have to comply with. If their cereals do not meet the required criteria, their batches are declassified, inducing a financial loss for the farmers and creating a climate of fear (psychological lock-in). Another consequence of industrialisation is the erosion of the diversity of practices, both in the agricultural system as in the food system. The Farming History has shown

that privatisation of extension services is one of the causes for the homogenisation of farming practices, inducing an institutional and technological lock-in as previously described by Meynard et al. (2012) and Vanloqueren and Baret (2008). This trend is radically opposed to the agroecological approach that values diversity and adaptability over homogeneity as described by Altieri (2002). Unfortunately, industrial mills and bakeries favour in general big batches of homogenous cereals and homogenous flour to produce uniform breads for the consumers. As a consequence, the overall food system is industrialised and homogenised, turning agricultural products into anonymous commodities (van der Ploeg, 2008). Moreover, institutional rules and regulations on quality and hygiene are shaped for the industrial food system and thus often not adapted to small chain production and processing. In this regard we agree with Wielinga and Vrolijk (2009) who state that the increasing administrative tasks inhibit creativity and innovation. According to Fares et al. (2012), the structure of the dominant food system in itself may represent a lock-in. Likewise, we identified, through this study, that the dominant food system to be a cluster of interlinked lock-ins.

Not only has the food system been torn apart, farmers have gotten more isolated due to the decreasing number of active farmers (Farming History). This trend has put them into a form of **social isolation** and into an attitude of individualism, illustrated by the reluctance towards farmer to farmer collaboration, machinery sharing or the many rumours in farming circles. In former times, farmers guilds and farmers unions guaranteed social cohesion among farmers and with the rural population, but today there is a growing mistrust because they became strangers to each other and competitors in the marketplace. Oreszczyn et al. (2010) agree that farmers are working increasingly in isolation which has a serious effect on their social capital. Those who do things differently are labelled by their peers as being **crazy** and often do not dare to be proud of being different. Isolation due to the fact of being different is a common aspect that came back among farmers, millers, bakers and brewers. One of the bakers even said: *We are an endangered species* (Kate 10/02/'18). Some farmers also expressed organic farming is still socially not fully accepted in the region, even though it has grown bigger over the last years. Certain farms indeed have the potential to become organic as they are typical mixed farms and they have maintained certain traditional (e.g. agroecological) practices. However, they do not dare to convert to organic farming due to different reasons, but partly out of social pressure, as discussed during the perspective meeting. The isolation and fear of being labelled as being crazy hinders the dissemination of knowledge and the adoption of new techniques.

Both the homogenisation of practices and products and the individualisation of farmers and processors result in a deterioration of **knowhow**. As farmer Ron explains: *Growing organic is technically not that difficult after all, it is all in the heads of the conventional farmers. What we have to do is make them understand that the threshold to convert to organic is not as high as they think* (Ron 17/01/'18). The experience within the FFS showed that the required knowhow was actually present or available and that putting into practice the required techniques was easier than the farmers thought. This is a clear illustration of a technical lock-in (lack of knowhow) which appears to be a cognitive lock-in. Among bakers, the

problem is similar, much knowhow has gone lost and bakers thus often rely on trial and error to adapt new techniques. As a consequence, bakers are now not accustomed to using local and pure flours which makes it more challenging to establish a direct relation between farmers, millers and bakers. However, once the relation is established, collaboration seems more fruitful than expected. Both the Zeeuwse Vlegel in the Netherlands and The Li Mestère network in Wallonia have proven the concept of farmers and bakers collaborating in a network and responding to the households' demand for nutritious and healthy bread (Baltazar et al., 2016; Oerlemans and Assouline, 2004).

The Farming History of Pajottenland has illustrated the **identity** and the pride of the farmers from the region. Their attitude can be a hindrance and an asset at the same time. Their conception for instance of having to feed the world (Lonnie) or the responsibility they feel for ensuring a good harvest (James and Steve) can be seen as a cognitive and psychological lock-ins, hindering the adoption of alternative production methods or of alternative methods of payment. On the other hand, their attitude means that many farmers in the region who work outdoors refuse to let go of their lands and continue farming them, something which was already illustrated by Kerkhove (1993). They are proud to be farmers and will not accept someone else taking power over their land. The heavy protest against the construction of the highway and the Walt Disney Corporation which threatened the region of Pajottenland in the 70s (Farming History) illustrate the strong will of the farmers. Therefore, creating a cereal network around a Lambic brewery, strongly embedded in the region and described by some as being the *Champaign from Pajottenland*, is an opportunity to strengthen the region's identity and increase the farmers' pride.

The preceding discussion is illustrated in Figure 17, representing the different lock-ins and their interlinkages we observed during the research. The illegibility of the figure illustrates the complexity of the situation and the multitude of interlinkages make it almost impossible to distinguish them one from another. Every link has been identified individually and was written on a flip chart, before designing Figure 17 (Appendix XIII). Nevertheless, we have chosen to display the figure like this, however, making it possible to read the different lock-ins in the boxes and distinguish the arrows' colour codes, indicating the four topics discussed above.

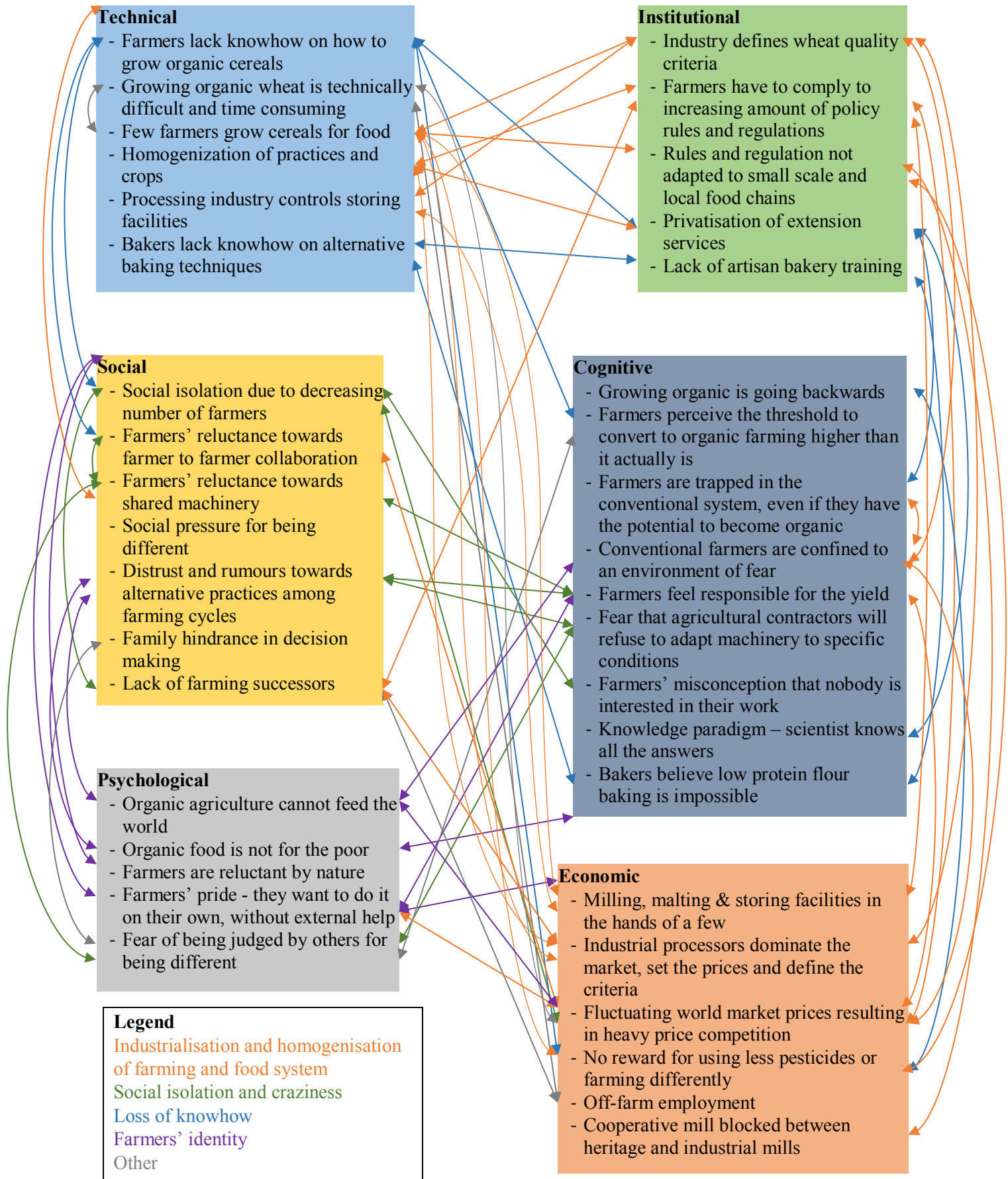


FIG 17: DIFFERENT LOCK-INS AND THEIR INTERLINKAGES

CONCLUSION TO RQ 3

Now that we have discussed the different lock-ins and their interlinkages, we believe this enables us to reach an answer to the third and main research question: *How do early participating farmers perceive the creation of a cereal network as a way to overcome the lock-ins they are confronted with?*

First of all, the high participation rate during the network meeting at the brewery on the 6th of July has proven the interest the farmers showed in the network. During the farmers' reflection on the same day, they expressed openly which benefits and obstacles they saw in joining the network. After the 1st scouting phase, only two farmers were willing to participate in the project. One year later, after the network meeting, six more farmers showed their interest in joining the project and growing cereals for the network. This revealed that farmers prefer to wait for something concrete to happen before getting involved in a new initiative. Nevertheless, seeing the outcomes the FFS produced and thinking about the possibilities the network could offer, they gained confidence in joining the project. On the other hand, after one year, we notice the emerging network is still vulnerable and needs proper coordination in order to further develop. Therefore, it relies on the commitment of its different stakeholders and particularly of the coordinator, to shape a feeling of belonging and a shared vision among its participants.

This brings us to the conclusion that the emerging cereal network has the potential to empower the farmers to overcome certain lock-ins they are confronted with. However, it has no guarantee for doing so, nor is it the sole way for overcoming lock-ins. Just as Kerkhove (1993) explains, there are many types of *good farmers*, we believe there are many ways to become good farmers. We have tried to show that creating a network might be one of them.

4.6 DISCUSSION ON THE METHODOLOGY

In this section we will discuss the different methodologies we used during our research. They will be discussed according to the three parts: past, present and future; and we will finish with some more general reflections on the overall research and the integrity of the results.

The **Farming History of Pajottenland** was almost exclusively based on the interviews with the seven key informants. It has been a conscious decision to tell the peoples' history instead of that written in textbooks or scientific documents. However, we are aware that the history is not a pure objective one, influenced both by the interviewees stories and the interviewer's interpretation. Therefore, we ought it necessary to interview key informants with different opinions and positions regarding agriculture and have the history validated by all of them. In addition, we send it to the active farmers in order to check whether they could identify themselves with the history. Most of them reacted positively and said having had great interest in reading the document, others did not agree on certain details or would have liked to have it even more in-debt. Due to time pressure and the already large proportion the history took, being only one third of the entire research, we decided not to alter it another time. We are conscious about the possible gaps or left-outs in our Farming History. We could have dedicated an entire research to the Farming History of

Pajottenland and end up with a more extensive history, but this was not our goal. Within our research the history part served as a tool to move onwards and be able to better answer our third and main research question.

The second part, the **Farmer Field School**, had its relevance in setting up a concrete experiment with the farmers, growing spring wheat on two plots. Setting up a FFS on such a short laps of time with only two farmers was both a strength and a weakness. First of all, we did not have an unlimited time to search for farmers to get involved in the FFS and as the project was very new and unseen in Flemish farming circles, only two of them accepted to take part. This reduced number enabled us to properly coordinate the experiment and gave us more flexibility in carrying out a FFS for the first time. In addition, we were lucky with the motivation, the enthusiasm and the willingness of both farmers to share knowledge and take part in the organised activities, despite their busy schedules. However, Vaarst (2007) argue that the optimal number of participants in a FFS is six. Having only two participating farmers might therefore not be enough for proving the relevance of a FFS. On the other hand, we strongly believe carrying out a FFS was crucial for the entire research and results would have been very different without setting up a FFS. If our entire research had been focused on assessing a FFS's relevance for farmers, having only two participants would not have been enough. However, in our case setting up a FFS was only one step in the development of a cereal network, for which it has proven its relevance.

The third part, **shaping the cereal network** and assessing the early participating farmers' perception on how it could benefit them, revealed to be the most difficult one. After one year, the potential was there for the network to arise, but it was not up and running yet. That made it difficult for the farmers to imagine what the network would be like and how it could benefit them both individually and collectively. We thus organised different networking activities, making the emerging network as tangible as possible for the farmers and involving them in the process of shaping the network. However, assessing the farmers' perception was a delicate task, due to my personal committed to the success of the emerging network. Ideally, coordination of the network and research on the network should have been done by two persons in order to ensure a certain degree of objectivity. On the other hand, PAR does not claim to be purely objective, as nobody has the ability to observe a social process purely objectively (Levin and Ravn 2007). According to Pretty (1995), results are always subjective to a certain extent, as data processing is done by people with values and weaknesses. Moreover, a scientific research methodology is supposed to be possibility copied by another researcher. In our case, I am conscious about the influence I had as a student researcher on the people I related to within the research. Hence, the same research carried out by a different researcher will most probably not give the same results.

As described above, the three parts within the research each have a serious scope and could have given rise to three individual studies. However, as the objective of the research was to benefit the farmers in the first place and to provide insight to others in how to establish a farmers network in the second place, it appeared to be difficult to reduce its scope. Even though one might argue this research is too broad and addressing too many themes, we argue that it gains in relevance because of its **holistic approach**. If one

wants to study how to co-develop a cereal network with farmers and processors and which answers their needs, one has to take into account the region, the history, the people's identity, the socio-economic situation and the lock-ins they are confronted with. Through this research we documented the way in which we started to develop such a farmers network and how to involve the farmers in a research process through the means of a PAR.

Finally, as a student researcher and the coordinator of the network, I would like to come back to the difficulty of **combining a scientific research method with a practical involvement** and responsibility taken on the field, specific to the PAR approach. Even though both jobs talk about the same topic, they are different in content and require a different approach. From my experience, research and practical involvement are not incompatible, but still very difficult to manage at the same time. Almost naturally, I was more drawn to the practical work as it had a direct impact on the people I was working with. After one year of efforts, shaping a network, we observed how vulnerable the network is at its start. Its survival is very dependent on the commitment of its different actors, and more in particular of its initiator and coordinator. In addition, we are conscious about the sometimes narrow margin between flourishing and exhaustion for initiators and early participants within networks, as described by Van Dam et al. (2017). This is something to take into account particularly during the following months in the development of the network. Just as a farmer cannot leave his farm during certain periods of the year due to harvest or calving for instance, a coordinator of a network too needs to be there at certain crucial moments, if he does not want the network to collapse. Coordinating a network thus entails a significant responsibility towards the stakeholders you work with. Because of this responsibility, the practical work for the network often gained priority over the work as a scientist.

Ensuring the **integrity of the results** through a PAR is a delicate task as the researcher has to properly balance an empathic involvement in a given system or topic, and a critical reflection on the same topic, generating rigorous and relevant data (Levin, 2012). Carrying out a PAR requires to be well prepared and well informed. However, not everything can be learned in advance and one will never be fully prepared before going out to the field. That is why learning by doing is an integral part of the process. Being able to discuss the methodology and the development of the research with my external supervisor and mentor was therefore crucial. As she has several years of experience in PAR, she was able to guide me whenever I had doubts about how to move on or how to handle a delicate situation. Levin (2012) agrees that one of the criteria to ensure the integrity of the research is to be able to discuss the process and the observations with a colleague or secondary person.

Another way of ensuring the integrity of the results was to base them directly on what farmers had said or to validate our findings by getting back to the farmers. Just as the Farming History of Pajottenland was handed back to the interviewees, the entire thesis will be handed over to the farmers who showed interest in reading it. Hence, bearing in mind, while writing, that the thesis would be read by the farmers, the results were treated with even more delicacy and the ethical considerations, mentioned in the methodology chapter, were taken into account.

4.7 FUTURE RESEARCH

The main focus of our research was the start-up phase of a co-developed local cereal network. Through the research we have identified several lock-ins the early participating farmers are confronted with as well as possible pathways to overcome them. It would however be interesting to study how such a network evolves over time and assess to what extent it did empower farmers and enable them to overcome the lock-ins that they have faced and will encounter in the future. In addition, one could strive to identify the key elements that ensure the efficiency and longevity of such a network. Several farmers networks have been created and studied were dismantled after the research project finished because they had become dependent on external money and lacked further coordination (Vaarst, 2016). It would hence be relevant to study how farmers networks can become independent, self-managed and long-lasting.

Furthermore, I have experienced through my international master in agroecology and from travels and experiences in other countries how much farmer to farmer cooperation differs from one country to another. The difference in farmers cooperatives in Belgium and France, for instance is already enormous. Therefore, it would be relevant to assess what makes these differences and how one can enhance a culture of positive collaboration within farming circles. Comparing farmers networks and cooperatives in different countries could provide insight into different ways to empower farmers, linked to a given socio-economic situation and a given region.

Finally, more insight is needed in how to ensure practical outcomes for farmers while doing scientific research. Too often farmers are *used* in research and undergo some form of intellectual extractivism because nothing concrete is handed back to them. However, from experimenting with PAR, I have seen how difficult it is to combine active engagement with scientific research. More efficient forms of farmer-researcher cooperation need to be sought that can meet the expectations and needs of all parties.

5. CONCLUSIONS

During this research we had the opportunity to assess the very first steps toward the establishment of a cereal network in the region of Pajottenland. As farmers and processors were involved from the beginning, the research has been shaped in such a way that they would benefit from it, as well as providing insight and enabling others to learn from our experiences.

The identified lock-ins are of technical, institutional, economic, social, psychological and cognitive nature; but in addition numerous interlinkages were observed, laying bare a cluster of intertwined lock-ins within the dominant industrial food system. Most important among them are the industrialisation and homogenisation of the agricultural and food system, dominated by the processing industry which sets the rules and the criteria farmers have to comply with; the privatisation of extension services resulting in a decreasing diversity of practices and a loss of knowhow; social isolation due to a decreasing number of active farmers; and the overall homogenisation of the food system, turning agricultural products into anonymous commodities. However, over the years farmers from Pajottenland have shown their reactions towards these trends, refusing to give away control over their lands.

Setting up a FFS has proven to be a sound way in exchanging knowledge, enhancing common learning and improving social interactions among farmers. In addition, it was an ideal setting for farmers to experiment new practices on their farms, they could discuss with other farmers and they were not alone taking the risk. Thanks to that, they had the chance to familiarise with organic farming practices and adjust their perception of organic being too complicated and not feasible, overcoming hence certain technological and cognitive lock-ins. Finally, cultivating wheat for local processors and being better rewarded for their work encouraged them to take part in the emerging cereal network.

Finding processors who are willing to pay a better price and who show respect, both for the farmers' work and for the products their deliver is key for shaping a farmers network. Working with a local mill and a local brewery empowered the farmers and strengthened their pride and identity. Hence, creating a locally embedded food system has the potential to counter the trend of industrialisation and homogenisation. Moreover, the collective approach and the recognition they received through the network instilled the farmers with confidence for being labelled as crazy by their peers. The incipient network has thus different potential assets: it is a possible means to regain knowledge autonomy towards private extension services; it could ensure economic stability and independence from the large scale processing industry and fluctuating prices; but it could also become a social outlet and a way to improve farmers' social capital. On the other hand, the network is not fully developed yet and certain things remain which still have to be dealt with, such as storage for instance. The cereal network has proven its potential, but still needs to prove its outcomes.

Finally, we would like to conclude by pointing out the key elements we take home from conducting this research and developing the cereal network. First of all is the crucial role of the initiator and inspirer of the network. Without his social network, his insight and his perseverance, the incipient network would

not have started. Second is the willingness from both farmers and processors to participate. A network should indeed respond to their needs, encourage participation in the process of shaping the network and foster the farmers to take ownership over their situation. Once a network has started building trust, there comes a stage of high vulnerability to be overcome. Therefore, a coordinator is essential for organising the meetings, bringing the participants together and keeping an eye on the development of the network. This, however, is a delicate task and requires a high degree of empathy, the flexibility to handle quickly in unexpected situations and the ability to step back if necessary. In addition, a network is a complex system of many interactions and can hence not be caught in a recipe. That is why we recommend to look for inspiration in our case study, but not to copy it.

Thanks to this research we have been able to ensure proper conditions so that the two seeds that bore the potential of a cereal network in them could sprout and become young plants. We are looking forward to see them grow and we will commit to protecting and supporting them so that they can become beautiful plants, giving birth to many new seeds.



FIG 18: TRADITIONAL WHEAT LANDRACES AT HARVEST
IMAGE BY XAVIER ETHUIN

6. REFERENCES

- Altieri, M.A., 2002. Agroecology: the science of natural resource management for poor farmers in marginal environments. *Agriculture, ecosystems & environment* 93 (1-3), 1–24.
- Anil, B., Tonts, M., Siddique, K.H., 2015. Strengthening the performance of farming system groups: perspectives from a Communities of Practice framework application. *International Journal of Sustainable Development & World Ecology* 22 (3), 219–230.
- Baltazar, S., Visser, M., 2017. Can we avoid extractivism while doing research in agroecology? A critical view on co-optation and institutionalisation of agroecology. *First Agroecology Europe Forum*. ISARA, Lyon, France. 27 October 2017. Abstract to be found at: <http://agroecology-europe.org/abstracts-talks-posters/>
- Baltazar, S., Visser, M., Dendoncker, N., 2016. From Seed to Bread: Co-construction of a Cereal Seed Network in Wallonia, in: Paper Presented at 12th European IFSA Symposium, United Kingdom. Presented at the 12th European IFSA Symposium, IFSA (Ed.), Harper Adams University (UK).
- Barham, E., 2003. Translating terroir: the global challenge of French AOC labeling. *Journal of rural studies* 19 (1), 127–138.
- Beauchesne, A., Bryant, C., 1999. Agriculture and innovation in the urban fringe: the case of organic farming in Quebec, Canada. *Tijdschrift voor economische en sociale geografie* 90 (3), 320–328.
- Beukenkamp, R.L., 1945. De wereldgraanhandel: bijdrage tot de kennis van zijn ontwikkelingsgeschiedenis (Phd thesis). Veenman, Wageningen. [Accessed 23 August 2018]. Available from: <https://library.wur.nl/WebQuery/wurpubs/525499>
- Braun, A., Duveskog, D., 2011. The Farmer Field School approach—History, global assessment and success stories. Background paper for the IFAD Rural poverty report.
- Chantre, E., 2011. Apprentissages des agriculteurs vers la réduction d'intrants en grandes cultures : Cas de la Champagne Berrichonne dans les années 1985-2010. (Phd thesis). AgroParisTech. [Accessed 23 August 2018]. Available from: <https://tel.archives-ouvertes.fr/tel-00675226/document>
- Chevalier, J.M., Buckles, D.J., 2013. Handbook for participatory action research, planning and evaluation. SAS2 Dialogue, Ottawa, Canada. [Accessed 8 March 2018]. Available from: www.participatoryactionresearch.net
- Coppein, B., 2005. De hand aan de ploeg: Vlaamse landbouworganisaties en Vlaams-nationalistische partijen in de twintigste eeuw. Deel I. *Wetenschappelijke tijdingen* 64 (2), 67–87.
- CultivAé, 2018. [WWW Document] URL <https://sites.google.com/view/cultivae/accueil> [Accessed 23 August 2018].
- Darré, J.-P., 1996. *L'invention des pratiques dans l'agriculture: vulgarisation et production locale de connaissance*. Karthala Editions.
- Delcour, A., Stappen, F.V., Gheysens, S., Decruyenaere, V., Stilmant, D., Burny, P., Rabier, F., Louppe, H., Goffart, J.P., 2014. Etat des lieux des flux céréaliers en Wallonie selon différentes filières d'utilisation. *Biotechnologie, Agronomie, Société et Environnement* 18 (2), 181–192.
- Delobel, V., 2014. Les Indomptables: an ethnography of niche novelty production in Walloon agriculture (Master's thesis). Wageningen University. [Accessed 23 August 2018]. Available from: <http://orgprints.org/25218/>
- Demblon, D., Aertsen, J., 1990. 100 jaar boeren. Epo, Berchem. ISBN 90-6445-506-6. Private collection
- Departement Landbouw en Visserij, 2016. Landbouwcijfers [WWW Document]. URL <https://lv.vlaanderen.be/nl/voorlichting-info/feiten-cijfers/landbouwcijfers> [Accessed 23 August 2018].

- Departement Landbouw en Visserij, 2015. Landbouw tuinbouw Vlaanderen [WWW Document]. URL <https://lv.vlaanderen.be/nl/voorlichting-info/publicaties/studies/sectoren/landbouw-tuinbouw-2015-vlaanderen> [Accessed 23 August 2018].
- EL-SWAIFY, S. A. and EVANS, D. O., 1999. Sustaining the Global Farm: Strategic Issues, Principles, and Approaches. In: *10th International Soil Conservation Organization Conference*. West Lafayette, Indiana, USA. International Soil Conservation Organization (ISCO). 1999.
- Eos Tracé, 2018. Tracé van Brood [WWW Document]. Eos Tracé. URL <http://eostrace.be/traces/trace-van-brood> [Accessed 23 August 2018].
- Fals-Borda, O., Rahman, M.A., 1991. Action and knowledge: breaking the monopoly with participatory action-research. The Apex Press, New York. ISBN 1-85339-098-4.
- Fares, M., Magrini, M.-B., Triboulet, P., 2012. Agroecological transition, innovation and lock-in effects: The impact of the organizational design of supply chains. The French Durum wheat supply chain case. *Cahiers Agricultures* 21 (1), 34–45.
- Gallagher, K., 2003. Fundamental elements of a farmer field school. *Leisa-Leusden Magazine* 19 (1), 5–6.
- Geels, F.W., 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy* 31 (8), 1257–1274.
- Goffin, S., Beudelot, A., 2018. Les chiffres du bio 2017 (Rapport de mai 2018). Biowallonie. [Accessed 23 August 2018]. Available from: <https://www.biowallonie.com/chiffres-bio-2017/>
- Gregoire, A., 2002. The mental health of farmers. *Occupational Medicine* 52 (8), 471–476. <https://doi.org/10.1093/occmed/52.8.471>
- Henriksen, B.I., Anneberg, I., Sørensen, J.T., Møller, S.H., 2015. Farmers' perception of stable schools as a tool to improve management for the benefit of mink welfare. *Livestock Science* 181, 7–16.
- Judd, F., Jackson, H., Fraser, C., Murray, G., Robins, G., Komiti, A., 2006. Understanding suicide in Australian farmers. *Social Psychiatry and Psychiatric Epidemiology* 41 (1), 1–10.
- Kerkhove, G., 1993. Sterk gemengd: een socio-economische analyse van agrarische bedrijvigheid in het Hageland en Pajottenland, België, *Studies van landbouw en platteland*. Modern, Bennekom, Den Haag. ISBN 90-6754-317-9. Private collection
- Khisa, G.S., 2003. Overview of the Farmer Field School approach. The Kenyan Experience. Report of the Farmer Field School stakeholders' forum held on the 27th March 2003 at ILRI, Nairobi, Kenya.
- Kleiner, A., Roth, G., 1996. Field manual for a learning historian. MIT Center for Organizational Learning and Reflection Learning Associates. [Accessed 23 August 2018]. Available from: <https://solonline.org/wp-content/uploads/2016/12/Field-Manual-Master.pdf>
- Klerkx, L., Leeuwis, C., 2008. Balancing multiple interests: Embedding innovation intermediation in the agricultural knowledge infrastructure. *Technovation* 28 (6), 364–378.
- Kolleck, N., Bormann, I., 2014. Analyzing trust in innovation networks: combining quantitative and qualitative techniques of Social Network Analysis. *Zeitschrift für Erziehungswissenschaft* 17 (5), 9–27.
- Lamine, C., Renting, H., Rossi, A., Wiskerke, J.H., Brunori, G., 2012. Agri-food systems and territorial development: innovations, new dynamics and changing governance mechanisms, in: *Farming Systems Research into the 21st Century: The New Dynamic*. Springer, pp. 229–256.
- Lefèvre, V., Capitaine, M., Peigné, J., Roger-Estrade, J., 2014. Farmers and agronomists design new biological agricultural practices for organic cropping systems in France. *Agron. Sustain. Dev.* 34 (3), 623–632.
- Levin, M., 2012. Academic integrity in action research. *Action Research* 10 (2), 133–149.
- Levin, M., Ravn, J.E., 2007. Involved in Praxis and Analytical at a Distance. *Systemic Practice and Action Research* 20 (1), 1–13.

- Li Mestère, 2018. Li Mestère, réseau belge de semences paysannes. [WWW Document] URL <http://www.limestere.be/> [Accessed 8 March 2018].
- Lilja, N., Dixon, J., 2008. Responding to the challenges of impact assessment of participatory research and gender analysis. *Experimental Agriculture* 44 (1), 3–19.
- Louah, L., Visser, M., 2016. Q Methodology, a useful tool to foster multi-actor innovation networks performance., in: *Social and Technological Transformation of Farming Systems: Diverging and Converging Pathways*. Presented at the 12th European IFSA Symposium, IFSA (Ed.), Harper Adams University (UK).
- Louah, L., Visser, M., Baltazar, S., Delobel, V., 2015. Changements de postures du chercheur, de l'agriculteur et de l'enseignant pour l'innovation agroécologique paysanne. *Pour* 2, 5–10.
- Louah, L., Visser, M., Blaimont, A., de Cannière, C., 2017. Barriers to the development of temperate agroforestry as an example of agroecological innovation: Mainly a matter of cognitive lock-in? *Land Use Policy* 67, 86–97.
- Lucas, V., Gasselin, P., van der Ploeg, J.D., 2016. Increasing searches for autonomy among French farmers: a starting point for agroecology? Presented at the 12th European IFSA Symposium, IFSA (Ed.), Harper Adams University (UK).
- Mathijs, E., 2003. Social capital and farmers' willingness to adopt countryside stewardship schemes. *Outlook on agriculture* 32 (1), 13–16.
- McIntyre, A., 2007. *Participatory Action Research*. SAGE Publications. ISBN 978-1-4833-8939-4.
- Meert, H., Van Huylenbroeck, G., Vernimmen, T., Bourgeois, M., van Hecke, E., 2005. Farm household survival strategies and diversification on marginal farms. *Journal of Rural Studies* 21 (1), 81–97.
- Méndez, V.E., Bacon, C.M., Cohen, R., 2016. Introduction: Agroecology as a Transdisciplinary, Participatory and Action-oriented Approach, in: *Agroecology: A Transdisciplinary, Participatory and Action-Oriented Approach*. CRC Press, pp. 1–21.
- Menozzi, D., Fioravanti, M., Donati, M., 2015. Farmer's motivation to adopt sustainable agricultural practices. *Bio-based and Applied Economics* 4 (2), 125–147.
- Messely, L., Dessein, J., Lauwers, L., 2010. Regional identity in rural development: three case studies of regional branding. *APSTRACT: Applied Studies in Agribusiness and Commerce* 4 (3/4), 19–24.
- Meynard, J.-M., Dedieu, B., Bos, A.P. (Bram), 2012. Re-design and co-design of farming systems. An overview of methods and practices, in: *Farming Systems Research into the 21st Century: The New Dynamic*. Springer, Dordrecht, pp. 405–429.
- Milestad, R., Bartel-Kratochvil, R., Leitner, H., Axmann, P., 2010. Being close: The quality of social relationships in a local organic cereal and bread network in Lower Austria. *Journal of Rural Studies* 26 (3), 228–240.
- Munasib, A.B., Jordan, J.L., 2011. The effect of social capital on the choice to use sustainable agricultural practices. *Journal of Agricultural and Applied Economics* 43 (2), 213.
- Neef, A., 2008. Integrating participatory elements into conventional research projects: measuring the costs and benefits. *Development in Practice* 18 (4-5), 576–589.
- Neef, A., Neubert, D., 2011. Stakeholder participation in agricultural research projects: a conceptual framework for reflection and decision-making. *Agriculture and Human Values* 28 (2), 179–194.
- Oerlemans, N., Assouline, G., 2004. Enhancing farmers' networking strategies for sustainable development1. *Journal of cleaner production* 12 (5), 469–478.
- Oreszczyn, S., Lane, A., Carr, S., 2010. The role of networks of practice and webs of influencers on farmers' engagement with and learning about agricultural innovations. *Journal of Rural Studies* 26 (4), 404–417.
- Parker, M., 2016. *Dialogue: A tool for thinking together and promoting team learning*. Agroecology M.Sc. Education at NMBU. NMBU, Ås, Norway. 10 November 2016.

- Pimbert, M.P., 2011. Participatory research and on-farm management of agricultural biodiversity in Europe. IIED. ISBN 978-1-84369-809-8. Private Collection.
- Plateau, L., Holzemer, L., 2016. La filière céréales – meunerie – boulangerie [online]. Rapport de recherche. CEESE-ULB. [Accessed 13 August 2018]. Analyse dynamique de la durabilité vécue et mise en œuvre par les acteurs des circuits courts. Available from: www.iew.be/IMG/pdf/carnet_4_filierecmb.pdf
- Platteau, J., Van Gijseghe, D., Van Bogaert, T., Vuylsteke, A., 2016. Voedsel om over na te denken. LARA/VIRA 2016 (Landouw- en visserijrapport 2016). Departement Landbouw en Visserij, Brussel. [Accessed 13 August 2018]. Available from: <https://lv.vlaanderen.be/nl/voorlichting-info/publicatiescijfers/studies/sectoren/voedsel-om-over-na-te-denken-laravira-2016>
- Pretty, J.N., 1995. Participatory learning for sustainable agriculture. *World development* 23 (8), 1247–1263.
- Relaes, J., 2011. Het Europees Gemeenschappelijk Landbouwbeleid (GLB) een beleid continu in beweging. [online]. 2011. Emeritiforum KU Leuven. [Accessed 23 August 2018]. Available from: <https://www.kuleuven.be/emertiforum/em/Forumgesprekken/2010-2011/310311>
- Rosenfeld, N., 2017. Le réseau des fermes novatrices en Wallonie picarde: application de la méthode d'analyse des réseaux sociaux pour comprendre l'innovation agroécologique (Master's thesis). Université Libre de Bruxelles, Belgium.
- Roth, G., Kleiner, A., 1998. Developing organizational memory through learning histories. *Organizational Dynamics* 27 (2), 43–60.
- Strauss, A., Corbin, J.M., 1997. Grounded theory in practice. Sage Publications Inc. ISBN 978-0-7619-0748-0.
- Timmermans, I., Van Bellegem, L., 2018. De biologische landbouw in Vlaanderen. Stand van zaken 2017 (Rapport). Departement Landbouw en Visserij, Brussel. [Accessed 23 August 2018]. Available from: <https://lv.vlaanderen.be/nl/voorlichting-info/publicaties-cijfers/studies/sectoren/de-biologische-landbouw-vlaanderen-stand-van>
- Vaarst, M., 2016. Ugandan Farmer Field Schools and Danish Stable Schools and Ugandan Farmer Family Learning Groups ... focus on forms of social capital and sustainability. Agroecology M.Sc. Education at NMBU. NMBU, Ås, Norway. 10 November 2016.
- Vaarst, M., 2007. Participatory common learning in groups of dairy farmers in Uganda (FFS approach) and Danish Stable Schools (Revised reprint of Master Thesis in Health Anthropology), Horticulture, Plant Science and Animal Science. Faculty of Agricultural Sciences. University of Aarhus, Denmark. [Accessed 23 August 2018]. Available from: www.agrsci.org
- Vaarst, M., Nissen, T.B., Østergaard, S., Klaas, I.C., Bennedsgaard, T.W., Christensen, J., 2007. Danish Stable Schools for Experiential Common Learning in Groups of Organic Dairy Farmers. *Journal of Dairy Science* 90 (5), 2543–2554.
- Vaarst, M., Winckler, C., Roderick, S., Smolders, G., Ivemeyer, S., Brinkmann, J., Mejdell, C.M., Whistance, L.K., Nicholas, P., Walkenhorst, M., 2011. Animal health and welfare planning in organic dairy cattle farms. *The Open Veterinary Science Journal* 5, 19–25.
- Van Dam, D., Lagneaux, S., Nizet, J., Streith, M., 2017. Collectifs en agriculture bio (Les): Entre idéalisation et réalisation. Educagri Editions. ISBN 979-10-7250-147-2.
- van der Ploeg, J.D., 2008. The New Peasantries: Struggles for Autonomy and Sustainability in an Era of Empire and Globalization. Earthscan, London. ISBN 978-1-84407-882-0. Private Collection.
- van der Ploeg, J.D., Bouma, J., Rip, A., Rijkenberg, F.H., Ventura, F., Wiskerke, J.S., 2004. On regimes, novelties, niches and co-production, in: *Seeds of Transition: Essays on Novelty Production, Niches and Regimes in Agriculture*. Van Gorcum, pp. 1–30.

- Vandermeulen, V., Verspecht, A., Van Huylenbroeck, G., Meert, H., Boulanger, A., Van Hecke, E., 2006. The importance of the institutional environment on multifunctional farming systems in the peri-urban area of Brussels. *Land Use Policy* 23 (4), 486–501.
- Vanloqueren, G., Baret, P., 2008. Why Are Ecological, Low-Input, Multi-Resistant Wheat Cultivars Slow to Develop Commercially? A Belgian Agricultural “Lock-In” Case Study. *Ecological Economics* 66, 436–446.
- Verbeke, P., 2015. Beknopt marktoverzicht voor biologisch graan in Vlaanderen en Europa (Rapport). BioForum. [Accessed 13 August 2018]. Available from: <https://www.bioforumvlaanderen.be/sites/default/files/MS%20Graan%2020150119def.pdf>
- Wenger, E., 1998. Communities of practice: Learning as a social system. *Systems thinker* 9 (5), 2–3.
- Wezel, A., Brives, H., Casagrande, M., Clément, C., Dufour, A., Vandembroucke, P., 2016. Agroecology territories: places for sustainable agricultural and food systems and biodiversity conservation. *Agroecology and sustainable food systems* 40 (2), 132–144.
- Wielinga, E., Vrolijk, M., 2009. Language and tools for networkers. *Journal of agricultural education and extension* 15 (2), 205–217.
- Wigboldus, S., Klerkx, L., Leeuwis, C., Schut, M., Muilerman, S., Jochemsen, H., 2016. Systemic perspectives on scaling agricultural innovations. A review. *Agronomy for Sustainable Development* 36 (3), 46.
- Wiskerke, J.S., 2003. On promising niches and constraining sociotechnical regimes: the case of Dutch wheat and bread. *Environment and Planning A* 35 (3), 429–448.
- Wood, B.A., Blair, H.T., Gray, D.I., Kemp, P.D., Kenyon, P.R., Morris, S.T., Sewell, A.M., 2014. Agricultural Science in the Wild: A Social Network Analysis of Farmer Knowledge Exchange. *PLOS ONE* 9 (8), e105203.

7. APPENDICES

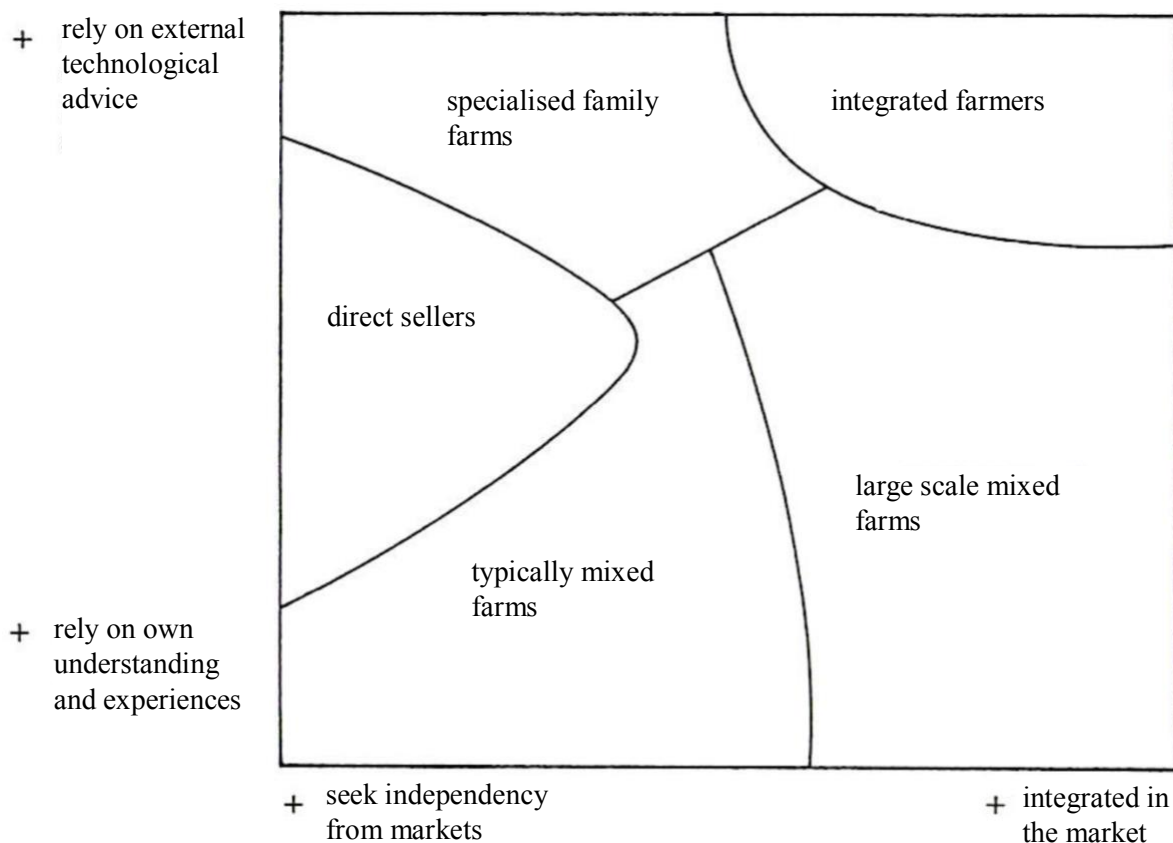
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APPENDIX I: CLASSIFICATION OF FARMING TYPOLOGIES IN PAJOTTENLAND

DESCRIPTION OF THE DIFFERENT FARMING TYPOLOGIES WITH THEIR CHARACTERISTICS, BY KERKHOVE (1993)

Farm typology	Characteristics
Large scale mixed farms	Farm grows jump-wise thanks to high investments, diverse but independent production, producing quantity over quality, relying on own knowledge and experience, market dependent
Typically mixed farms	Diverse and interlinked production, input-autonomy, low investment rate, knowledge and experience is turned into value, market-independent
Direct sellers	Adding as much on-farm value to the products as possible and selling on-farm, in farmer's shops, markets etc. market-independent
Specialised family farms	Technologically very up-to date farmers, rather small scale and market-independent
Integrated farmers	Non-grounded agriculture, highly dependent on banks and industries, market-integrated, highly specialised and mechanised, depending on external technologies

CLASSIFICATION OF FARMING TYPOLOGIES IN PAJOTTENLAND ACCORDING TO THEIR DEGREE OF DEPENDENCE FROM EXTERNAL TECHNOLOGICAL ADVICE (VERTICAL AXIS) AND THEIR DEGREE OF INTEGRATION IN THE MARKET (HORIZONTAL AXIS).



Taken from the book *Sterk gemengd* (Strongly mixed) by Greet Kerkhove (1993).

Original language: Dutch

Translated in English by Lucas Van den Abeele

APPENDIX II: ADDITIONAL LITERATURE REVIEW AND BACKGROUND ON PARTICIPATORY ACTION RESEARCH

One way of empowering farmers and helping them to overcome their technological and institutional lock-ins is by working more closely together with research institutes through **Participatory Action Research** (PAR). Farmers have more knowledge than they would often think and the challenge is to bring their knowledge to the foreground in order to be shared with others, farmers and researchers (Vaarst et al., 2007). Therefore, it is essential that research programmes shift from being *for* farmers to being *with* farmers (McIntyre, 2007). PAR questions and interchanges the role of both researcher and participant in order to augment reciprocal learning and improve useful outcomes for the participant (Louah et al., 2015). Opposite to traditional research which often leads to controlling people and practices, PAR aims at empowering and amplifying the voices of those that have often been forgotten in research by combining scientific and local knowledge, in other words, by combining theory and practice (Méndez et al., 2016; Meynard et al., 2012). In addition, Fals-Borda and Rahman (1991) define PAR as: “an innovative approach to economic and social change, which goes beyond usual institutional boundaries in development by actively involving the people in generating knowledge about their own condition and how it can be changed”. Indeed, PAR creates a learning environment or **safe learning space** where the different stakeholders can gain better awareness over their proper situation and define collective action in order to improve their working conditions and thus overcome the lock-ins they are confronted with (Neef and Neubert, 2011). Finally, PAR refers back to the concept of networks as its main outcome lies in the social network and social capital it builds through trust, confidence and knowledge sharing (Lilja and Dixon, 2008).

A disadvantage of PAR and engaged research is that it is complex and time-consuming as it does not objectivise, but properly considers the nuances the participants bring and the human interactions that take place within the research (Levin and Ravn, 2007). Critics claim that PAR results remains *islands of success* and thus cannot be extrapolated to other research cases (El-Swaify and Evans, 1999 in Neef and Neubert, 2011). Others even state PAR is *populist* and unable to produce rigorous and quality research (Neef, 2008). According to Levin and Ravn (2007), research that lacks in rigor, easily tends towards activism or draws researchers to become problem-solving consultants. Therefore, they advise every engaged researcher to gain a proper understanding of his/her influence on the given situation and the involved actors by practicing critical reflection (Levin, 2012). The processes of reflection, discussion and dialoguing are valuable to better understand and manage the researcher’s position and responsibilities within the researched group (Neef and Neubert, 2011).

APPENDIX III: INTERVIEW GUIDE (FARMING HISTORY)

This interview guideline provides the framework for a dialogue between interviewee and interviewer in order to understand the agricultural development in the region over the past 50 years. The starting question will be to describe a typical farm from the region, 50 years ago. Starting from this, the conversation will be guided over different topics in a fluent way, enabling the interviewee to express his/her point of view by providing time for observation and reflection. The list of questions below will serve the interviewer to tick off the addressed topics, rather than to ask one question after the other.

Farm scale

What was a typical farm like, 50 years ago?

- Farm-activities, scale, surface, type and number of animals, mixed farm or not, degree in autonomy, crop rotation, diversity, etc.
- Collaboration with fellow farmers and others?
- Where and to/from whom were the products sold/bought?
- How was knowledge exchanged and where did innovation emerge from?
- What was waste handled?

Farming in the area

- Which type of farming systems were present in the region, 50 years ago?
- How did these farms evolve over the years, which were the big farming trends and by whom were they led? How did the farms become the farms they are today?
- Which big events (manifestations) shaped farming practices over the past years?
- Which were the main cultivated crops in the area and what was their destination?
- How did the agricultural industrialisation evolve in the area?
- Which emerging new machines had a big impact on farming practices (pos. or neg.)?
- Which degree in autonomy did the region have in terms of food and agricultural products?

Economic

- Which were/are the big processing companies in the area?
- Which big companies established in the region and how did they influence farming practices?
- How stable or fluctuating has been the production over the years?
- How did the balance between family labour and external labour evolve on the farms?
- How did in- and output prices and wages evolve?

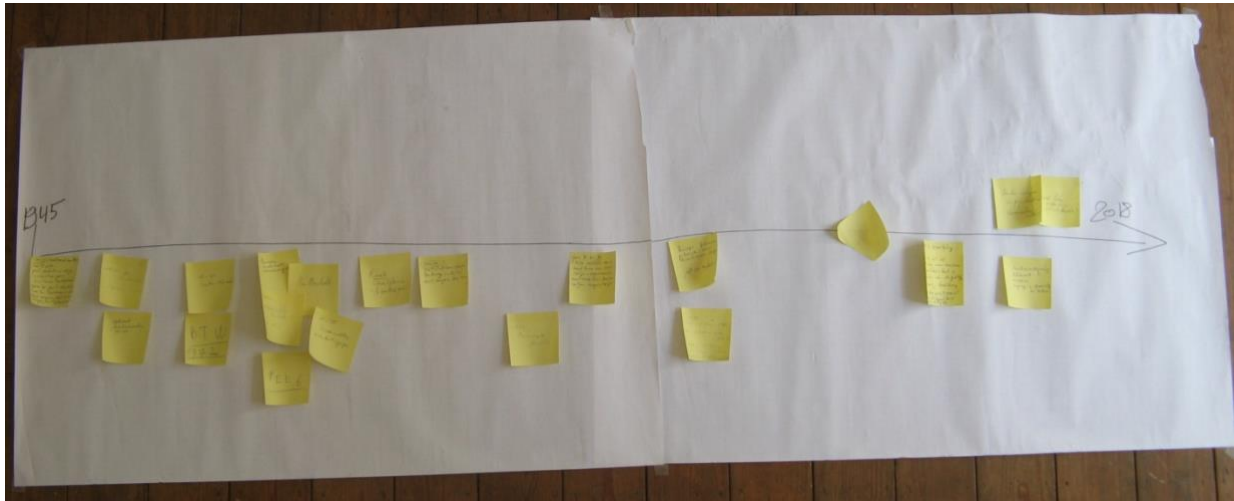
Political and institutional

- How far-reaching was the power of farmers unions, which ones were dominant in the region and what did they stand for?
- How did the influence of Boerenbond evolve in the region?
- How did national or European policy influence farming in the region?
- Which knowledge and advisory centres were present in the area and by whom were they led?

Social

- How did the farmers' identity and emancipation evolve over the years?
- Who were the influential farmers, the dominant farmers or innovative ones in the area?
- Which tensions were present between farmers, between farmers and companies, farmers and unions, companies and unions, etc.?
- How was the relation between farmers and city dwellers?

APPENDIX IV: OUTCOMES TIMELINE EXERCICE (FARMING HISTORY)



Timeline:

- '40 – '45 traditional agriculture
- '50 – '60 emergence of mechanisation
- '57 EEC agricultural policy – treaty of Rome (x2)
- After '58 big industrial and agricultural evolution in Belgium
- '60 – '70 tractor & milking machine
- '70s big infrastructure constructions (highway, industry), first European agricultural subsidies
- '71 manifestation against the Mansholt plan, scale enlargement (x3)
- '71 VAT
- '65 – '75 pesticides, production maximisation
- '76 – '80 landscape alters, regional plans protect agricultural land, suburban areas grow
- '81 Farmers market Gaasbeek
- '80 – '90 increasing European subsidies to compensate for GATT treaty
- '89 fall of the Berlin wall, liberalisation, cheap labour
- '92 CAP reform: industrial agriculture, capitalism, scale enlargement
- '94 GATT & WTO
- After 2000 increasing administrative pressure and electronical revolution
- After 2000 effect of excessive scale expansion, drawbacks from toxins, citizens' awareness, turning point thanks to health issues, awareness among the rich
- After 2000 Structure of the farms – family farms remain thanks to their conservative attitude
- After 2000 Environmental policies, climate policies, erosion, alteration of pesticides etc.
- After 2000 Local food supply chain, local processing, increasing local demand

APPENDIX V: DESCRIPTION OF THE FARMERS IN THE NETWORK AND THEIR LOCATION

A list of involved farmers in the network and during the research is given here with a brief description of their farms and their location on the map. Their real names and their addresses will not be revealed out of privacy reasons. The map only gives an overview of their location within the region.

Tim

Background:	No farming background, but followed a two-year training in organic farming and worked on many farms. Wanted to take over a farm without successors, but did not succeed and started his own farm with a colleague. Passionate about traditional wheat landraces and peasants' rights.
Occupation:	Part time farmer and part time employee at a regional ngo
Farm type:	Organic cereal and vegetable farm, exclusively local marketing
Land:	5 ha arable land
Crops:	Different cereals and numerous vegetables, traditional wheat landraces
Animals:	None

James

Background:	His parents bought his first field four years ago after which he started growing organic. Does not come from farming background, but has worked during summer time on many farms from the region. Very young and motivated farmer.
Occupation:	Student, farming after hours
Farm type:	Partly organic, partly in conversion
Land:	5 ha arable land
Crops:	Wheat, triticale, pumpkins, yacón, potatoes
Animals:	None

Steve & Calvin

Background:	Farmer's son, took over the farm from his parents (Karel – Calvin) who still help on the farm. Experienced farmer with knowhow on traditional practices and a well-developed social network.
Occupation:	Full-time employed at nearby industrial mill. Farming after hours.
Farm type:	Conventional highly mixed farm, partly self-processing and self-marketing
Land:	10 ha meadow and 28 ha arable land
Crops:	Wheat, barley, oats, maize, potatoes, different vegetables, different fruits,
Animals:	70 Limousin cattle and 60 chickens

John

Background:	Farmer's son, will take over the farm from his parents who are still in charge. He hopes to be able to further develop organic farming in the region and take part in a wider initiative, strengthening social bounds among farmers. Has as an objective to make his farm economically more viable.
Occupation:	Worked formerly as an agricultural contractor, works now as a labourer. Helps after hours on the farm
Farm type:	Organic mixed farm since 2005. Partly self-processing and educational farm activities with children
Land:	25 ha meadows, 9 ha arable land
Crops:	Maize and triticale

Animals: 6 Holsteiner dairy cattle

Ben

Background: No farming background, but followed a two-year training in organic farming. Bought land in 2012 and started farming in 2016.

Occupation: Works part time at the cooperative mill

Farm type: Organic vegetable farm. Sells partly through box schemes

Land: 1,3 ha arable land

Crops: Different vegetables, cereals, fruits and herbs

Animals: None

Paul

Background: Farmer's son, will take over the farm from his parents who are still in charge. Potentially interested in converting to organic and would like to become more autonomous from selling and retailing industry. Has as an objective to make his farm economically more viable.

Occupation: Full-time technical worker, helps after hours on the farm

Farm type: Conventional mixed farm

Land: 9 ha meadow and 6 ha arable land

Crops: Maize, wheat, spelt

Animals: 20 Limousin cattle

Lonnie & Wayne

Background: Formerly working as an economical engineer. Took over his parents-in-law's farm 20 years ago. He would like to become less dependent from selling and retailing industry. His son-in-law (Wouter – Wayne) is interested to take over the farm and might want to convert to organic.

Occupation: Retired, but full time farmer.

Farm type: Conventional farm, partly in agroforestry

Land: 6 ha meadows and 20 ha arable land

Crops: Winter wheat, barley, rapeseed, oats, potatoes, maize and occasionally hemp

Animals: None

Monika

Background: Started farming in 1988, converted to organic in 1989 as one of the first in the region

Occupation: Full-time farmers

Farm type: Organic vegetable farm

Land: 30 ha arable land

Crops: Pumpkins, broccoli, cauliflower, cabbage and triticale

Animals: None

Ron

Background: Started as a conventional farmer-baker in 2004, converted to organic farming in 2012 and stopped baking in 2016. Specialised in organic cereal farming and looking to develop a bigger network of organic farmers in the region.

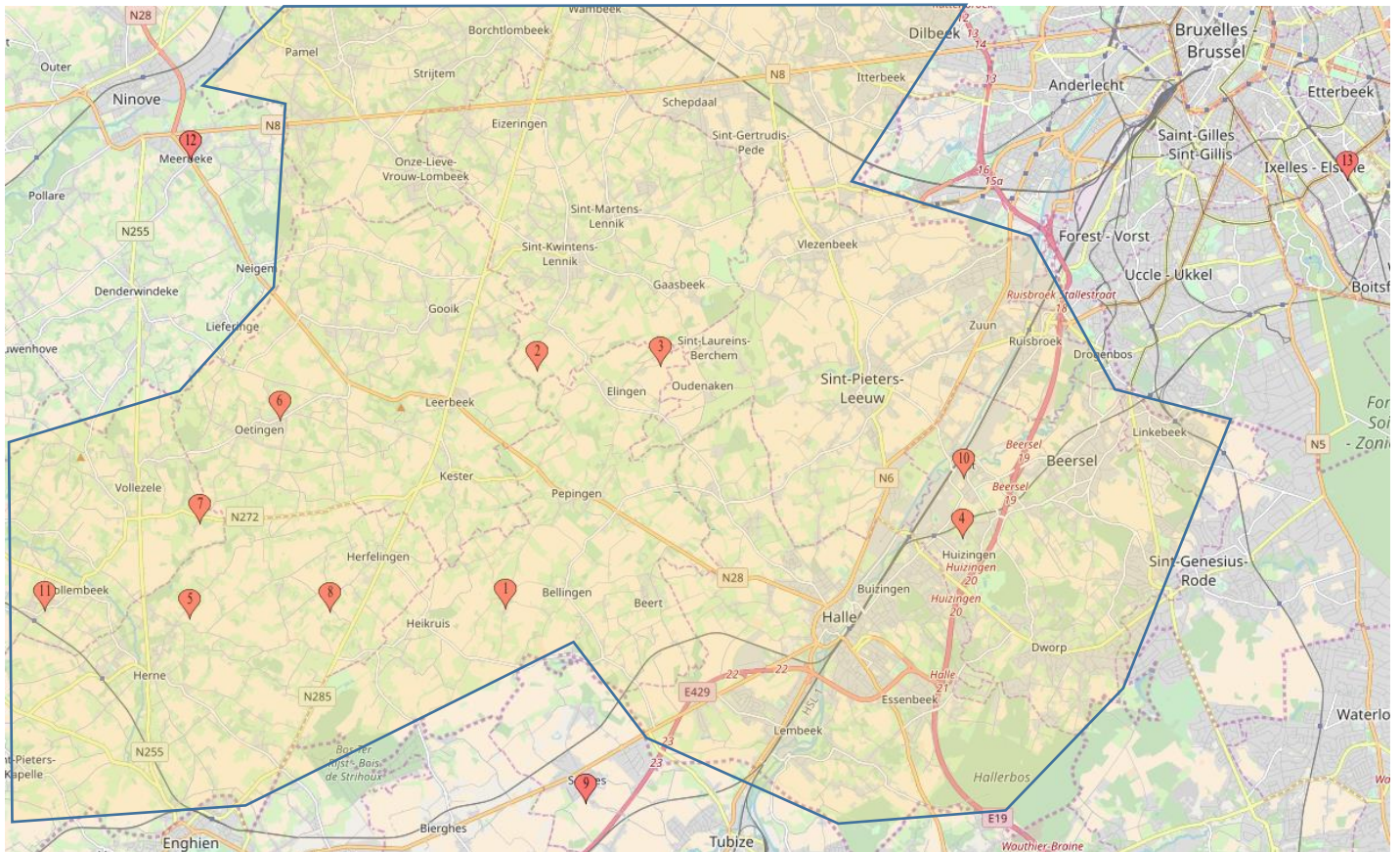
Occupation: Full time farmer

Farm type: Organic cereal and vegetable farm

Land: 68 ha arable land

Crops:	Beans, spelt, peas, winter wheat, potatoes, oats, rye and chicories
Animals:	None

MAP OF PAJOTTENLAND, SHOWING THE STAKEHOLDERS



Legend & Names

1. Tim
2. James
3. Steve & Calvin
4. John
5. Ben
6. Paul
7. Lonnie & Wayne
8. Monika
9. Ron
10. Brewery
11. Justin: Cooperative mill
12. Kate: bakery
13. Marjorie

The indicated area is the region of Pajottenland in the province of Vlaams Brabant – Belgium

APPENDIX VI: TECHNICAL SHEET SPRING WHEAT GROWING 2018 (FFS)

Variety selection

Epos and Feeling: compromise between, disease resistance and baking quality
Lavett, Sensas, Specifiek, Septima: high baking quality
Lennox: mix between winter and spring wheat, long cycle
Quintus, Tybalt: typical spring wheat varieties

Preparing the soil

Cover crop during winter: mowing and ploughing it under
Soil test, nitrogen availability, fertilising eventually

Sowing

Start of February till mid of March, depending on the weather conditions, preferably as soon as possible
400 seeds/m², ±170 kg/ha, sowing dense in order to compensate losses by tine harrowing
3-4cm depth in loose soil
Eventually sowing traditional wheat landraces on a small plot in the middle of the field as a trial for the brewery
Giving clear instructions to the agricultural contractor
(van den Bossche – 0495307104)

Weeding

Variety that covers well the soil
In crop rotation after temporary meadow or root crops

Tine weeder:

Preventive
Depending on the weather conditions
Best during the morning rather than in evening time and under dry weather
Controlling stand and speed
When to tine weed? – mimic greenhouse effect
Under high weed pressure, day after first tine weeding turn, tine weeding again but sideways or in opposite direction

Remaining mechanical weeding options:

Rotary hoe, complementary to tine weeder

Cultivator, requires to sow on rows of 20 cm distance and cultivating needs to be done precisely

Harvest

Regulating combine harvester not to harvest weed seeds together with the grains, give clear instructions to the agricultural contractor

Destination

Jan Andries bakery

Milling in Heetveldemill or Flietermill (organic)

APPENDIX VII: GUIDING QUESTION FFS CONCLUDING INTERVIEW

- What motivated you to participate?
- How satisfied are you of having participated?
- What did the collective approach add to the experience?
- What did you learn from others and what did they learn from you?
- What would you do differently if we had to redo it next year?
- Would you recommend other farmers to join the network?
- How could we organise the FFS differently to involve more farmers?
- Would you participate again and why?
- How important was it to know that the wheat would serve local processors, bakery or brewery – did it change something to the experience?
- Did you look for additional learning related to organic agriculture, YouTube, ask befriended farmers ...?
- How did you decide whether to tine harrow a second time or not?
- Did the FFS change your opinion on organic farming and how?
- Are there things you will do differently in your conventional cereal fields thanks to the organic experience, which ones?
- Why did you choose payment per tonne and not per ha?
- Did the price you got for the wheat cover the labour, time and investment you put into it? How is this in comparison to the conventional fields?
- What will you remember from the experience?

Meeting Cereal Network Pajottenland 6th of July 2018

Programme

- 16h Technical visit to the fields of James and Steve
- 17h30 Vision of the brewers and other cereal processors for closer collaboration with farmers: searched for quantity, quality, price, commitment, etc.
- 18h30 Farmers' reflection on the next steps within the network, who will participate and which obstacles still have to be overcome
- 19h30 Conclude with some food and drinks, offered by the brewery

Field Visit: Performed operations Epos Spring Wheat growing 2018

James

- 24/09: Sowing green cover, 28 kg Mixagro (Fodder radish - *Raphanus sativus*, California bluebell - *Phacelia campanularia*, Rye - *Secale cereale*, Vetch – Vivia, White Mustard – *Sinapis alba*)
- 18/02: Mowing green cover
- 24/03: 25 T cow manure, ploughing first part, but too wet conditions
- 08/04: Ploughing in the morning, sowing in the afternoon: Epos (175 kg). Appropriate weather conditions
- 28/04: 1st tine weeding turn, once through the field on lowest position
- 10/05: 2nd tine weeding turn, once through the field on middle position

Steve

- 26/09: 20 T cow manure
- 27/09: Sowing green cover, 28 kg Mixagro (Fodder radish - *Raphanus sativus*, California bluebell - *Phacelia campanularia*, Rye - *Secale cereale*, Vetch – Vivia, White Mustard – *Sinapis alba*)
- 22/03: 14 T cow slurry
- 24/03: ploughing (drying weather)
- 25/03: sowing wheat: Epos 175 kg (rain during next days)
- 22/04: 1st tine weeding turn (started raining directly after), once through the field on lowest position
- 10/05: 2nd tine weeding turn, once through the field on middle position

**Pajottenland – the cereal supply yard for Brussels and environs:
Organic agriculture + local processing = a sustainable economic model**

The need for this initiative

From the beginning of the 20th century, the industrialization of European agriculture accelerated. It gained in force by two world wars and an equal number of agricultural crises. The first pesticides and fertilizers were already developed and marketed during the interwar period and after the Second World War these products took a big flight in Europe, together with the replacement of labour by machines and capital. Scale enlargement, globalization, outflow of labour to industry and the services sector, overproduction and the ensuing price pressure created an unrelenting pressure on the family and mixed farm. The paradox is that Belgium produces the highest yields per hectare and per labour unit in the world, but it fails equally in offering farmers a decent income as less fortunate countries.

The first price crisis for cereals is already happens in the nineteenth century. Gigantic agricultural areas in the New World could produce cheap grain that undermined local cereal production. More than a century

later, this evolution has ensured, among other things, that the whole cereal chain became frail, globalized and anonymous. The logical link between the farmer, processor (miller & baker, malt & brewer) and consumer was lost. Baking and brewing cereals are imported in large quantities from anonymous foreign countries and even larger quantities of local cereals are declassified into animal feed grain, partly because industrial baking processes does not allow natural variation.

(Local) cereals should however stand as the emblem of our food culture: bread and beer. How discouraging is it for farmers to see this emblem has been taken out of their hands?

Objective and long term goal of the cereal network

This charter aims to unite a group of like-minded people around a shared vision:

1. Come back to local partnerships between farmers and processors;
2. An absolute choice for organic farming out of respect for people and nature;
3. Coming back to, for the Pajottenland, original grain varieties, in particular wheat and barley;
4. Ensuring a fair price for the farmer and with a higher esteem for the farmer's craftsmanship.

The ultimate goal is to combine supply and demand in a cooperative or similar partnership and to jointly carry the annual surpluses / shortages / other risks.

Eventually, a tourist component can be linked to the network. Two target groups in particular are interested in experiencing the origin of their food:

- The many (international) beer lovers who visit Brussels and the region of Pajottenland in search of traditional (Lambic) beers
- The critical consumer / citizen from Pajottenland who values a healthy agricultural model, a short food supply chain and who wants to see where his/her bread, beer, ... comes from. Pajottenland, the traditional hinterland of Brussels, can play a pioneering role here.

All this is supported by the rich tradition of food stores, restaurants, bars, brewers and bakers in and around Brussels.

Who supports the network

- Farmers
- Mills
 - o Flietermill
 - o Heetveldemill
- Bakers
 - o Jan Andries
 - o Hopla Geiss
 - o Broodnodig
- Malting plans
- Breweries
 - o Brewery 3 Fonteinen
 - o Brewery De la Senne
 - o Brewery Cantillon
 - o Brewery Belgoo
- Researchers
 - o Marjolein Visser
 - o Lucas Van den Abeele
- Restaurants

Contactdetails

Network's Coordinator:
Lucas Van den Abeele:
0497047142 -
lucasvandenabeele@gmail.com

Processors:
3 Fonteinen: Molenstraat 47,
1651 Lot - info@3fonteinen.be
Flietermill: Flieterkouter 43a,
1570 Tollembeek - 054 24 80 83

APPENDIX IX: MAX-MIN TOOL NETWORK MEETING

TRAINING FOR CHANGE

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Maximizing/ Minimizing

the value of a learning experience

A specific kind of discovery list. The facilitator first asks "How, in your experience, do you maximize the value of a learning experience? For example, maybe a friend offers to show you how to use a new computer program, or you go to an evening class to learn a new skill. How have you found that in your life you're able to maximize the value of a learning experience?"

Note that you are *not* asking them how the teacher can be more effective, or how the environment can be more supportive. The teacher may be terrible and the environment worse. The point of this exercise is empowerment. How can *you* maximize the value of a learning experience? Be very clear about this in your own mind, and when a participant offers an idea which is not about what they have the power to do, explain again the intention of your question: what do *you* do to maximize . . .

List the ideas, and interact, ask for an example or two, ask for hands on how many others have found that a way of maximizing the value, ask for surprising ideas that might not already be Conventional Wisdom in the group.

When they are with you (no need to make this an exhaustive list), switch to "How, in your experience, do you *minimize* the value of . . . ?" Smile, assure them this is honesty time, give permission for them to do self-disclosure. Interact a lot with them after the first one or two (not at the outset). Ask them for examples at first, then ask them how that way of minimizing might show up in this workshop. "Ah, you get sleepy after lunch and zone out? How many others sometimes do that (hands)?"

"What have you found works when you zone out, to bring yourself back to the present?" Get some options from participants -- no need to write those up. Another way to ask this question is: "If this shows up in this training, how will we know?"

You have options after this list is up, like forming buddies to talk about how to handle these discoveries ("What support do you need?) or small groups to take different ones of the Minimizing list and do problem-solving.

Note: While this write-up is applied to your learning, it could easily be applied to how do you maximize or minimize your staff meetings, your demonstrations, your fundraising dinners, your board meetings, your lobbying visits with legislators.

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APPENDIX X: FACILITATION SHEET NETWORK MEETING

FACILITATION FARMERS4 REFLECTION NETWORK MEETING

DATE: 6/7/2018

LOCATION: Lot

REMAINING INFO:

THEME: collective discussion with farmers in order to shape a cereal network in Pajottenland between farmers, millers, bakers and brewers that aims at strengthening the farmers' situation

- farmers understand what the network offers and feel involved
- identify bottlenecks/barriers/obstacles/doubts and chances or opportunities the network could offer
- discuss the next steps within the network, who joins in

DURATION: 60 min

beforehand: presentation brewery and cereal processors about quality, quantity, price, logistics...

Time	What	Objective	Materials
18:30	MAX MIN network		Flipcharts,
19:30	→ (Intro (explaining the objectives of the exercise)		tape, markers
(E)			
5'	<i>'I shared this with you as a plan to start thinking about what role this network can play, what opportunities and benefits this can offer for each of you, but also to be realistic - what can stand in the way and how we might be able to deal with this; because the ultimate objective remains to <u>strengthen your position as a farmer</u>'</i>		
	“Think back to the presentations you just heard, what you have seen on the field, the ideas or questions that came to mind this afternoon”		
5'	→ <u>Exchange</u> with your neighbour what <u>opportunities, benefits or support this network could offer you or your farm?</u> Summarise the one or two main elements in a few words that you will share in the whole group after five minutes. Invitation to keep in mind that both of you are speaking	- mapping how the network can provide positive support for farmers (benefits)	co- facilitator takes notes on the flipchart and marks repeated ideas
10'	→ <i>Harvesting ideas</i> : each duos speaks (starting with the most important element). Second round, something not named? Indicate if it is already named. Closing check if something else has emerged.	- container building - each one gets the chance to share ideas	
5'	→ Now exchange with other neighbor what possible <u>obstacles, doubts or bottlenecks</u> that could impede you from participating in this network?	- mapping the factors that would prevent the network to be 'successful'	

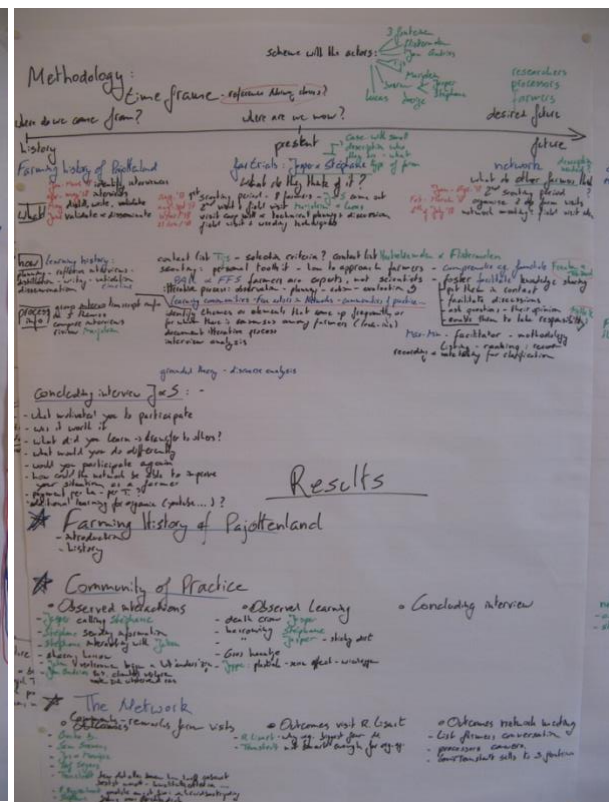
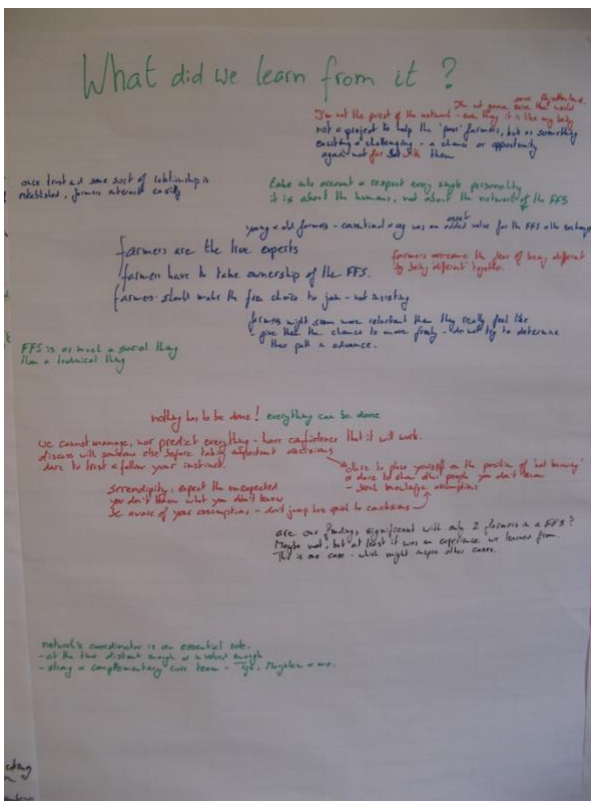
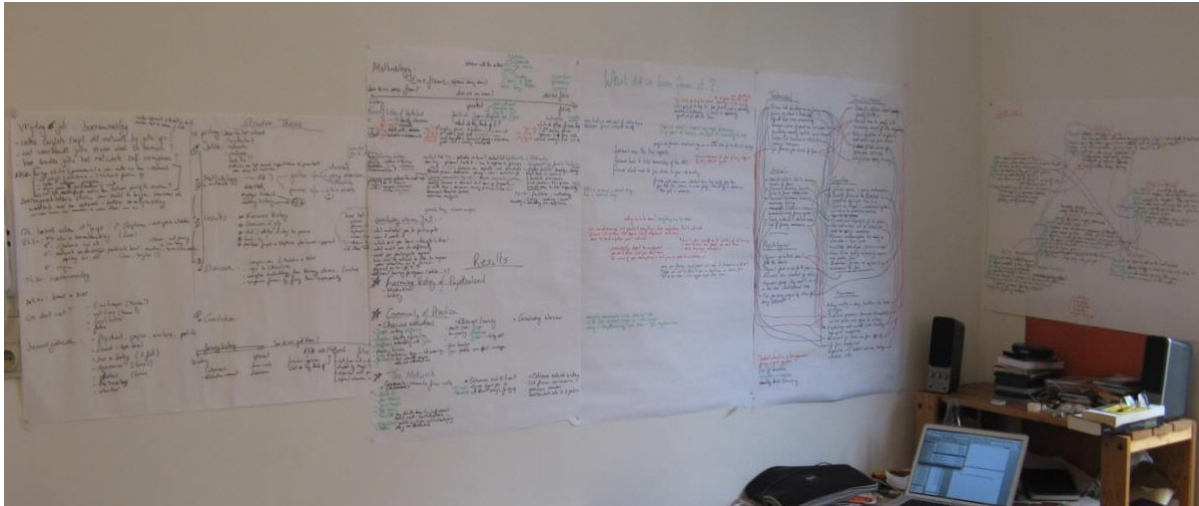
10'	→ <i>Harvesting ideas</i> : each duos speaks (starting with the most important element). Second round, something not named? Indicate if it is already named. Closing check if something else has emerged.	- container building - each one gets the chance to share ideas	
R 5'	→ Anything to add to the list?	- make sure to bring underlying elements or factors to the surface	
G 5'	→ Think for yourself now if you had to should choose one element from each column what would it be, which is your priority? Take a few minutes of reflection time here - and mark the element with a marker.	- giving significance to / weighting the listed factors - physical movement to keep the brain fit	Markers
A 10'	→ In trios: choose one or more obstacles, and think from your own experience what a possible solution might be; practical example: " <i>example obstacle + solution</i> " → plenary feedback (<i>if not enough time to write</i>)	- bring up knowledge and experiences from the group	Cards/ post-its
(5')	Conclusion: (if enough time first exchange with neighbor) Short circle where each one expresses if he feels like: - what do you take with you from this evening? - how do you see your place in this network? (participate in, help to shape, interested in, want to be informed about ... the network)	- get a quick idea of what they got out of it	On flipchart?

Written by An Maeyens (facilitator) for brewery 3 Fonteinens

Original language: Dutch

Translated to English by Lucas Van den Abeele

APPENDIX XI: MIND MAPS TO PROCESS INFORMATION



APPENDIX XII: HARVESTING TRADITIONAL WHEAT LANDRACES ON TIM'S FIELDS

Multiplying and growing traditional wheat landraces is an important aspect within the emerging cereal network, especially because the brewery is looking for specific landraces to use. Farmer Tim had already begun multiplication from his personal interest and was happy to continue doing so for the brewery. However, multiplying requires different techniques and specific knowhow. That is why we decided not to integrate this yet in the FFS, not making it too complex for the early participating farmers. Nevertheless, farmer Tim was assisted during harvest of the multiplication plots as it is an intensive and time-consuming task. On the one hand, first year multiplication plots (about 2 m²/variety) were harvested manually and tied together, waiting to be threshed. On the other hand, second year multiplication plots (0,25 ha/variety) were harvested separately by the means of a regular combine harvester and big bags in order to separate each variety.

During harvest, Tim expressed his anxiety of being judged by agricultural contractors and neighbouring conventional farmers for being too alternative and not enough of a *real* farmer. Last year Tim almost lost his entire harvest because of the many weeds in his field. This was due to two reasons: the humid conditions during harvest, and not daring to ask the contractor to adjust the combine harvester in order to collect only the wheat grains. As a result, the batch of wheat was stuffed with humid weed seeds which could make the wheat moist within one day. Together with miller Justin he cleaned and dried the whole batch manually. This time again, he feared the contractor would not have the time, nor the willingness to harvest the four different wheat varieties separately on one field. However, after explaining the utility of the different traditional wheat landraces and what they would serve for, the contractor was happy to spend more time harvesting them separately. Even Calvin, who had been asked to bring back with his tractor the wagon filled with cereals to the farm, was glad to assist this particular wheat harvest. Both Calvin and the contractor did not in the least judge Tim because of his *craziness*. On the contrary, they were happy to assist him. What comforted Tim even more were the two photographers who documented the harvest on request by the brewery, whom the four harvested varieties were destined for. All of a sudden Tim felt people were showing interest for the hard work he had been doing over years, multiplying traditional wheat landraces. Harvesting on Tim's fields illustrated the psychological and cognitive lock-ins Tim is confronted with and how he managed to overcome them.

WHEAT LANDRACES HARVEST FIRST YEAR
MULTIPLICATION PLOTS

IMAGES BY FREDERIC VANWALLEGHEM



WHEAT LANDRACES HARVEST SECOND YEAR
MULTIPLICATION PLOTS

IMAGES BY FREDERIC VANWALLEGHEM





APPENDIX XIII: INTERLINKED LOCK-INS

