6 Resilience of Dairy Farming in Flanders

Past, Current and Future

ISABEAU COOPMANS, ERWIN WAUTERS,
JO BIJTTEBIER AND ERIK MATHIJS

6.1 Introduction

6.1.1 Agriculture in Flanders

Flanders is a mostly flatland region occupying a size of about 13,500 km^2 in the Northern, Dutch-speaking part of Belgium. Due to its fertile soils combined with a temperate climate, the agricultural sector in Flanders has a rich history and has generally been perceived as an important societal pillar for at least more than one and a half centuries. As in most European regions, the structural evolutions during the last decade include a shrinking population of farms (from 28,331 in 2010 to 23,225 in 2017), increasing average farm sizes, mechanisation and automation of agricultural activities and an increasing share of older farmers over younger farmers. Due to a very high population density, competition for agricultural land is very high in Flanders, resulting in high land prices (Danckaert et al. 2018a).

6.1.2 Dairy Farming in Flanders

In 2017, dairy farming accounted for about 13 per cent of the total final production value of Flemish agriculture. As Figure 6.1 shows, dairy farms are spread over the whole of Flanders, but tend to show some regional concentration, whereby the provinces of Antwerp, East Flanders and West Flanders contain regions with a relatively high amount of intensive dairy farms. Over the last decades, the Flemish dairy sector has gone through major structural changes (Danckaert et al. 2018b). The number of farms holding dairy herds has shown some fluctuations between 2012 and 2017, but on the whole, remained at around 6,000 farms (Departement Landbouw en Visserij 2020). About half of these are specialised dairy

https://doi.org/10.1017/9781009093569.007 Published online by Cambridge University Press

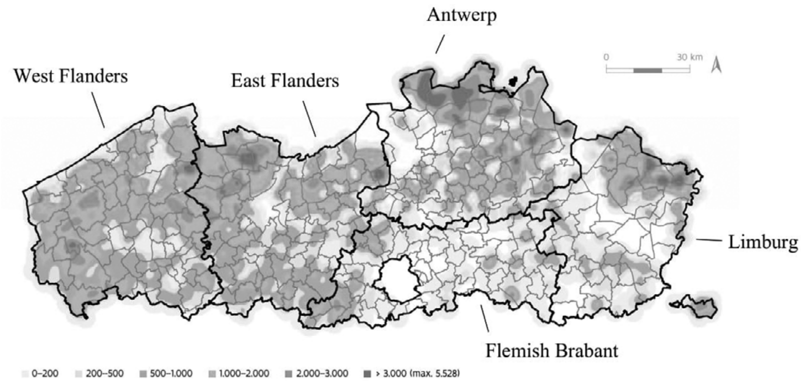


Figure 6.1 Importance of dairy farming in Flanders per municipality (euro standard output per hectare) in 2017.

Source: Departement Landbouw en Visserij, VLM-Mestbank en Informatie Vlaanderen

farms, and especially this group has remained stable since 2012 (Danckaert et al. 2018b). Therefore, the proportion of specialised dairy farms in relation to the total number of dairy farms is increasing. The average number of dairy cows on these specialised dairy farms has increased sharply: from fifty dairy cows in 2007 to eighty-five in 2017. Scale enlargement, combined with increased productivity, has led to a remarkable increase in milk production in Flanders, as will be elaborated in Section 6.3. In 2019, on all Flemish dairy farms included, 339,087 dairy cows produced almost 3 billion litres of milk. Farm sizes are substantially increasing, yet family farming remains the predominant business management model in this agricultural sector. Very rarely is all the cultivated land also in the property of the farmer or farming family. Legally speaking, most farms are sole proprietorship. On these farms, a Flemish dairy farm manager was aged 51 on average in 2016, and 18 per cent of them had a designated successor. Interestingly, recently more and more partnerships are being founded (currently 14 per cent), parallel to the risks associated with increasing farm sizes in terms of economic performances (expressed by EU SO typology) (Danckaert et al. 2018b).

6.1.3 Outlook for This Chapter

The underlying causes of these structural changes are discussed in what follows, as well as the role of different actors in the Flemish dairy farming system and its enabling environment. Government has played a major role as regulation of the EU market has disappeared (quota, production levies, etc.) over the last decades and liberalisation of free trade is increasing. The extra litres of milk resulting from this quota abolishment need to be processed further down the chain and eventually marketed. Besides causes, the impact of structural changes will be discussed. A great deal of the produce is traded, especially within Europe (Danckaert et al. 2018b). Export-oriented production makes the farming system susceptible to events in neighbouring countries and, by extension, in the rest of the world. In addition, the increased intensification of production also has a number of consequences for the public functions of the farming system, which pose additional challenges. Some strengths and weaknesses of the farming system are highlighted, which have an impact on its current and future resilience capacities. The remainder of this chapter discusses these aspects based on various research activities from the SURE-Farm project. All findings presented hereafter are also summarised in Annex 6.1. The methods used for data gathering and data interpretations are carefully explained in Chapter 1. These included: (1) an online survey assessing farmers' perceived risks and resilience capacities (Spiegel et al. 2019); (2) both desk research (policy document analysis) (Lievens and Mathijs 2018) and bottom-up research (in-depth interviews) (Coopmans et al. 2019c) about policy impacts on the resilience of the farming system; (3) interviews with farmers and farm household members exploring factors that affect generational renewal in agriculture (Coopmans et al. 2019b); (4) interviews investigating sources and informants impacting operational, tactical and strategic decision-making by farmers (Urquhart et al. 2019); (5) biographical narratives with farmers to understand farm developmental trajectories (Fowler et al. 2019); (6) agent-based modelling of farm structural change (Pitson et al. 2020); and (7) a workshop examining broad stakeholder perceptions on the current resilience of the system (Paas et al. 2019). Hence, this chapter is based on both qualitative and quantitative data, all aimed at better understanding different building blocks of resilience.

6.2 The Dynamics and Growth in the Sector Are Both a Sign of and a Challenge for Resilience

The Flemish dairy farming sector has experienced quite some dynamics in recent years. A combination of factors has induced structural investments that lead to an overall growth and structural change. Amongst the most important factors are the quota abolishment in 2015, a relatively favourable long-term market outlook, low profitability in the beef sector pushing these farmers into milk production, and technological development. Total milk production in Flanders increased by 21 per cent between 2015 and 2019 (BCZ 2020a). In the same period, the total number of cows increased by 7 per cent and average production per farm increased by 33 per cent. In 2015, some farms grew to over 1,000 cows for the first time. There is evidence of spatial structural change whereby dairy farming is losing relative importance in some areas, but gaining relative importance in other areas, as was also illustrated in Figure 6.1. This development is both a sign of and a challenge for the future resilience of the farming system, as we argue next.

The growth of and structural change within the sector are signs that the sector as a whole, and many individual farms within it, possess a substantial degree of resilience, both in terms of robustness and adaptability/transformability. Since 2010, the growth in the sector has been continuous and structural change has been accelerating. Yet, the dairy farming system has been subjected to a number of challenges in this period, such as at least two periods with very low prices, the Russian import ban, drought, more stringent environmental regulation and growing societal pressure on milk production from an environmental, animal welfare and health point of view. Some of these challenges have to some extent triggered the structural developments; however, the latter also took place in spite of many of these challenges. Dairy farmers have been able to profit from an enabling environment that supported the system's robustness against these challenges relatively well. Pillar 1 payments, a strong agricultural knowledge and innovation system (AKIS), a milk-processing sector that attempts to support its farmers, and governments that provided additional support during crises contributed to this. Furthermore, investment subsidies, banks and a strong and diverse AKIS also provided support for structural investments by many dairy farmers. Although instruments for investments into adapted or transformed modes of farming are available, and have to some extent been used by a small share of dairy farms, the main investments have been in business-as-usual modes of farming. Nonetheless, agent-based model simulations suggest that this enabling environment is also keeping inefficient farms in the sector, and as such hinders further structural change and prevents remaining farms to exploit economies of scale (Pitson et al. 2020; Chapter 3).

At the same time, this growth in total production and in dairy cows is a challenge for the future of the dairy sector that potentially threatens its system functions. Through the growth in total production and cow numbers, its' environmental footprint might increase, thereby leading to further societal pressure and, possibly, political restrictions. For instance, whereas productivity gains resulted in a decrease of the total sector's greenhouse gas emissions, its share in nitrate pollution is increasing. The sector reacts in two main ways, aiming to increase the robustness of the sector against these challenges. One is technological developments that improve the eco-efficiency of milk production, the other is attempting to counter this pressure by communication activities that highlight improvements in environmental performance and the possible place of dairy products in a healthy and sustainable diet.

Another threat that arises from this increase in milk production is the increased vulnerability to market disturbance. Flanders' degree of self-sufficiency increases and is above 100 per cent. Hence, for the milk price, the sector is dependent on the global market, export possibilities and the capacity of the processors to add value. This leads to a vulnerable situation, as, for example, the price decrease during the COVID-19 crisis has shown.

6.3 Social Capital as a Robustness-Increasing Asset of the Farming System

Social self-organisation has the potential to contribute to resilience (Cabell and Oelofse 2012; Meuwissen et al. 2019), particularly when connections are expanded to include supply chain actors. Due to milk's high perishability, the incentive to vertically coordinate is particularly high in the dairy sector. In addition, the sector's ability to cope with market changes strongly depends on the dairy processing industry's ability to switch between different products (fresh milk, cheese, butter, skimmed milk powder, ice-cream, etc.), while also the sector's adaptation strongly depends on dairies' abilities to innovate and add value.

The Flemish dairy sector has a strong history in collaboration. First, about two-thirds of all milk is processed by dairy cooperatives. Second, several initiatives bringing together dairy farmers and processors have been established. In 1999, the Flemish dairy sector established a

Complete Dairy Quality Assurance (DQA) Scheme to incorporate all food safety, environmental and animal welfare regulations. The scheme is based on farmers' self-monitoring and involves the three Belgian farmers' organisations and the Belgian association of the dairy industry (IKM 2020). In 2019, an interbranch organisation (MilkBE) has been established by the same actors. MilkBE currently focuses on milk contaminants and botulism (BCZ 2020b).

In the Flemish dairy sector, self-organisation mainly contributed to increased robustness and less to adaptability and transformability. Expanding the base for self-organisation to supply chain actors, such as dairies, increased the ability to cope with shocks, because it entailed more storage capacity available for processed milk, and more flexibility and modularity for milk processing activities. This is particularly the case for cooperative dairies as it is their aim to support their members. Supply chain actors can also assist farmers in implementing innovations aimed at adapting their farming. However, self-organisation in which supply chain actors are involved results in lower incentives to transformative change. Dairies have high asset specificity and strongly depend on their local supply base. Hence, it is in their interest to stabilise or even increase milk volumes (to capture economies of scale), which makes them oppose adaptations or transformations aimed at reducing milk production or marketing dairy products in different ways. Furthermore, collaboration implies coordination costs, which increase with increasing heterogeneity in farmers' attitudes and practices. Our results showed that some farmers felt that their influence on the course of cooperatives had decreased in the last twenty years. The increasing sizes and commercialisation of these organisations made these farmers feel left out (Coopmans et al. 2019a).

6.4 Public and Private Functions of the Farming System: Search for Balance

Results from the stakeholder workshop showed that the most important functions attributed to the dairy farming system are income generation for farmers and the delivery of high-quality food products for consumers. Not surprisingly, farmers rated economic viability as more important, while industry and other stakeholders gave higher rates to food production and maintaining natural resources. In contrast to the perceived importance of different system functions, their performances were rated similarly by both farmers and industry stakeholders, whereby they unanimously perceived the provision and maintenance of public goods (e.g. biodiversity) as better compared to that of private goods (e.g. food products) (Coopmans et al. 2019a). However, official statistics do not fully confirm this, as, for instance, nitrate pollution from dairy farming is increasing. In the same line, farmers perceived environmental challenges as less constraining compared to economic and institutional challenges (Fowler et al. 2019).

These results are also reflected in coping strategies of the farming system over the last decades. Increasing production efficiency and scale enlargement are mainly strategies to deal with decreasing margins, and have resulted in increased milk production, per cow, per farm and at the level of the farming system. Having to cope with environmental issues is mainly the result of measures imposed by regional and European regulations. However, despite increasingly strict regulations on manure application, the quality of surface and groundwater in Flanders remains inadequate. Expectations regarding emissions from the Flemish agricultural sector in 2020 show that additional measures will be needed to achieve the 2050 objectives. These objectives indicate a reduction of greenhouse gas emissions from the agricultural sector (both energetic and non-energetic) to 3.5 Mton CO2eq by 2050 (7.5 Mton CO2eq in 2017). Besides that, by 2050, agricultural practices should allow a continuous rise of soil carbon content or remain stable at a high level (Vlaamse Overheid 2018). At the European level, the 'farm to fork strategy' and 'biodiversity strategy' will force the sector into taking additional measures to meet ambitions regarding biodiversity and environmental impact in general. However, our results showed that farmers believe that they already put sufficient effort into maintaining natural resources and protecting biodiversity. They occasionally argue that sectors other than agriculture should also contribute towards a climate-neutral society, instead of agriculture always being looked upon as the 'predominant polluting industry'. Farmers feel that their efforts are undervalued, with sometimes a negative impact on their motivation to continue farming (Fowler et al. 2019; Urquhart et al. 2019).

Nevertheless, the trend of increasing environmental awareness and societal concerns on animal welfare will likely continue. The dairy processing industry adapts its product portfolio by including more and more plant-based alternatives for milk. A recent report from think tank RethinkX predicted the disruption of dairy farming systems in the following decade due to the emergence of lab-grown proteins (Tubb and Seba 2019). It is highly questionable whether it will go that fast, but it does not seem impossible that the industry and/or technological development will force adaptation and/or transformation of the current farming system. Or will regional and European policies provide sufficient incentives or actions so as to enable the farming system to respond to the ever-increasing pressure on current production methods? The reaction of milk production and dairy processing (supported by many stakeholders from agricultural government department, banks and input suppliers) has mainly been to try to counteract these trends by communicating about environmental improvements that have been realised and about the possible health benefits of dairy products.

6.5 Resilience: More than Robustness – What Can Policies Do?

Past and current strategies to deal with shocks and stresses contributed to the robustness of the Flemish dairy farming system. Both strategies implemented by the actors in the farming system and by actors in the enabling environment contributed mainly to robustness. This is not surprising as this is in line with the long existing goal of providing high-quality food at low prices, so it is important to maintain milk production both in quantitative and in qualitative terms.

Robustness is an important capacity as a short-term answer to disturbances and shocks, while adaptation to change happens on an intermediate time span, and transformations of the system are mainly observed over longer time scales (Chapter 4 of this book). Because of this, robustness is easier to assess, compared to responses that imply gradual changes in the farming system, ultimately resulting in adaptation or transformation. However, in the project, we do acknowledge the importance of adaptive and transformative capacity as contributing to the resilience of farming systems. Also, other stakeholders from the Flemish dairy sector are of the opinion that maintaining status quo is not always the best contributor to a better resilience. However, there is no full consensus on whether the emphasis of policies that enhance robustness is disproportional. Some agree that this emphasis is illustrated by the share of the CAP budget that flows to the dairy farmers under the form of pillar 1 payments. Taking up one quarter of the total Flemish direct payments budget in 2016, dairy farming is supported considerably more compared to horticulture and pig farming, yet arable and beef cattle farming are more known for being dependent on direct payments. However, some underline that the robustness-oriented character of the agricultural policy has been mitigated during the last few decades by a systematic shift of budget shares from pillar 1 to pillar 2 combined with a drastic decrease in the amount of market management measures (which are notorious for extending economic problems rather than providing a constructive solution) in order to comply with the European ambition to encourage farmers to engage in market-oriented production (Flemish Government 2013).

Nevertheless, it is important to consider what resilience capacities are aspired to with certain policies. Sometimes a focus on robustness can have a negative impact on adaptation and/or transformation, because the support for status-quo modes of production outcompetes adapted modes of production. Striving for uniformity in production, for example, makes it easier to support farmers, both technically and policy-wise. Less diversity between producers is also more efficient for the processing industry as well as for input suppliers. Nevertheless, heterogeneity between farms is considered a characteristic of resilience, as it has a positive impact on functional and response diversity. Another example is the intervention during the recent COVID-19 crisis. Short-term interventions (in this case private storage aid) are still important for crisis management. Some stakeholders ask for more emphasis on adaptability- and transformability-facilitating policies. A sector-wide dialogue can support a shared long-term vision for agricultural production in Flanders and the role of dairy production in the provision of public and private functions. This might result in tailored actions to make the Flemish dairy sector more resilient to future challenges.

It might be valuable to focus on strategies and policies that contribute to all resilience capacities. SURE-Farm policy research has revealed that policy goals are to a large extent aiming to support both robustness and long-term adaptability of the dairy-farming system, while aspects related to transformability are seldom implemented in policy goals (Lievens and Mathijs 2018). Remarkably, although robustness and adaptability characteristics are clearly present in policy ambitions, the corresponding policy measures do not always succeed in realising the anticipated effects. One of the observations that led to this finding was that farmers are either not aware of the variety of support measures at their disposal, or they are confronted with multiple obstacles like administrative complexities that hinder or even withdraw receipt (Coopmans et al. 2019c). By way of contrast, where transformability-related ambitions are lacking in policy objectives, there are policy instruments in place, such as specific subsidised trainings and a budget exclusively destined for innovative projects, which offers strong potential to improve transformability in the sector. The main lesson learnt herein is twofold. First, policymakers should better evaluate and monitor the feasibility of the measures in force to achieve the proposed and foreseen results. Second, policymakers should be aware of the opportunity to broaden and enrich the scope and use of existing measures, particularly with transformability-enabling elements.

6.6 Conclusion

The main findings of the SURE-Farm research in the Belgian case study are visually summarised in Annex 6.1. The Flemish dairy farming system has been showing signs of robustness and adaptive capacity, mainly materialised in large structural changes of the sector. This robustness has been supported by strong social organisation of the farming system, both at the level of the AKIS and a long history of collaboration among supply chain actors.

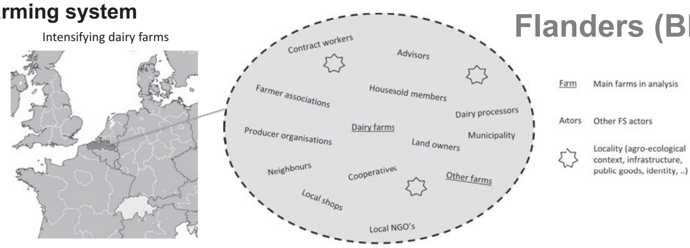
However, putting much effort in robustness might slow down the adaptive and transformative capacity of the farming system. Some specific long-term stresses, however, warrant mainly adaptation and/or transformation in the long run. In this respect, policymakers should also be aware of the limitations of robustness-enabling instruments. Resilience was explicitly taken up in the central themes formulated by the Flemish government to guide the implementation of Rural Development Programme-related measures, which indicates that policymakers acknowledge, at least implicitly, that resilience is more than protecting the status quo through direct financial support and market management – measures that are often related to robustness.

Resilience capacities can be supported by a wide range of resilience attributes, which might be the subject of future policies. Some attributes stimulate particularly one capacity. Others stimulate mainly all capacities. Attributes influence each other. Further study is needed to identify the relationship between resilience attributes and all capacities of the dairy farming system in Flanders. This might be a prerequisite to further tailor support from the enabling environment.

Farming system

Intensifying dairy farms

Flanders (BE)



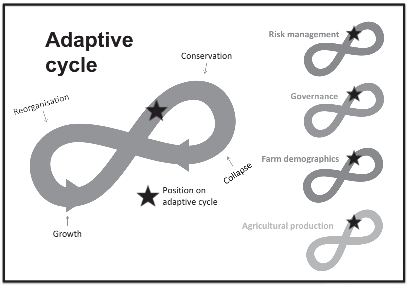
Challenges

Institutional
- Changing regulations
- Low availability & high price of land

Environmental
- Extreme adverse weather events

Economic
- Volatile milk prices, including possible price drops
- Changing consumer demand to less animal-based food

Social
- Societal acceptability



Essential functions' performances

Private goods
- Income generation: low for those employed in agriculture, good for those employed in food industry
- High-quality dairy production: good
- Dairy farmers' quality of life & wellbeing: low

Public goods
- Maintaining natural resources in good condition, animal welfare: potential pitfall in (nearby) future

Resilience capacities

Robustness has been relatively high, yet mainly through enabling environment support

High focus on protecting status quo; low interest in support and perceived need for transformability

Low to moderate adaptability and transformability; support exists but is much less used. However, low interest in and need for transformations makes analysis of transformability difficult

Resilience attributes

Diversity low	Although dairy farms are diverse in terms of sizes and functions, high specialization and intensification levels induce low functional diversity at sector level. Lack of policy support instruments dismantling status quo.
Modularity moderate	High capacity to absorb shocks but low flexibility of farming system. High asset specificity. High dependence on value creation by processors.
System reserves low	High soil levels of Nitrogen, but low soil organic carbon. Low profitability, low financial buffer and low succession rate.
Tightness of feedbacks moderate	Already high degree of horizontal cooperation, but room for improvement in both horizontal and vertical cooperation
Openness moderate	End of quota has increased susceptibility to world market events.

Future strategies

Risk management
- Hedging
- Market information
- Financial buffer
- Technological optimization
- Better vertical cooperation and coordination

Governance
- More stable policies with long-term vision
- Accommodate flexibility and variety
- Stimulate and regulate vertical and horizontal cooperation

Farm demographics
- Govern land availability
- Tackle succession at an early stage
- Labour flexibility schemes
- (Inter)personal advice and coaching
- Alternative financing and organisational models

Agricultural production
- Precision dairy farming
- Improve eco-efficiency
- Insurance against weather events and diseases
- Increase agronomic awareness and knowledge about alternative production systems

This project has received funds from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 727520

ILVO Flanders research institute for agriculture, fisheries and food

SURE Farm

Annex 6.1 Factsheet synthesising resilience of the current farming system in Flanders (Belgium).

https://doi.org/10.1017/9781009093569.007 Published online by Cambridge University Press

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https://doi.org/10.1017/9781009093569.007 Published online by Cambridge University Press