Drivers of generational renewal in European farming systems: a conceptual framework

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Motivation Statement

Education is the process of developing, sharpening of sensibilities, and acquiring of moral and ethical values. The thesis process is the culmination of a student's formal education; I firmly believe that in this work it is important to show the motivation and rationale behind the choice of a particular topic.

My personal academic interests are broad and varied, and I approach them with passion and curiosity, applying rigorous a critical thought process to knowledge. The main topic of my thesis and my selected study program can be seemingly considered unrelated. This introductory motivation paragraph is aimed at explaining why while the stark division of knowledge fields can become a harmful It has been ascertained that future careers will increasingly need flexibility and critical thinking skills, more than specialization. Considering this, I believe that my choice of thesis topic is coherent with my academic studies. The MSc Food Safety, in the specialization Supply chain safety, focuses on the "farm to fork" approach, enshrined also in the European food legislative framework. My attention for the farm part of the food system is therefore absolutely justified. Moreover, the materials and methods employed in the thesis work have supplemented my fairly technical preparation with social sciences knowledge, which was a relatively new process for me.

My experience at Wageningen University served as a wake-up call regarding my own personal development and my ambitions for my future career. The cognitive dissonance that I experienced while attending the master's degree in Food Safety and my own beliefs and convictions about food and society made it possible to embark on a journey of understanding and development of my person.

This disclaimer is necessary to explain to the Examination commission why this thesis was relevant to the completion of my studies. The main objective of pursuing higher education, and the culmination of an educative course with the writing of the master thesis, is to develop as a person, as a citizen and worker. In light of this consideration, the subject matter of the thesis is secondary to the broader scope of one's educational journey.

Indeed, I chose to delve into a topic on agriculture and its demographic peculiarities, and what does this have to do with food? My rationale behind this choice mainly resonates with my personal interests, which evolved and mutated since I embarked on my specific degree. My personal ethos regarding food requires a systematic view, embracing all its aspects: from the production of food to its final consumption. My particularly existentialist approach to food and agriculture made it possible to find quite some interest in the demographic ailments of European farming systems. More concretely, how would it be possible to develop more sustainable and safe food production systems if there is a lack of farmers who are willing to develop such systems? Innovation and entrepreneurship are processes undeniably needed for the change needed in our agriculture and food systems and are spearheaded by the contribution of younger generations in the labour force.

Furthermore, what initially attracted me to this thesis project was the concept of resilience which is the basis for the SURE-Farm project. The notion of resilience as *the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and identity* (Walker et al., 2004) spurred interesting ruminations, not only on the academic object of my thesis, but also on how applying this resilience concept to myself as a person.

To conclude, I recognize the unorthodoxy of my choice of thesis topic and adjustment of my educational trajectory, but also appreciate the need and worth to make such choices for my personal development, the substantial aim of education.

Executive Summary/Abstract

This report analyses generational renewal in selected European farming systems, firstly by illustrating the challenges to the occurrence of such phenomenon and secondly by identifying some of the major drivers of this demographic process. To elaborate a narrative of generational renewal in European farms, thematic analysis was conducted on qualitative data resulting from the SURE-Farm project, comprising of results from semi-structured interviews conducted within 10 heterogeneous European farming systems. A cross-case study comparison was carried out to indicate common challenges afflicting farms' demographic adjustments; the comparison was instrumental in the selection of drivers of generational renewal. The analysis provided a complex and systematic picture of farm demographics, highlighting the interconnectedness and influence of different drivers. The low farm profitability and insufficient income, along with the general unattractiveness of the farmer's lifestyle determine the lack of generational renewal. However, labour provision challenges, land allocation and inefficient policy interventions all impact generational renewal. The outcome of the report is a descriptive understanding of the demographic dynamics within different farming systems, which can better inform policymaking, addressing the many shortcomings of the current public support measures. Better targeted policy interventions should focus on territories and regions, aiming for the improvement the general wellbeing of rural areas and economic viability of farms, while also enabling structural change where needed.

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1. Introduction

1.1 Problem Statement

The European agricultural sector is a key element of the continent's economy, and therefore it has always been carefully regulated to ensure food security and a viable economic structure. The challenges of agriculture are manifold and complex: ranging from environmental risks to market shocks and price volatility. The future of the sector is further challenged by rapid structural change, which will require a swift ability to adapt and adjust (Balmann, et al., 2006). Generally, Western countries have witnessed widespread structural change in agriculture in the past decades: most rural areas have been subjected to an ongoing reduction in number farms and migration of rural residents towards urban areas. The structural change in farms affects equity, productivity and efficiency of the agricultural sector, as well as the survival of well-functioning rural communities (Breusted & Glauben, 2007). The impoverishment in human capital at farm level is driven by a number of factors, such as the amount and quality of off farm employment, the low profitability of farm work, and low attractiveness of the farm lifestyle (Balmann, et al., 2006). Within the framework the European Union's agricultural policy, sustainable rural development includes the following objectives: increasing competitiveness of the agricultural sector, foster the environment and countryside through support for land management and enhancing the quality of life in rural areas and promoting diversification of economic activities. A fundamental, structural hindrance to future sustainability of the agricultural sector, and consequently of the whole food system, is the lack of generational renewal of the agricultural labour force, especially as farm owners and managers (Zagata, et al., 2017).

The Union's statistical data shows that across the continent the average age of farmers is increasing: one farmer out of three is older than 65 years old and the number of farmers under 35 years of age is about 7.5% (Zagata & Sutherland, 2015). Demographic trends directly impact economic output, inasmuch as labour is a production factor, in the same as much as capital and land. The distribution and characteristics of the working population are inherently linked to the output of an economic sector. Food production is the most basic human economic activity, the output of agriculture is the sustenance of life itself, therefore the analysis of how demographics impact the agricultural sector is ultimately linked to the ability and capacity to produce enough food. Demographic dynamics gain a fundamental importance in the analysis of the current state of European agriculture and highlight criticalities and opportunities for future survival of the sector.

The past structural change of agriculture derived from a concatenation of factors: modernization in technology, through intensification and mechanization, has led to a steady decline in the number of farm businesses, which generally consolidated land in fewer and fewer farms.

This process was exacerbated by past productivist agricultural policies, which made use of direct subsidies based first on production quotas and subsequently on land extension, to aid farmers in coping with uncertainty. The unintended consequence of public aid has been the concentration and consolidation of land in fewer, larger businesses which are able to harness scale economies and work more efficiently (Breusted & Glauben, 2007).

1.2 Research objectives

Further research on the farm demographic of the European agricultural sector is needed because policy making should be well informed in order to fundamentally tackle socioeconomic challenges obstructing the resilience and sustainability of farming systems. The thesis report will develop around an inquiry of the main demographic dynamics in European agriculture, specifically targeting the process of generational renewal, or lack thereof, as a potential challenge to the future sustainability of the sector. The report builds on empirical research based on qualitative data gathered within the SURE-Farm project, as well as on a review of existing literature. The main objective of the thesis report is to acquire on the socioeconomic dimension of European farming, while providing a comprehensive representation of the current drivers affecting demographic issues at the farming system level. Operationally, the research assessed the current state of farm demographics, based on the data of each case study of the SURE-farm project; moreover, it progressed with thematic conceptualization of the drivers affecting each farming system, highlighting how the farming systems demographics are also influenced by the interactions with other actors of the farming system.

The specific research objectives on which the introductory work is based on are as follows:

1) Review the situation concerning generational renewal in Europe:
    i) what is the farm demographic situation in Europe?
    ii) what are the policies at European level that influence generational renewal?
    iii) what are the hindrances to generational renewal?

2) Based on the qualitative data available from the SURE-Farm project, assess current farm demographics in Europe, i.e.:
    i) within the farming systems considered in the project: what are the specific farm demographic situations and possible criticalities or opportunities for development?
    ii) what are the socioeconomic drivers affecting further generational renewal?

1.3 Outline of thesis report

The thesis report will start with the analysis of the literature available on the topic of generational renewal to frame the problem and its peculiarities. In Chapter 2, the literature review focusses on the features of generational renewal as a desirable component of demographic processes, as well as the policy environment enabling the process. In Chapter 3.1, a conceptual framework on the drivers of demographic change, and thus generational renewal is described and elaborated. The conceptual framework is an explicative tool, necessary to the analysis of the different situations in European farming systems. In Chapter 4, the results are enumerated and further discussed in chapter 5.

2. Features of generational renewal

2.1: The demographic situation in Europe

A recruitment crisis?

Assessing the demographic situation of the agricultural sector in the European Union is mainly possible thanks to the availability of surveys on labour force composition. Even considering the difference between the various member states socioeconomic situations, an overwhelming consensus can be reached: farm owners and managers are aging, and the process of generational renewal needs a boost. The underlying reasons for this trend are multiple and varied: however, it mirrors a wider societal phenomenon of aging of the general working population in European countries. As a matter fact, demographic change in Europe is also due to the drop in fertility rates and increased longevity throughout developed countries. Furthermore, the longer period that young people engage in education implies a delayed entry in the labour market (Matthews, 2018). This general demographic trend is worth mentioning before delving any further into an analysis of labour issues in agriculture.

The agricultural sector is constantly undergoing deep structural changes which affect its productivity, the rural landscape and labour allocation. The current trajectory of the EU agricultural sector entails the intensification and concentration of farm businesses in fewer, but larger farms, which can employ larger amounts of capital to invest in technologies, use scale economies and specialize; this pattern is supported by the data showing that the total number of farms is dropping at a significantly faster pace than the contraction of utilised agricultural areas. However, while structural change is inevitable, the European agricultural sector must be able to cope with change and be able to maintain its output, also given the possibility of fewer inputs due to environmental risks and market uncertainties. Farm exits lead to depopulation of the countryside and impoverishment of rural areas. Rural areas range from 44% to 80% of every country in the European Union: they provide natural resources and food, as well as still being a source of employment for millions of people (European Court of Auditors, 2017). The vicious circle of abandonment of rural areas lead to lower demand of services and infrastructure as well as the dissolution of vital rural communities. The shrinking of the farmer population is an inevitable trend, caused by technological progress, migration, and lack of attractiveness of the farmer profession. The underlying causes of the current farm population decline are multiple and can be ascribed meanly as to low rate of new entries in the sector and delayed retirement of older farmers (European Commission, 2012). The actual socioeconomic factors influencing these patterns are the topic of later analysis.

The nature of farming businesses - family farming and succession

Demographic trends in farms are also influenced by the particular business organization of farms. Historically, farming has a predominantly been family business, and therefore the succession process from one generation to the next is of paramount importance. According to the FAO, a family farm is "*an agricultural holding which is managed and operated by a household and where farm labour is largely supplied by that household"* (Garner & O Campos, 2014). The characteristics in size,

enterprise type or standard output of the business itself is irrelevant, the ownership is still considered to be based on family households. If the succession process is not timely planned, and carried out, it can be observed that farms either get sold, abandoned, or bought out by other farms (Leonard, et al., 2017). The familial nature of agricultural businesses adds a layer of complexity to the analysis of the economic dimension of agriculture: family businesses are not only driven by external factors, but also linked to the endogenous cycles of family life (Fischer & Burton, 2014). Furthermore, family farms do not behave as perfect rational business entities with only profit maximisation as their main interest; the process of succession and the handing of a viable farm to the next generation is considered a main objective of the enterprise (Lobley, et al., 2010).

Overall, literature available unanimously reaches the conclusion that presently the efforts to ensure smooth farm transfer and generational renewal are inadequate (Leonard, et al., 2017). Existing academic literature on the topic of farm succession can also be broadly divided by the typology of factors considered for the analysis. Fischer and Burton (2014), in fact, posit the existence of two main study categories relating to farm succession. The first relates farm size and profitability, location, diversification strategies and transaction costs to likelihood or timing of succession processes. The second category is based on sociological factors determined by the farm-owning family characteristics, such as age, presence of heirs, successor identification process. Overall, in the existing literature, light is yet to be shed on what specific motives influence the decision to take up the farmer's profession and lifestyle. There seems to be a knowledge gap specifically around the factors that can determine the entry/non-entry decisions in a farm business by the next generation of farmers. Dynamics of succession are integral in the context of generational renewal, and to reform the European agricultural policies promptly and effectively, their importance needs to be acknowledged. The future European agricultural policy will have to necessarily address the issue of succession, generational renewal, and availability of labour force, and to do so adequate knowledge should be available on what are the specific needs of farmers. The study and understanding of this topic come at a particularly significant time, due to the imminent CAP reform, forthcoming in 2020. In this regard, overarching qualitative analysis is missing from the existing literature on generational renewal. The knowledge gap concerning the socio-economic environment affecting demographically relevant decision-making processes needs to be filled.

2.2: Trajectories for generational renewal

In order to provide a more comprehensive theoretical framework to grasp the complex demographic dynamics permeating agricultural businesses, it is helpful to provide a review of the possible trajectories that enable generational renewal to rectify the current situation. As mentioned in the previous chapter, the EU agricultural sector faces existential issues dealing with senescence of farmer population. The following question that arises is therefore, what are the possible corrective solutions to the issue? How can generational renewal occur?

Literature identifies three major paths for farmers to access the profession:

- Intra-family succession: described by Gasson & Errington (1993) as a "*process by which the ownership and management capacity of the family farm business is transferred"*;

- New entrance: a consistent definition on what is considered a new entrance, given that there is a plurality of possible trajectories and paths leading to the farming activity, often not completely *ex-novo* (EIP-AGRI, 2016);
- Employment as a farm worker, non-family labour is also to be accounted as a form of generational renewal, especially in corporate farms, in which management is not necessarily held by a single family.

Continuity within a farm business is relevant in this analysis because, as already mentioned, the majority of farms in Europe are family run and succession remains a primary way in which new farmers "enter" the sector: in the farming business, intergenerational succession rates are much higher than in any other self-employed occupation (Zagata & Sutherland, 2015). The term *succession* corresponds to an articulate process of handing the farm to the new generation; the process itself has been studied at length by economists and rural sociologists, a plethora of literature investigated the deterministic variables of the succession process, i.e. the passing on of farm assets, capital and land, as well as the transmission of tacit and specific knowledge and special skills, which are considered inseparable from the farm management itself (Uchiyama et al., 2008).

Succession

Many studies have investigated the effects of succession on and its management and development of farm trajectory. The process can be roughly broken down in different moments, but it must be taken into account that it is a lengthy and iterative process which begins with the identification of the successor by the principal farmer. The process can then be envisaged as a "ladder", according to Gasson & Errington (1993), through which the gradual delegation of decisions and tasks happens: the successor is given growing responsibility, starting with technical decision concerning production inputs, then involving tactical decisions about day-to-day planning like enterprise, financial decisions (negotiating sales and identifying sources of financing) and culminating with the complete handover of strategic decision making. Succession and retirement are therefore mirroring events, and while their steps are theoretically laid out by academia, the execution is seldom seamless (Lobley, 2010).

Succession processes have been shown to affect considerably farm business performance and development: different timing and patterns have been theorized, Potter and Lobley (1992) describe the existence of a "succession effect" entailing larger capital investments functional to the passing down of a successful business. This same process can be found empirically proven in a study by Calus et al. (2008) which links the amount of total farm assets with the succession process, highlighting how farms that are likely to be inherited will invest more and expand their business. Fischer and Burton (2014) focus on the endogenous factors affecting the succession process, citing the identification of potential successors in the occupation of farmer as a key point determining successful inheritance processes. In all these studies, attention is brought to the fact that within farm enterprises the business and household dimension often intertwine and overlap. The productive function of the farm depends also on the life cycles of the family itself and on the internal relationship within a household.

Retirement concerns the gradual withdrawal from the most arduous and physically intensive tasks while continuously engaging with the day-to-day activities involving management and financial decisions. Literature has indicated that in case of absence of a prospective successor, the retirement process involves the disengagement and downsizing of farm businesses, which operate less intensively and ultimately liquidates the assets (Potter & Lobley, 1992).

Another characteristic feature of farms concerns the peculiarity that the profit maximisation is not the sole driver for the existence of the farm business, the inheritance of the farming activity is also a primary driver for the existence of a farm. What emerges from further literature review on the topic of intra-family succession pertains to the field of rural sociology: many studies delve into the social process of identification of a successor and categorize the types of succession patterns. Fewer studies are available in the field of agricultural economics; however, many studies have focused on econometric analysis of the succession process, highlighting how farm financial status as well as farm characteristics can influence the succession patterns within regions. The casual-quantitative approach found in these studies often fails to highlight the existence, or lack thereof, of a causal relationship between variables.

In table 1, I propose a short overview of the available scientific literature of econometrics studies about farm succession, highlighting the considered variables, which mostly relate the probability of succession with characteristics of the farming family or the financial performance.

Table 1: outcome of literature review on generational renewal as a variable of econometric analysis

Reference	Dependent variable	Independent variable
Kimhi and Nachlieli (2001)	Established succession	Farmer family characteristics (age, education)
Calus et al. (2008)	Established succession	Value of total farm assets
Cavicchioli et al. (2015)	Established succession	Farm, family, and main decision-maker characteristics
Harris et al. (2012)	Financial performance (ROE and OPM)	Intra family succession
Mischra et al. (2010)	Established succession	Farm household wealth and farmer characteristics (age, education)
Glauben et al. (2004)	Established succession	Age of farm operator, number of family members, SGM and LU

New entrants

The entrance of new farmers can be understood in two ways: one aspect concerns the more innovative attitude associated with younger farmers, which collectively push towards increased productivity and competitiveness; the other aspect is associated with the fundamental role of

agriculture within society, as a provider of goods and services. Age can be associated with the evolution of farm management strategies and can reflect views on sustainability and orientation of the business trajectory (European Commission, 2015). An important mean of generational renewal is the entrance of new farmers in the business, specifically of young new entrants (because the terminology new entrant does not necessarily correlate to age). New entrants are identified as "*people entering farming for the first time or returning to farming after a period of off-farm employment*" (EIP-Agri, 2016).

Laying out the methods for generational renewal is functional to the examination of current policy fields which support, directly or indirectly, the aforementioned process. Measures can be divided based on their target in: one category can be ascribed to measures facilitating the likelihood of succession, for example, boosting education in the field of agriculture or by increasing attractiveness of the profession, thus enabling the identification process. Another category includes measures aimed at reducing barriers to retirement, such as early retirement schemes or local policies providing services for retirees and measures reducing barriers to entry (Lobley et al., 2010).

2.3: Policy environment concerning generational renewal

The European Union is presently faced with a decisive turning point: the current Common Agricultural Policy will end in 2020 and make space for a new policy agenda. The objectives laid out in the proposed amendment include "*fostering a smart and resilient agricultural sector, bolstering environmental care and climate action to contribute to the environmental and climate objectives of the EU, strengthening the socio-economic fabric of rural areas*" (European Commission, 2017). In light of this, "The future of food and farming" the EU Commission paper, compiled after a wide public consultation, provides an outline for future policy action: nine different policy areas are indicated, ranging from climate change action to food security. Within these objectives, generational renewal is included as "the supplement of new blood", a phenomenon to encourage and foster to achieve sustainable development objectives (*ibidem*). Low representation of young farmers in Europe limits future economic potential of food production: this is due to established correlations between age of farmer and tendency towards innovation, environmental attitudes, and more sustainable production practices (Zagata & Sutherland, 2015). It is important to mention that a 'magic number' of older to young farmers does not exist, there is no optimal ratio confirming the actual presence of a demographic issue. However, within a modernist framework for agricultural policies, the drive for innovation spearheaded by the younger generation is fostered and encouraged (Zagata & Sutherland, 2015; Matthews, 2018). The support from institutions to young farmers is in fact legitimized by the general belief that younger generations are more inclined to be more efficient and productive, and include innovative farm management strategies in the business, and collectively also in the whole sector.

The Common Agricultural Policy

Within the context of this analysis, which is restricted to the European Union, it is worth mentioning the importance of the Common Agricultural Policy. The CAP is one of the fundamental European common policies, first enacted in 1962 and subsequently renewed every seven years. The initial aim

of the CAP was ensuring food security for European citizens in the post war context, while guaranteeing income for farmers, as well as constructing the foundation for the common market. In the Treaty of the Functioning of the European Union (art. 39) the main objectives of the policy are expressed as: "*the increase of productivity by promoting technical progress and by ensuring the rational development of agricultural production, and the optimum utilisation of the factors of production in particular labour; ensuring a fair standard of living for the agricultural community; stabilising markets, assuring availability of supplies, ensuring supplies reach consumers at a reasonable price*". These objectives lay at the base of all subsequent reforms of the CAP, which currently prioritizes sustainable use of natural resources, balanced rural development, and income support to farmers (European Commission, 2019). Public intervention through direct subsidies in the agricultural sector is justified by the inherently uncertain nature of farming activity, whether it be environmental threats or market instability; operationally farmers receive economic aid in the form of income support, measures and rural development measures. By the 1980s, the combined effects of the CAP direct aid and technological advancements in agriculture led to overproduction and the subsequent need to establish production quotas and export subsidies (Tangermann & von Cramon-Taubadel, 2013). In the early 1990s with the McSharry reform, price support was phased out, and direct payments to farmers were introduced. The consequent reforms focused on further splitting support from production and redirecting it towards a payment scheme based on hectares of land farmed. The last round of CAP reform was introduced in 2013 and in practice it is legally articulated in two main expenditure pools, referred to as Pillars: Pillar 1 currently laid out in Council Regulation 1307/2013 , which regulates direct payment to famers, and Pillar 2 currently laid out in Council Regulation 1305/2013 concerning rural development schemes.

Policy measures specifically aimed at remedying demographic issues

As introduced in chapter 1, the agricultural sector is currently facing what is referred to as a demographic crisis, embodied by the lack of a generational renewal process that should be occurring naturally. And while it is widely accepted that modernization and intensification entail a smaller percentage of workers employed in the first sector, it has become evident that there is some need for policy action to curb the demographic imbalance.

This acknowledgment justifies policy action to encourage younger segments of the working population to engage in the farming activity. In the last CAP reform, this action was implemented through different measures purposefully targeting demographic issues.

According to the Regulation laying out the payment schemes under the CAP, young farmers are defined as natural persons as:

"a) who are setting up for the first time an agricultural holding as head of the holding, or who have already set up such a holding during the five years preceding the first submission of an application under the basic payment scheme or the single area payment scheme;

(b) who are no more than 40 years of age in the year of submission of the application referred to in point (a)". It is worth noting the discrepancy between this definition and the category used by the Eurostat to classify young farmers, which puts 35 years as the threshold in its surveys. This discrepancy clearly produces an obstacle to the empirical assessment of the current young farmer

situation (Zagata & Sutherland, 2015). This discrepancy impedes a clear prior assessment of the problem in each Member State as well as the impact assessment of the policies.
In table 2, current policy actions targeted at young farmers are presented schematically.

Table 2: overview of European policies directly and indirectly affecting generational renewal

POLICY	DIRECT EFFECT	HOW?	LIMITATIONS	INDIRECT EFFECT	HOW?	LIMITATIONS
PILLAR I (1307/2013)	Young farmers payment scheme	25% top-up in respect to the direct payments	Must be beneficiary of direct payments (administrative limitations)	Direct payments	Entitlement payment (based on owning at least 0.5 ha of land)	Must be beneficiary of direct payments (administrative limitations)
			Small % of income, not enough to hedge entry risk			
PILLAR II (1305/2013)	Farm and business development fund	Business start-up aid of a maximum 70k euros	Voluntary measures to be implemented by Members States and regions (administrative burden may lead to failure of attributing the funds up to the expenditure ceiling provided)	Knowledge transfer	Participation in RD programs, demonstrate viability of business	Variability of MS distribution and allocation of funds (for size of recipient farm)
				Co-operation (networks and business plans)		
		Recipients must develop and apply a business plan		Investment in agricultural activities		Applying to RDP measures involves respecting certain criteria, which could be contradictory (start-up aid is given to farmers which have been farming for less than 5 years, and is not tied to age)
				Advisory services, farm management and farm relief services		

Currently, young farmers can benefit from a variety of supportive measures: first and foremost, the subsidies contained within the Basic Payment Scheme, which is based on payment entitlements; secondly the Young Farmer Payment, which targets directly the young farmers income and is additional to the BPS, but based on the given definition of young farmer (given that "a young farmer that exercises effective and long-term control over the legal person in terms of decisions related to management, benefits and financial risks in the first year of the legal person's application"). Eligibility for direct support for farmers is based on the submission of a yearly application and the payment is based on hectare (one hectare being the minimum threshold for receiving aid, art. 10 1307/2013).
Furthermore, financial assistance for young farmers is provided generally through Rural development programs, incorporated under the Pillar 2 of the CAP, and can be directly aimed at helping generational renewal, or indirectly (European Parliament, 2017). The main direct measure is start-up aid is as a program in the "Farm viability and competitiveness" measure, which directly

targets young farmers by providing up to 70k euros for applicant farmers who submit and implement a viable business plan. However, more RDP policy actions can be used advantageously by young farmers, such as funds for training, knowledge transfer and general assistance.

The main rationale behind the support specifically targeted to young farmers lies in the attempt to reduce barriers to entry in the agricultural sector, namely access to land finance and knowledge and facilitate *the entry of adequately skilled farmers into the agricultural sector* (Reg. 1305/2013).

2.4 Challenges to generational renewal

There are many factors that have been indicated as hindrances and barriers to generational renewal, both in terms of young farmers entering the sector or succeeding in the family business. The European Court of Auditors has broken down the factors in main categories, dealing with the access to resources, for example:

- Access to land
- Access to capital
- Access to knowledge
- Lack of infrastructure and services in rural areas

Access to land, either through acquisition or rent, is lamented as a barrier for 60% of young farmers (European Court of Auditors, 2017), the high price of land and the unwillingness of older farmers to retire play a role in land unavailability. Land price is a considerable variable within regions and member states because it depends on a great number of factors, such as national laws, environmental factors (climate, soil, location), localized factors - proximity to urban centres, competition with other economic activities (Eurostat, 2018). Financing and capital acquisition can pose as a barrier to new entrants, successors, and young farmers, both through credit financing and subsidies. Access to credit can be impeded by the general credit structure in agricultural markets, in which lenders are less likely to lend to younger farmers, because of higher perceived risks and generally lower equity and assets (Kaufmann, 2013). Financing through European subsidies can also trouble young farmers, because of burdensome bureaucracy and lack of administrative support in requesting the subsidies. Credit is a mean for young and beginning farmers to acquire land, machinery, make investments and thus developing their business. Access to knowledge for young farmers is also indicated as a possible hindrance to the development of successful and innovative businesses. Modernization of the agricultural sector entails also giving a growing importance to building specific knowledge. Knowledge concerning business strategic positioning, farm management and risk management is considered the most needed for young farmers, as well as knowledge about the current policy measures, regulations, and European projects (Klair et al., 1998).

Knowledge transfer and information dissemination is aimed at promoting in farmers management and entrepreneurial skills that can be fundamental in the development of more innovative farms, more competitive and resilient (Koppert, et al., 2015). Knowledge can be retrieved through traditionally established agriculture extension services, but new knowledge transfer tools – such as social networks and exchange programs - are also giving opportunities for farmers to acquire new

information and sharing best practices. In a 2015 survey conducted by the European Commission on the needs of young farmers, the capacity to reach the necessary knowledge was hindered by a lack of time and number of unreliable sources (*ibidem*).

3. Materials and methods

3.1 Materials and case studies

The assessment of the current social, economic, and political situation affects demographic trends, I will make use of qualitative data collected in the 10 farming systems of the SURE-Farm project (Meuwissen et al., 2018)[1]. A qualitative approach is adopted for this research because it is more suitable for the identification of drivers of demographic dynamics. In order to analyse these drivers, the analysis taps in the work carried out within the SURE-Farm project. The analysis revolves around ten European farming systems within Europe, different for production orientation and characteristics, presenting a heterogeneous portrayal of the European agriculture (*ibidem*). The SURE-Farm project data used in this thesis report is comprised of semi-structured interviews with farmers in different case study areas. These interviews were conducted by researchers within each partnered institution of the SURE-Farm project. The interviews were carried out according to a specific methodology and protocol to ensure a certain level of homogeneity while also delivering a complex and diverse image of the farming systems The material was collected independently by different teams of researchers collaborating in the SURE-farm project, and collected by ILVO, the Flemish institute of Agricultural research, where the report's analysis was carried out. In table 3, the case study regions and related farming systems are enumerated.

Table 3: overview of the case study materials included in the report's analysis (SURE-Farm project)

Farming system	Country – region
Extensive beef cattle system	France - Bourbonnais
Extensive beef and sheep farming systems	Spain – Sierra de Guadarrama/Aragón
Intensifying dairy farming	Belgium – Flanders
High value egg and broiler systems	Sweden - South
Private family fruit and vegetable farming	Poland - Mazovian
Large scale corporate arable farming	UK – East England
Large scale corporate arable farming	Germany – Altmark
Large scale corporate arable farming	Bulgaria – North East and North central
Small scale perennial crops	Italy - Lazio

[1] The SURE-Farm project analyses 11 farming systems – in this report only 10 were taken into consideration due to timing of delivery

Small scale farming	Romania - Iași

The summaries of the case study materials can be found in Annex I.

3.2 Data analysis

The information collected within the interviews was analysed by applying grounded theory methodology, a social science approach entailing an increasing abstraction and theorization of concepts (Strauss & Corbin, 1990). The interviews were therefore previously analysed by each case study's research team, by means of axial coding. Additionally, the information which emerged from the interviews was compiled and summarized in comprehensive reports, including background information for each case study and farm system. This methodology was applied because of the large data set that was used to execute the cross-case study comparison. The research questions formulated at the beginning of this report entail a deductive and exploratory approach, the aim is not to prove a hypothesis but rather to construct one (Clark & Braun, 2014). The evaluation of the drivers of demographic change therefore calls for such a method to describe and discern recurrent topics within the available dataset. The outcome of the analysis is the result of the theorization of themes, which are not quantifiably measured but are rather seen as relevant for the answer to the specific research question. The outcome of the structured interviews represents a testimony of issues and challenges that farmers are facing and are adapting to cope with. To identify specific drivers affecting farming systems demographic dynamics, I carried out an overarching comparison of the case studies highlighting differences and similarities, challenges, and opportunities. The analysis process used to identify the drivers ascribes to the qualitative data analysis method of thematic analysis, a method which entails the identification, organization and description of themes found within a data set. (Nowell et al., 2017). The step-by-step approach of this analysis is shown in Figure 1. The theorization step of the analysis, which was conducted in Belgium in the month of January 2019, initiated from the information contained in the country reports and the codes resulting from the semi-structured interviews.

The first step in this approach consisted in the transcription of the codes from the interviews from each case study, both axial codes and open codes, on paper: this concrete, visual representation of the information proved useful for a first review of the material available. Subsequently, the codes were divided and categorized according to the main topic inferred: a first discrimination criterion for the codes was whether the driver of generational renewal was external or it depended was an endogenous factor deriving from characteristics of the individual business. The internal factors mentioned in the case studies, such as farmers' values or inclinations are not considered in this discussion. Incrementally, the categories grew more numerous and homogenous in content, the first patterns and similarities started to cluster together and emphasised the presence of specific themes and concepts. The second division of the codes included a discrimination between economic, institutional, and environmental drivers. Finally, a sorting of the various categories made it possible to conceptualize the first main drivers influencing the decision to entry, or not, in the farming sector.

Figure 1: outline of analysis steps followed

The material used for the analysis included the case study reports of the different farming systems, as well as the general information of farm typologies and systemic challenges. The case study reports also included the results of the axial coding of farmers' interviews, quotes, and some transcripts of the interviews themselves. This methodology was applied because of the large data set that was used to execute the cross-case study comparison. The research questions formulated at the beginning of this report entail a deductive and exploratory approach, the aim is not to prove a hypothesis but rather to construct one (Clark & Braun, 2014). The evaluation of the drivers of demographic change therefore calls for such a method to describe and discern recurrent topics within the available dataset. The outcome of the analysis is the result of the theorization of themes, which are not quantifiably measured but are rather seen as relevant for the answer to the specific research question (Guest et al., 2014).

3.3 Understanding generational renewal: a conceptual framework

The analysis of the qualitative data deriving from the SURE-Farm case studies was instrumental to develop a conceptual framework as a key to understand the processes innervating the demographic dynamics of the different farm systems. The main takeaway which emerged from the analysis is comprised by the interdependence of most processes and drivers. Economic drivers would be initiated by policy, market drivers would be influenced by societal changes, the environment would be influenced by economic and policy changes. The acknowledgement of the interconnection between the individual unit and the contextual relations of the farming system testifies to the complexity of a modern and globalized world, emphasising how systematic approaches are needed to discern such complexity. In Figure 2, I propose a conceptual framework to organize this complexity; the conceptual framework was constructed as mean to illustrate the processes influencing demographic dynamics and generational renewal.

The structure of the conceptual framework is articulated according to the level of organization of the farming system: at the innermost part of the diagram, there is the personal sphere concerning the individual farmer decision making, influenced by the external drivers but also from personal circumstances: attachment to family farming, emotional ties to the lifestyle, individual interests and skills. Moving outwards from this personal sphere, the degree of organization increases including

the farm business, the farming system, and the societal spheres. The degree of organization therefore increases from the centre of the framework to the outer level, in parallel to the level of control and influence that an individual's decision to entry/exit has on the general outcome of demographic processes.

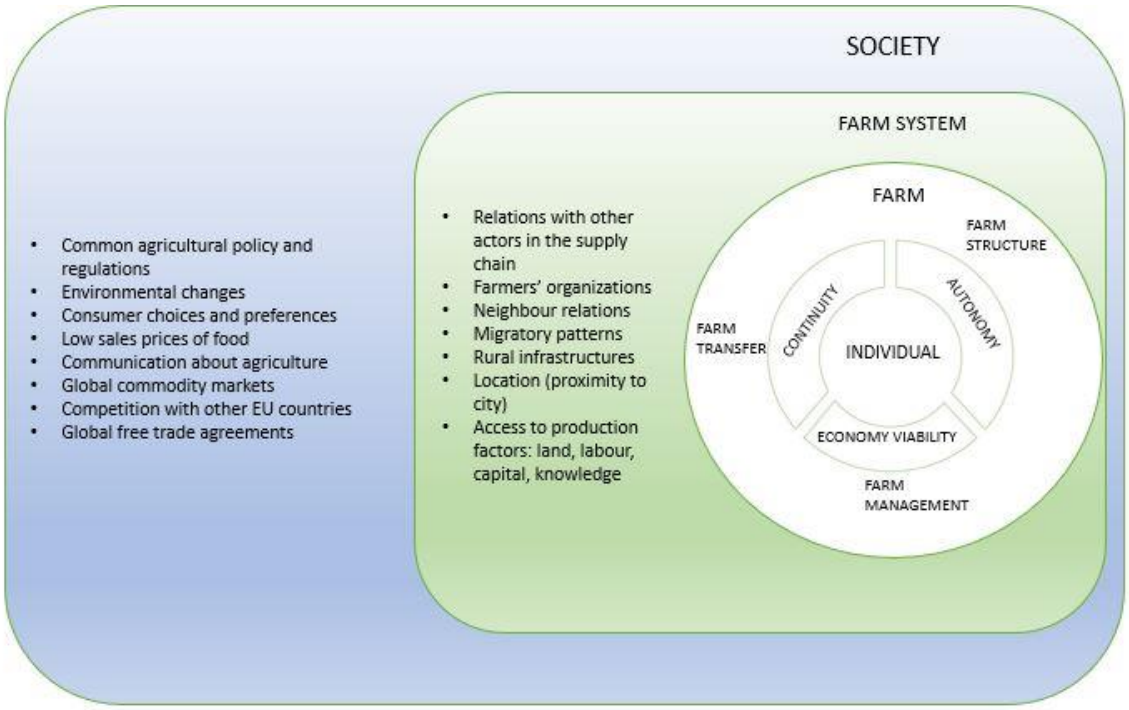

Figure 2: interpretative framework for case study materials

Furthermore, three main themes were indicated to describe the factors influencing farmers' strategic decisions to engage in the farming activity.

Defining generational renewal

The themes merging from the data analysis were instrumental in defining the processes influential in generational renewal in farming systems. These concepts were grouped as follows:

- Economic viability addressed as profitability by the respondents of the case studies is always mentioned as the main constraint affecting generational renewal. It is the existential condition for the persistence of the farm business, and it is the main influence on the individual's decision-making process on exiting/entering in the sector. Regardless from the financial management capabilities of the singular agricultural entrepreneur, which are beyond the scope of this discussion, there are many external economic processes affecting profitability of farm/farming system: cost-price squeeze, supply chain power imbalance, market price volatility and commodification of agricultural goods are some of the causes affecting farm profitability, farming income and therefore the attractiveness of the farming activity;
- Continuity of the farm businesses, is indicated as one of the farm business primary goals, as also discussed in the introductory chapter on farm succession. The familial nature of most farms influences the trajectory of the business, its survival through the years and possible

developments. In many farming systems is mentioned how the lack of generational renewal and the general absence of qualified labour force put at risk the continuation of the farming system in the current state. The lack of interest in farming is also mentioned a possible threat for future continuity of farm businesses. The low attractiveness of the farming profession, due to low income, long hours, and no possibility to take advantage of welfare measures in comparison to other off-farm occupations are often pointed out as hindrances to continuity. An exemplary quote from the Polish case study highlights the struggle to find a way to continue the farm business: *"It's that we are seeing that every year it's going worse, we are returning back, so… it comes a moment in which you are discouraged. For this many people leave the sector. It is normal. People are aging and [they] do not get a successor"*.

- Autonomy or independence, emerged from the analysis as a theme involving the structural dimension of agriculture, as well as the organizational and legislative dimensions. In numerous case studies, land tenure legislations and land availability are indicated as a concern for the future development of the farm business: the economic viability of the farm business is tightly intertwined with the possibility to apply scale economies and more efficient agricultural practices. The reliance of farmers on other actors in the supply chain is also mentioned as restraining on autonomy, because production decisions might be mandated by a wholesaler or processing industry, rather than the individual farmer. However, this theme emerged also due to a positive connotation expressed by the respondents of the case studies linked to the farming profession itself, which often being an independent profession gives more freedom and independence to who decide to pursue it. Almost contradictorily, this aspect arises from the case study materials: the autonomy that can be achieved by being a farmer is often hindered by the surrounding environment.

The discrimination criteria for the layout of the conceptual framework are based on the obvious, yet implicit, existence of different degrees of control with which the individual farmer can influence the decision-making. For example: the influence of an external, society-level, driver can be great on the operations of a single farm unit, but the level of control of the individual on its outcome is lesser. In the same analysis, three other processes were identified as affecting the farm demographic component of the systems and therefore the generational renewal. In the framework, the processes are indicated as Farm transfer, Farm management and Farm structure.

- Farm transfer process implies the procedures linked to the passing of the farm business to the next generation, or the sale of the assets in case of farm exit: availability of farm advisory services on succession, labour opportunities in other sectors (professional mobility within the region of the farm system) can be indicated as factors influencing farm transfer between generations.
- Farm management as a process simply involves the actions and measures taken by the farmers to conduct their business in an economically viable way and it includes the strategies taken to adapt and overcome challenge: diversification of production or specialization, adoption of different production techniques, organic conversion, uptake of risk management tools.

- Farm structure includes the changes impacting the structure of the farming systems: land concentration, changes in organizational structure of farms – such as the formation of cooperative and collective farming organizations)

These processes are influencing the farming system sphere, while the themes continuity, independence and economic viability are seen as the influences at individual business level.

The outcome of the thematic analysis and the construction of the framework provided an interpretative key of the data and information deriving from the case studies, instrumental for the creation of a narrative of the circumstances in which farm systems operate. The processes described this framework were instrumental in delineating the drivers of generational renewal, the external factors impacting this phenomenon.

4. Results

In the following paragraphs I propose the results to the two main research questions of the report. The main objective of the analysis was to compile a cross case study comparison and to indicate the drivers of generational renewal.

4.1 Cross-country comparison of farm demographic issues in case study regions

The case study materials used in the analysis, which are summarised in Annex I, provide the indication of the current challenges afflicting European farming systems in their demographic component. By demographic component, the SURE-Farm definition is adopted: meaning that farm demographics concept includes not only the human capital, but also the administrative and organizational structure of the farms. The farming systems considered in this analysis have different business structures and production orientations and therefore provide quite a heterogeneous picture of European agriculture. The case studies include purposefully different organizational structures - corporate farms, cooperatives, self-sustenance small farms, family farms - and different labour characteristics.

Notably, most of the case studies include family farm structures, entailing the presence of succession and transfer patterns from one generation to the next as described by literature findings in paragraph 2.2. The handing down of family farms from one generation to the next can include complications and contingencies such as the sentimental attachment to a family farm can influence the occurrence of succession and generational renewal. Exception to the family farming structures can be found in two specific cases: Germany and Bulgaria, differing from the others because the business structure of the farms includes corporation or cooperatives, which does not entail by default transfer within families. In the cases including corporate farming, the generational renewal process depends mostly on the availability of skilled labour. As indicated by the framework in chapter 3.1, there are some factors influencing generational renewal at the individual level, such as interest for the farming profession, relationships with family or opportunity cost in pursuing off-farm labour. In many case studies it emerged that sentimental values associated with the family farm or vocation for the farming lifestyle are ultimately more compelling than many other external factors, such as economic performance of the farm. This aspect can be exemplified by a quote from the Italian case study *"We are not farmers, I took over the land for a sort of vocation I have with*

agriculture, if one looks at the economics of this, it would be better off doing other things" , highlighting how farmers do not operate as perfectly rational actors.

Despite the heterogeneity of the farming systems considered, some common challenges seem to be shared by most case studies. Principally, the scarcity of labour force and the hindrances to generational renewal are apparent in all case studies, except for, most notably, the Italian one. The Italian case study included family owned hazelnut farms in the Central region of Lazio. In this case, most respondents reported the existence of an established succession plan with the presence of the possible successor already in the farm. The occurrence of generational renewal in the hazelnut farms was attributed mostly to the positive economic performance of the market within that farming system. Hazelnut production places itself favourably on the market and therefore the economic opportunities attract the next generation of farmers. The continuity of this farm system is enhanced by the positive market incentives that can be reaped by cultivating hazelnuts. However, the clear challenge afflicting the other farming systems is constituted by the economic challenges inherent to agriculture. Unsatisfying income coupled with the demanding and physical nature of farm work, is often mentioned as a big deterrent for generational renewal or succession planning. The insufficient revenues from the sale of agricultural products and the simultaneous rising costs of inputs impact negatively in the profit margins of the farm business: this cost price squeeze is mentioned in multiple case studies, especially in the Polish fruit and vegetable farms, whose respondents indicate the low profitability as a major hindrance to the occurrence of succession.

Globalized markets, international competition and unfair trading practices within supply chains are also mentioned throughout the case studies as impactful determinants of the economic welfare of the farm businesses. In some cases these factors can be negative, the globalized market dynamics are cited in those farm systems that produce agricultural commodities, such as Bulgaria and the UK, because the types of crop grown are more subject to change in exchange rates and the competitive advantage of other countries. For example, the Bulgarian respondents are weary of competition with larger producers, such as Russia and Kazakhstan, as highlighted by this excerpt from one of the case study respondents "*So, the harvest in Russia, Ukraine and Kazakhstan began and the prices are usually collapsing, and they sell cheaply because they produce cheaply, their cost is perhaps 2 times lower than ours given the natural resources and the state policy. They actively started investing in new technologies Russia, Ukraine, Kazakhstan, Moldova and started to aggressively subsidize agriculture"*. International trade poses a challenge also for the French case study, in which the extensive cattle rearing has to compete on the same market as intensively raised beef imported from south America, whose import could be streamlined by the introduction of free trade agreements. Farmers produce and sell goods within a highly competitive global market, the outcomes of which can be unfavourable. Competition can be unfair and production in other countries can be enhanced by trade distorting public subsidies.

In all case studies, interesting labour allocation issues arise. In the British and French cases, respondents state that farm incomes are insufficient in sustaining more than one household: this entails that farmer and prospective successor cannot work simultaneously in the farm business, the latter seeking off farm employment. This particular aspect could lead to a missed opportunity to construct the farmer's identity, as theorized by Fischer & Burton (2014), or to encourage the

attachment to the farming lifestyle which is showed to be influential in the willingness to enter the agricultural sector. Furthermore, the availability of properly skilled labour is identified as a common challenge. Bulgarian and British respondents particularly lament the scarcity of adequately skilled workers: the two case studies are characterized by the same production orientation – large scale crop farming, in which the operations are mostly mechanized and thus require workers with a specific skillset and knowledge. This highlights how labour requirements in farming systems can be widely different based on the production orientation of farms. This aspect is exemplified by the experience of a polish respondent: "*Maybe some innovation, for example new harvest technologies, in this direction I pay attention, because human labour is more and more expensive, and you can replace some of the work with machines"*.

In addition, another interesting aspect that arose from the analysis includes the emergence of migratory patterns as influential in labour provision. For example, in Romania, the migration of workers to other countries is portrayed negatively because it drains workers and potential successors from the family farms included in the case study, leaving an increasingly aging rural population to deal with many economic and environmental challenges. Migration can have some positive outcomes of migration are linked to the return of possible successors, who, in turn, can bring knowledge and innovations acquired abroad. Migratory patterns can also occur within countries borders: rural-urban migration is also a constant hindrance to generational renewal in farming systems. Work opportunities tend to be more economically rewarding and sought after in urban areas than in rural ones, pulling prospective successors away from farms. This is evident from case study regions Belgium, Poland, and Spain, were the vicinity of farms to urban centres is mentioned as a common challenge to generational renewal in rural areas.

The case studies also highlight possible trajectories for the future of each farming system. In each system some opportunities for adaptation to demographic challenges are presented. The case studies respondents in some instances find strategies and practices to cope with challenges and overcome them and offer some examples for the possible future restructuring of the system. Throughout the different farm management strategies are signalled as possible coping mechanisms with the demographic challenges. Interestingly, these strategies vary between case studies but also within the same region. An example of this can be found in the Belgian case study, where the farming system is affected by the same challenges: encroaching of the urban environment, low profitability of the milk sector, land unavailability. In this case, the solutions indicated by farmers are quite different: the choice of the coping strategy is either intensification and further automation of farm operations or diversification of products and marketing strategies.

The intensification and automation strategies were mentioned elsewhere, especially in case studies such as the Bulgarian one, where the lack of skilled labour force is compensated by investing in more sophisticated equipment – exemplified in this quote from one of the respondents "*And the question is what to do in the future - with better machines, more modern and less expensive, and moreover, that there are no workers, it is the main way to work more land with fewer people" "Innovations are mainly related to new plant protection, also new machines, because new machines with more computers, more opportunities, more information*". This strategy entails that even though the lack of labour is compensated on the short term, the skills required in the daily operations are also more

sophisticated. This entails that other labour challenges could ensue on the long term, for example the lack of training for specific skills in the local job market.

Diversification of production is indicated in a variety of case studies as a risk management strategy. Diversification of production is mentioned by some of the German respondents, who in some cases indicated energy production from agricultural biomass as an opportunity to diversify revenue sources and produce private goods for the region. In other cases, diversification of marketing channels is indicated as a possible coping strategy for the low income: by direct sales or quality schemes, farmers try to reap a larger profit margin and therefore increase farm income. The limited income that is generally associated with the farming activity is a key aspect that is mentioned throughout the case studies as a fundamental limitation in the further development of farm business and ultimately on their potential succession and transfer. Strategies to cope with the low profitability of the farm business include the choice of engaging in part-time farming, concurrent to a job in a different, more economically rewarding sector, or relying on the income of spouses.

4.2 External drivers of generational renewal in European farming systems

Many factors interplay in affecting generational renewal: economic conditions, climate alterations, societal changes, and policy burdens. Within this report only a few economic drivers will be elaborated and discussed for brevity's sake. Within the thematic analysis, many concepts and drivers were identified in the case study materials, and they were used in the redaction of a comprehensive SURE-Farm report, which assesses farm demographics thoroughly (Coopmans et al., 2019). The different productive orientations of the farming systems entail different degrees of influence of these factors, but generally these were mentioned in all the cases studies as hindrances in the smooth continuation of a farm business and farm development. It is possible to infer that generational renewal of these farm systems is influenced by these drivers; the quantifiable extension of this influence is impossible to assess at this stage but could be the topic of further analysis.

Labour

Farm labour characteristics, in terms of availability and allocation, are cited in all the case studies as an essential driver of farm demographic processes. Family farms, which are widely represented within the case studies, rely usually on informal labour provision by family members, as well as external contracted work. When nonfamily labour force is required, many respondents denounce the lack of an adequately skilled labour force: workers are generally less interested in farming because it is an unattractive lifestyle and farm work is not sufficiently compensated when compared with other, non-agricultural professions. The lifestyle associated with farming – long hours, lack of welfare benefits, lack of vacation time - is often perceived as inconvenient, both for workers and prospective successors. This, in turn, not only drains farms of potentials managers and workers, but also leads to a divestment from services and infrastructure from rural areas because of depopulation. In table 5, some examples of labour provision issues are presented.

Table 5: case study examples of the driver 'labour'

Description	Case study examples
Agricultural professions are unattractive because of the long hours and low pay, the lack of rural workers inhibits the development of labour intense activities	- "Buying machines to be less dependent on labour market" (GE) - "Young generation is not interested in agriculture" (BG) - "Presence or absence of workers may prevent the development of an activity "(FR) - "Interest in working outside the family farm as reason for non-entry or delayed entry" (UK) - "Higher income from work outside the farm" (PL) - "Lack of seasonal workers" (PL)

In some case studies, lack of turnover in the labour force leads to the choice of mechanization and intensification of farming practices, which consequently requires more skilled employees. The potential unintended consequence of this is constituted by future unavailability of skilled workers, thus highlighting the short-term problem-solving that often takes place. Furthermore, abandoning more labour-intensive practices that do not yield sufficient returns, is not a suitable strategy for all farming systems, especially when trying to maintain diverse farm structures. Seasonal workers are also a crucial component of European farming systems: may farms rely on the provision of cheaper labour employment for specific moments of the year, such as fruit and vegetable harvest. The presence of seasonal workers can be ascribed to mobility within the EU as well as the administrative efficiency needed to employ them.

Economic performance and market drivers

Insufficient income from the farming activity is mentioned by many respondents of the case studies as the main deterrent to farm development and succession of the next generation.

Table 6: case study examples of the driver 'economic performance and market'

Description	Example from case studies
Lack of profitability and insufficient income deriving from agricultural activities as a hindrance.	- "Fall of profitability of production" (PL) - "Profitability is necessary for the farm to exist" (FR) - " Economic situation of the production is not in favour of succession" (FR) - "Introduction of intensive crops to increase farm profitability" (RO)
Farmers find themselves suffering from the cost-price squeeze that reduces the profit margin.	- "Costs of inputs rise while selling prices remain stagnant" (PL) - "Prices of pesticides, fertilizers, fuels and other production resources are constantly growing" (PL) - "Fruit and vegetable prices have remained at a similar level for many years" (PL) - "Food is too cheap so need to educate public about true cost of food production" (UK) - "low profitability of the sector, where prices keep low and costs increase" (ES)
Opportunities for farm development and introduction of new technologies/management practices as an opportunity for entrance	- "Commercial function development through access to new markets and supply diversification" (RO) - "Market opportunities as reasons to enter farming" (BG) - "Diversification and increase of financial sources options for farmers" (BG)

- "Changes in the production structure due to large fluctuations in profitability between individual products" (RO)
- "Profitability increase is the main reason why major changes have been generated on the farm" (RO)

Economic viability of the farm business, or lack thereof, is mentioned extensively in the case studies as a determining driver affecting demographic relevant decisions, and therefore generational renewal. Profitability of the farm business determines whether agricultural activity remains attractive for the next generation. From the case studies object of this report, the profitability is mentioned in all cases mostly as factor discouraging the entrance or continuation of the farm businesses. Only in the Italian case study provided an exception: the favourable economic situation in which the farming system versed were mentioned as an attractive force for new generations to the farming activity and an opportunity to further farm development and invest. Conversely, in the Spanish case study, the lack of possibilities to make a decent income was mentioned as an influential hindrance to succession as indicated by this passage from the Spanish report: *"They do not do it because it is not profitable, because they do not find the point …This is the problem, this is the problem. The prices do not increase, we are with a few average prices like twenty-five years ago".*

In the general European context, profit from agricultural activities has seen a decline in the past decades as a result of cost-price squeeze deriving from the different pace of expansion of supply of agricultural output and demand (EU parliament, 2015). Accounting also for geographical variability within the European context, the instability of farm income has induced structural change, such as the demographic dynamics discussed in this thesis. In a framework of free market economics, this phenomenon follows the rationale by which farms that are not profitable need to exit the market, the remaining farms supposedly engage in economies of scale and allocate available resources more efficiently. Academic literature on farm income in the past decades fails to describe an overarching farm income problem: the datasets and parameters included in economic analyses vary and provide different results, due to variability of farm structures and lack of precise accountancy data. Terres et al. (2013) find that there is great variability in European regions and farm typologies and that when modelling agricultural income with country GDP, many regions display almost relative poverty levels, however the analysis is far from being exhaustive. These considerations cannot be generalized to the whole European context, for example Marino et al., 2018 find that agricultural income tends to be lower in European countries that entered last in the union, such as Romania, Poland, and Bulgaria. Generally, farm income is known to be volatile and unstable due to variability in farm output, and this serves as rationale for public aid in the form of direct assistance (Calus & Huylenbroeck, 2010). Despite public aid, the economic performance of farms is considered unsatisfactory and unattractive to future generations. In some case studies, opportunities for future development are mentioned by respondents through the enhancement of the economic performance of the farm, which can be achieved through diversification of production or distribution channels, multifunctionality, specialization and intensification.

Structural change and land

Land is an essential production factor in farming and, as already introduced in chapter 2.4, access to land can be problematic. Access to land is not problematic only for young farmers or new entrants: lack of affordable land is also an issue for existing farms that see the expansion as a development strategy. Increasing land extension can encourage investments in mechanization, and to take advantage of external economies of scale, which subsequently entail less dependence on the labour market. Land can be unavailable due to competition between rural areas and encroaching urbanization, like in the Belgian case study, or due to administrative burdens; the latter are associated with local land tenure legislation and contracts with landowners.

Table 7: case study examples of the driver 'structural change and land drivers'

Description	Case studies
Access to land can be limited by administrative issues, high prices and competition with urban environments. Land is an important factor for the development of the farm.	- "Current CAP forces big farm sizes" (GE) - "High land prices have substantial influence on farm" (GE) - "Land ownership and relationships between landowners and farmers to buy/rent/lease farmland" (BG) - "Direct payments slowed down the turnover of land, payments don't always reach the farmers cultivating the land" (PL) - "Tenure type influences stability of farm" (UK)

The availability and access to land evidently affect the demographic component of farms, especially in the institutional perspective - administrative structure, ownership, organization of the farm business (Vrolijk et al., 2010). Land ownership and contracting influences generational renewal. family farms especially have notable interests in passing down farm assets such as land to the following generation, and in case the intergenerational succession does not occur, land can be reallocated efficiently and bought by other farmers. This process of restructuring can put in question the equitable reallocation of land and the land ownership structures that arise: the concentration and consolidation of assets in few holding can lead to the rise inequal power dynamics and an unsustainable development of agriculture (Van Vliet, et al., 2015). In many case studies, local land tenure legislation is presented as a challenge: short term land contracts hinder the ability to make long term plans and investments and shift the focus of farm management on short term results because of the contractual uncertainty. The acquisition of land – and therefore expansion of the farm business - is mentioned as a viable risk management strategy to secure stability and independence. Larger farm structures are indicated as more able to cope with future shocks and price fluctuations and give the opportunity to have more control on the production process, like in the French case study where acquiring land to grow feed for livestock is seen as an alternative on the reliance on imports.

Policy and institutional drivers

As it emerged also from the literature review in paragraph 2.3, policy is a crucial aspect of European farming systems. It is no surprise that in the case study materials policy related issues were widespread. As delineated in table 8, the intricacies of the CAP were indicated as a hindrance to

farm development, especially due to the lack of clear goals and vision of the current measures: this uncertainty can prevent farmers from taking long term decisions, thus hindering structural change.

Table 8: case study examples of the driver 'policy and institutional drivers'

Example	Case studies
Public policy measures are pervasive and influential in many decisions involving the demographic dimension of the farm	- Lack of long-term strategy at national level for the development of the sector - Instability caused by continuous changes in policy goals as well as national legislation - Bureaucracy is a burden - current CAP forces big farm sizes - A strong second pillar of CAP could provide interesting development perspectives, especially for smaller farms - CAP supplies and legislation influence farm productions and practices

The burdensome bureaucracy and paperwork related to applying to different support measures deter farmers from applying for subsidies and rural development programs. Completing administrative and bureaucratic tasks requires more specific knowledge and skillsets, which not all farmers possess, and which might also not be easily accessible through farm advisory services. Additionally, administrative burdens can subtract time from the daily operations on the farm, pushing farmers to either balance these activities or neglect one or the other. The bureaucratic burden of requesting assistance through the CAP lowers the benefits of receiving subsidies.

Furthermore, the mechanisms to obtain aids and funding are described as sluggish and inefficient, especially in the subsidy provision. However, in some case studies such as Poland and Spain, subsidies are seen favourably for their income-stabilizing effect and in the new investment possibilities that are granted through the rural development schemes, such as the young farmer payment or financing for new investments.

5. Discussion and Conclusion

As highlighted by the analysis included in the previous chapters, generational renewal in farming systems is an interesting demographic dynamic contributing to the future sustainable development of food production in Europe (European Commission, 2017). Generational renewal is affected by a variety of intermingled and complex drivers, among these also the human dimension of farming systems requires careful explanation and discussion. The case studies uncovered a number of socioeconomic drivers influencing the demographic situation of farming systems and the occurrence of generational renewal and the outcome of the analysis is the construction of a narrative of the challenges affecting farmers and provide interesting suggestions for possible future actions to cope with demographic challenges. Generational renewal is a process tethered to the many systemic challenges confronting farming systems, and it cannot be described exhaustively through the acknowledgement of the scarce number of young farmers. The latter is a symptomatic demonstration of the underlying general predicament of agricultural sector.

Policy intervention

The most immediate and logical outcome that stems from the analysis contained in this report entails the discussion of possible public measures that could be employed to encourage generational renewal. As mentioned in the introductory paragraphs, any analysis of European agriculture needs to account for the tentacular presence of public policy instruments of the CAP: public intervention in this sector is justified by the strategic role of food production and the inherent vulnerability of agriculture. Interestingly, the possible solutions which can be inferred from the analysis include multiple public interventions that could support generational renewal in a broader sense, rather than focussing on direct measures and financial aids specifically for young farmers. Systemic issues call for systemic solutions, which can mutually reinforce each other by delivering multiple outcomes increasing the attractiveness of agriculture as a profession. Policymakers should reinvent support tools that aim at promoting the wellbeing of rural communities, and incidentally create a favourable environment for generational renewal. Long-term policy goals should be the social and economic inclusion of rural areas, with farmers delivering the food and ecosystem services that can help the transition towards a sustainable food system (De Schutter, et al., 2019).

The Common Agricultural Policy is widely perceived by farmers as sluggish and ineffective, especially in the Pillar 1 measures concerning the direct payments based on acreage; conversely, Pillar 2 measures including rural development are pointed out as instrumental for the improvement of farm businesses, especially for smaller farms. It is often argued that direct payments have become an anachronistic public support measure, especially in its perpetuation of inequalities, especially in the concentration and consolidation effect on land and farm structures (Balmann, et al., 2006). Pillar 2 on the other hand, provides more possibilities to encourage rural development actions which might attract rural workers, like making more attractive rural areas by bettering infrastructure, encouraging the uptake or risk management tools, and promoting food chain organization.

In order to ensure the adaptation of the socio-ecological systems, as farming systems can be considered, different political theories and governance models should be adopted in mainstream

policymaking: progressive modes of governance that include the managing of resources according to the theory of commons and change the policy goals from maximisation of output to fostering the ability to cope with change and difficulties (Armitage, 2008). Income integration and direct subsidies make up already a considerable amount of the European public expenditure, and the extent to which these public measures effectively aid farm livelihood can be debated endlessly. The current political discourse fails to coordinate on what is the future trajectory of European farming will be, a hybrid between market oriented enterprises producing for a globalized economy and the multifunctional family farm should be able to coexist to ensure the production of agricultural commodities as well as public goods (Calus et al., 2010). The lack of a clear political vision creates uncertainty for farmers, who are then deterred from making investments or selling their assets, thus delaying any foreseeable structural change (*ibidem*).

A methodological discussion

Lastly, it is necessary to assess the methods used to conduct the analysis contained in this report. Qualitative analysis is needed to appreciate the complexity of farming systems demographics and generational renewal. The application of a systematic approach is a useful tool to grasp the concepts expressed by single respondents and the thematic analysis proved a satisfactory method to construct an interesting narrative of generational renewal, which included a multidisciplinary understanding of interrelations, interdependencies and trade-offs. Furthermore, as mentioned in the opening chapters, abundant scientific literature analyses generational renewal, mostly in the form of succession, through quantitative methods and econometric analyses (Calus, et al., 2008; Harris, et al., 2012; Mishra, et al., 2010). There is value in integrating these methods with some more descriptive approaches based on case studies, interviews and general qualitative data, thus escaping from the normative nature of economic analysis (Fischer & Burton, 2014).

Obviously, there are quite a few limitations concerning the analysis contained in this report. Firstly, the infiltration of researcher's subjectivity and bias in the analysis process: qualitative analyses tend to be more subject to interpretation than quantitative ones. Most importantly, the use of thematic analysis in this report was chosen to construct an interpretive key and to understand the processes characterizing generational renewal in farm systems; the accuracy of this method is debatable, because it depends on the sensibility and bias of the researchers (Nowell, et al., 2017). Notwithstanding that the analysis was carried out in a research institution with the assistance and input of different researchers, I believe that more rigorous tracking of the analysis steps should have been kept. The analysis could have benefitted from a more thorough methodological approach and theoretical approach in the formulation of the research questions in the proposal writing stage.

Secondly, due to the limitations of the report's format being a master thesis, many factors were not included in a comprehensive analysis. Climate change, neighbour relations and endogenous factors of farmers' lives were not included in further abstraction because of lack of time and deemed as not strictly necessary to construct a meaningful discussion of the drivers of generational renewal. These aspects were considered in the analysis and can be found in the comprehensive analysis on farm demographics conducted within the SURE-Farm project (Coopmans et al., 2019). This report is

therefore a collection of a few elements: a compiling of relevant existing literature and a qualitative analysis aiming to compose a comprehensive image of the state of affairs of the farmer labour force in different European farming systems.

Objective 1: Review the situation concerning generational renewal in Europe

The drafting of the report stemmed from the consideration that agricultural labour force is undergoing a labour shortage and recruitment crisis, often a position promoted also by policymakers. The focus of the research questions focusing on generational renewal stemmed from the acknowledgment of the existence of *young farmer problem* in Europe (Zagata & Sutherland, 2015). Furthermore, the trajectories for access to the farming profession were researched to construct a theoretical base before delving into the data analysis. The literature search on succession and farm transfer, proved particularly useful to understand some of the processes described in the case studies, which overwhelmingly displayed the functioning of family farms.

Sub-objective i: what is the farm demographic situation in Europe?

Scholars and policymakers lament a recruitment crisis in European agriculture which could harm the future sustainability and development of the sector. The actual extent of this crisis is difficult to assess and the normative statements that are made to describe the demographic situation are based on EU-wide surveys on farm structures that often are not thorough and only portray a partial image of the situation (Zagata & Sutherland, 2015; Matthews, 2018): the farmer's population in Europe is indeed rapidly aging, but it also follows the demographic trend of the general population. Furthermore, the family farm structure predominates throughout Europe, highlighting how farm demographic dynamics are also linked to structural change (Balmann, et al., 2006).

Sub-objective ii: what are the policies at European level that influence generational renewal?

The process of generational renewal is high on policymakers' agendas because it is seen as an existentially important factor for the future of farming and the provision of food and public services. New and young farmers need to inject new life in agriculture, through innovative and sustainable farming practices, better management, and development of farm businesses (Suess-Reyes & Fuetsch, 2016). At European level, measures within the Common agricultural policy exist to directly support the farmers' population turnover, such as the start-up aid for young farmers; indirectly, the CAP supports young farmers by providing access to knowledge through training courses, by improving access to investments and by encouraging farm advisory services. As any public measure, the effectiveness of the CAP's policy tools is debatable and needs further impact assessments (Kaufmann, 2013).

Sub-objective iii: what are the hindrances to generational renewal?

Access to production factors, such as land, capital and knowledge is indicated extensively in literature as the major hindrance to generational renewal, both for new entrants and for successors on existing farms. Furthermore, the familial nature of farming businesses requires the acknowledgment of successions and transfer processes engendered in the sector.

Objective 2:

The analysis of the information and qualitative data deriving from the SURE-Farm case studies provided some empirical base to assess the current situation of generational renewal processes in a diverse set of farming systems. The identification of drivers of demographic relevant decisions shows how a variety of factors influences an individual's decision to take up the farming profession.

Sub-objective i: within the farming systems considered in the project: what are farm demographic situations and possible criticalities or opportunities for development?

The cross-case study comparison between different farming systems conducted within this research was instrumental in drafting an overarching narrative of the demographic situations. The case studies provided a testimonial of some general demographic characteristics of farms in different contexts: traditional family farms, cooperative and corporate farms were the base for the analysis. The demographic dynamics analysis departed from the acknowledgement of the farm characteristics: farm managers, farm workers and farm typology. The case studies provided a complex image of demographic components; however, it is possible to state that generational renewal is a hindered process in all systems. Singular cases of generational renewal and effective succession were recorded in some farming systems, such as Italian hazelnut farms or Swedish broiler production. A deeper understanding of demographic situation emphasized the common challenges afflicting diverse farming systems: namely the lack of sufficiently satisfactory incomes from farming, labour availability and allocation issues, location and proximity to urban centres, environmental challenges, gaps in education and training, lack of access to credit, bureaucracy burdens.

Sub-objective ii: what are the socioeconomic drivers affecting further generational renewal?

From the analysis it emerged how the farming profession is overwhelmingly described as unattractive economically: the low incomes, unfavourable working conditions and mismanaged rural areas all contribute to deterring a new generation of farmers. The low incomes are linked to the low profitability of farms, which in turn is not only due to individual management capabilities but mainly dependant on macroeconomic factors such as the cost-price squeeze, volatility of commodity prices, competition in global markets, exchange rates, imbalance in bargaining power with other actors in the supply chain. Political uncertainty and regulatory ambiguity can also impact the process of generational renewal because of the lack of long-term vision that hinders farms' development trajectories. Land ownership and tenancy contracts are also mentioned as a source of instability: short-term contracts are favoured, thus also impacting opportunities for development.

The lack of generational renewal will have to be addressed and tackled more efficiently in the coming decades by envisioning what kind of adaptation will have to occur for farming systems to maintain the supply of goods and services. The management of the demographic situation will obviously differ from case to case: some systems might be able to cope better with labour shortages and lack of generational renewal by intensifying production with technology, this is the case for example of large scale crop production for example could more easily cope with lack of agricultural labour force by making use of scale economies. Conversely, more labour-intensive farming, such as extensive livestock breeding, will have to find different ways to adapt, taking up different strategies,

such as: part-time farming, diversification in multifunctional agriculture, focussing on quality production or organic practices.

The outcome of qualitative analysis such as the one included in this report could inform more farsighted policymaking, which would include territorial differences and specific challenges of different production systems, rather than continue focussing on centralized responses.

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Annex I

Case study descriptions

1.Romania

The Romanian case study is set in the North-Eastern region of the country, in the municipality of Iași. The area considered in the case study is one of the poorest in Romania and Europe. This entails the presence of high unemployment rates; a lack of private investments in entrepreneurial activities; strong migratory patterns (rural-urban and abroad); an ageing population; lack of adequate services (railways and infrastructure).

The sample of farms used in this study were predominantly small family farms dedicated to mixed activities including arable crops, livestock rearing, fruit, and vegetables. Some of the farms have a commercial function and are embedded in local value chains, others are for subsistence only. The farms considered in this case study are representative of the prevalent structure in the area: 40% of the UAA of the area is farmed by small farms of 1-10 ha and Romania indeed holds more than 30% of the total number of farms within the European Union (Eurostat, 2018), denoting a particular fragmentation of land in small businesses, which is also due to the process coming from post-sovietic reallocation of land.

The fragmentation of the land in predominantly smaller farms is mostly due to the post-communist liquidation of state cooperative farms to the former landowners. The farm labour force is construed principally of family members, especially in sustenance farms, and occasionally seasonal workers. The impact of migration on the demographic dynamics significantly influences the availability of farm labour as well as the likelihood of smooth succession processes. However, migration is also presented positively in some cases: returning migrants bring in new knowledge, entrepreneurial attitudes, and a stronger inclination towards innovative agricultural practices.

The business-related decision-making lies traditionally with the farm head, usually male, thus displaying traditional gender roles and conventional division of labour among family members. Operational and strategic decisions are taken by the farm head, while the commercial activities are usually responsibility of the assisting spouse. In this case study, the overlap of the farm business and the household is displayed in the attitude towards financing, by sourcing money from extended family and local networks is preferred over established credit institutions.

Production risks are perceived primarily as environmental: incidence of drought and extreme weather events are indicated as the main source of uncertainty. Market related risks include the ongoing price-cost squeeze that makes farming unprofitable and unattractive to future generations: which is perceived as the main barrier for entry. The low bargaining power with other actors in the supply chain is cited as a source of organizational risk. CAP Subsidies and RDP measures are perceived very favourably and influential for modernization and investment.

Table A1: background information on Romanian case study – Sustenance family farms

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Sustenance farms for self-consumption/weak commercial activity	• Old average age of the population • Strong migratory patterns – abroad and rural/urban • Labour provision mostly from family	• Farmland • fragmentation and lack of economies of scale • Lack of cooperation and organization between farmers and no development of value chains • Lack of financing opportunities from private institutions makes investments and improvements difficult • Complete overlap between farm management and family life cycle	• Take up of RDP measures • Return of labour force from abroad with knowledge and entrepreneurial spirit

2. Germany

The German case study covers the Altmark region in the Saxony-Anhalt Federal state in North East Germany. Most farms in this region is characterized by large scale operations on extensive amounts of land: this is a direct consequence of state-run cooperative structures of the GDR. The mini-cases present mainly specialization in arable crop farming and dairy production, in some cases diversification is sought by constructing and running a biogas plant. Gradually, the livestock specialization is abandoned or re-examined, as it is perceived as a source of potential risks including (1) the low profitability of the sector is caused by low milk prices; (2) regular changes in the milk quota system entail an extra source of uncertainty and (3) the low availability of skilled labour force for the dairy sector.

Land prices in the region are high and therefore most farms in this case study have reached their capacity in terms of land expansion. Consequently, growth and development are most likely to happen through optimization by implementing of more efficient techniques, further mechanization and technology driven diversifications. Farms are managed mostly by educated professionals, who either have a formal education in agriculture or extensive experience in the sector.

The more complex organizational structure of cooperative/corporate farms differentiates the succession process from family farms: in these structures the prospective successor does not necessarily have to be tied to the family to take over the business.

This feature introduces the difficulty of recruiting properly trained and trustworthy employees, which is mentioned as a potential disruption for future development of the business. The recruitment crisis is most likely caused by the low attractivity of the sector for the new generation, due to low profitability relative to other career options. Furthermore, negative representation of agriculture in media, fuelled by a non-scientific public debate on the externalities of agricultural practices, is recognised as a cause for non-entrance in the farming sector.

Additionally, the lack of long-term political vision in agricultural reforms is identified as a potential source of instability. The overbearing bureaucracy of the CAP is an obstacle to long-term investments and planning. For example, the application process for direct subsidies is seen as a nuisance and the actual outcome of the subsidies is not perceived as a benefit, making the whole system a redundant and outdated form of support, which encourages the formation of increasingly larger farm as a pursuit of greater profitability. The respondents of this case study pointed to the Pillar II of the CAP as the answer to strengthen the farming sector and to ensure the survival of smaller farms. Organizational risks mainly consist of power imbalance in supply chain relation. A viable strategy to overcome this problem includes direct marketing, which is not suitable for all type of farms.

Table A2: background information on German case study – commercial arable farming

Information on the farm system	Demographic challenges	Structural challenges	Opportunities/coping strategies
Commercial arable farms with cooperative structure	• Recruitment crisis: off farm employment is more desirable and profitable • Lack of properly skilled labour • Succession is a challenging and difficult procedure • Intergenerational conflict hampers innovation	• High land prices and lack of possibility for expansion • Access to financial capital as barrier to growth • Gap between practice and education • Lack of public services in rural areas • Dairy farming slowly phased out because unprofitable	• Optimization and push for efficiency with available resources • Diversification of enterprises is seen as opportunity for the future (direct marketing) • Growth can happen mainly via acquisition of smaller farms exiting the business (consolidation) • Development of biofuel plants as a diversification strategy

3. Italy

The Italian case study focuses on the hazelnut sector in Northern Lazio. The farms are predominantly small-medium, family owned enterprises, organized in either simple partnerships of cooperatives. In the past, the main demographic changes were driven by intense mechanisation of the sector, which caused a substantial reduction of the labour requirements. Hazelnut cultivation is quite a profitable sector and therefore remains attractive for future generations.

The good economic situation of the whole sector entails a push further intensification of production which was perceived as a potential future challenge by the respondents. They state that, if not well managed, the intensification trend could lead to the constitution of a monoculture; breaking down the diversity of the farm businesses in the territory, in in most of the mini-cases a succession process was already delineated, which illustrates a sector-level trend that is in stark contrast with the general national farm labour dynamics. The typical farmers population distribution skewed towards older farmers is thus not elaborated by this case-study.

The Italian case study particularly emphasized a shift towards more sustainable agricultural practices. The drivers for this shift are mostly recognized by young respondents as environmental risks, health risks for farm operators, and the possibility of gaining a price premium a more lucrative market (e.g. organic production). The generational renewal occurring in this case study thus comprises both a demographic change and an alteration in common values associated with farming. While structural change used to be driven mainly by economic profitability, the next generations farmers seem to implement innovations also taking ethical considerations into account.

Technologically innovative strategies mostly include investment in irrigation system to counter environmental risks. Market risks are constituted by the competing Turkish hazelnut industry, which provide unfair competition for the Italian hazelnut growers.

Respondents are most concerned about the power imbalance in the value chain because the processing industry makes it hard to obtain a fair revenue from the sale of the hazelnuts, many farmers indicate the possibility to start processing independently as a solution to receive a higher selling price.

Table A3: background information on Italian case study – perennial crop farming

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Hazelnut tee farming	• The profitability of the sector makes agriculture still attractive for the next generations • Family farms display a certain degree of intergenerational succession • Traditional family farming.	• Intensification of production pushes for monoculture and subsequently to	• Organica conversion • Direct processing

4. UK

The UK case-study is set in East England and it comprises of mostly large arable crops farms, extension-wise larger than the average farm size in the area. The crops grown are mostly cereals and sugar beet or potatoes, some farms also own some livestock, but it does not constitute the primary source of income as livestock rearing is presented as unprofitable activity. The crops grown, especially wheat, are generally regarded as commodities and therefore are particularly susceptible to price volatility correlated to exchange rates of the pound and global market trends. Operation-wise, this entails a cost-effective driven management of farms. A common strategy is to diversify the farm scope with activities that are less volatile compared to arable farming, like tourism services, nature conservation and selling for land for construction. Furthermore, the farmers in the case study pursue an enlargement of the farmed land, to use resources efficiently and to increase productivity and profitability. However, buying land if often constrained by high prices. Contract farming might constitute the only solution for running more efficient operations.

A first demographic aspect characterizing this farming system concerns the inability of the farm to support more than one family at a time. This entails the delayed entrance of the prospective successors that was observed. A significant share of respondents first engaged in non-agricultural activities. A shift towards more timely successions was an important opportunity for enabling successful farm transfers in the future. Secondly, a shortage of skilled labour availability is seen as a limiting factor for further development of the agricultural sector in the area. Paradoxically, it will most likely be the driver for further automation and technological innovation; thereby entailing the requirement of fewer but highly specialized workers. The labour availability is also clouded by Brexit uncertainty, which will most likely affect the possibility to hire foreign seasonal workers who might have the skills that the local human resources lack. The upcoming Brexit seems to additionally cause further vulnerability of the agricultural sector. Some farmers tend to behave more risk averse or are for example taking advantage of the last European subsidies available to buy machinery.

Table A4: background information on English case study – extensive arable farming

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Extensive arable farming	• Farm income cannot support more than one household • No availability of skilled labour • Lack of succession planning • Scale economies • Family partnerships entail that business decisions inevitably depend on the family structure and relationship	• Main barrier to entry is the lack of skills and qualifications	• Cost effectiveness driven farm management • Mechanization, specialization, technological advancements to take advantage of scale economies

5. Sweden

The farms in the Swedish mini case specialize in egg and/or broiler chicken production. Some have diversification in forestry and/or arable crops either for sale or for use as fodder for the animals. The farms are all described as family owned farms; inferring that the business entity and the household dynamics intermingle in the management as well as in the labour provision. The labour force is usually found within the family, and the development trajectory of the farm business is often linked to the presence of interest in farming of prospective successors. Therefore, early involvement in the rural lifestyle and specific education are recognized factors impacting the future of the sector. Next to family labour, hired non-family labour also arises. The discriminant factor in the recruitment process of the farm labour are specific education and interest for working with animals.

The main trend in the sector is intensification and further mechanization of operations, encouraged also by other actors downstream in the chain. Retailers require a shift in the specialization of the farm. Generally, the good relationships between the farmers and the other value-chain actors (both upstream and downstream), enable either entry or continuation of the farm business. Production quality standards and costs of production are higher in Sweden that in the rest of Europe: the resulting competition is perceived as unfair and it seems to impact demographic decisions for this sector. The imbalance between input prices and final consumer product prices reinforces this

dynamic. In this case-study, particular attention is given to the existence of specific gender roles in the division of labour and responsibilities. While mostly men hold the managerial roles and are principal decision-makers, women are regarded as employees, focussing on operational activities mainly associated by rearing chickens, being secondary in the strategic decision-making process.

Table A5: background information on the Swedish case study – egg and broiler production

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Broiler and egg production	• Labour provision is dependent on family structure	• Inadequate rural public services • Strong dependency on other sectors of the supply chain	• Embeddedness in the value chain is a determinant for continuity • Push for large scale production and intensification • Expansion needed only to support more than one household

6. Spain

The Spanish case study involves livestock farmers in the eastern region of Sierra de Guadarrama, in the outskirts of Madrid. The farm enterprises revolve around extensive livestock rearing, particularly cattle and sheep, and the activities needed for the production of the feed and pasture. Generally, the situation depicted in the case studies is rather bleak and hopeless: many of the respondents cited mainly emotional reasons for their perseverance in the farming sector. The sector's low profitability, disregarding whether it is sheep or cattle raising, makes entrance unappealing to possible successors and is a constant source of hardship for farmers who decide to remain in the business. The rising costs of farm input mismatch the lowering selling prices of the outputs, leaving little space for farmers to retain sufficient profit. Other sources of disgruntlement include the convoluted inefficiencies of the CAP, which does not favour small farmers and adds only bureaucratic weight on everyday operations. Regarding the succession process, family inheritance is proposed as the main mean of entering the farming sector, as it provides easy access to land which is the biggest barrier to entry as well as specific knowledge and the emotional bond to the farm

needed to persevere in a hostile profession. The ownership of land and animals, as well as the availability of CAP subsidies which usually counts for almost 30% of the income, keeps farmers in the sector. The lack of adequate rural services and infrastructure is also deterrent to new entrants.

Possible developments for the sector would require either the intensification of the farming activity in more lucrative fields, such as intensive chicken and pig breeding, which have higher return on investment than the extensive cattle rearing, or the participation in quality schemes to collect premium prices from meat sales, such as the already existing geographical indication IGP Carne Sierra de Guadarrama.

Table A6: background information on Spanish case study – extensive livestock farming

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Extensive cattle rearing	• Aging farmer and lack of rural infrastructure drive people away from workers. • Inheritance is the only mean of the entry into the sector • No way to transfer knowledge to new generations • High labour costs • Organizational structure of family farm influences demographic	• Poor profitability of the farming activity; conflict between rural and urban areas • Access to land main entry barrier • General lack of confidence in future	• Most farmers are at a crossroads between a shift to intensive farming systems or enrolment in quality schemes • Being part of a cooperative or professional association can be opportunity (increase bargaining power) • Set up new commercialization channels

7. Bulgaria

In the Bulgarian case study, the process of restitution of land from collectivized state-run enterprises to private citizens plays an important role in the demographic dynamics of the farming system. The case study focuses on large scale arable crop farms, that have resulted from the gradual consolidation of smaller farms. However, much of the land is rented based on short-term contracts. The land ownership pattern highlighted in the case study entails that farm businesses are not older than 20-25 years and therefore there is no consolidated tradition of farm succession: the current owners are faced for the first time with this process.

High land prices are presented as a main limitation for farmers, who would like to increase their percentage of owned land to ensure long term stability of their business. The post-soviet

environment hindered the development of relationship between farmers and financial institutions. Currently, this relationship is evolving gradually, but the initial financing of most of the farms was obtained through informal relationships or with the use of subsidies that favoured investments and crop diversification. The entrance in a more globalized market induced a more entrepreneurial approach to agriculture, instilling farmer to try new practices, to apply greening measures and to diversify their crops to be competitive.

In all the mini case there is a high degree of mechanization was cited as a risk management strategy for the current labour market situation, which is lacking motivated and specialized workers who can work with complex machinery. Rural-urban migration and/or migration to other countries are indicated as major drivers for the lack of adequate labour.

The respondents of the mini cases have generally received formal education in agriculture and indicate the bridge between agricultural practice and research as a very important factor for the development of the sector.

Table A7: background information on Bulgarian case study – large scale corporate farming

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Large scale corporate farming	• Former cooperative structure is still influential for the entering in the business • Land ownership and relations between landowners and farmers (increase demand for land, non-loyal practices, short term leases) • Lack of institutionalized succession patterns	• No connection between education and practice • Financial challenges (access to credits, lack of entrepreneurship and acceptance of credit burden)	• Diversification is needed to sustain the business (distribution of inputs) • Greening and ecological requirements (additional income and long-term viability of land) • Investment in mechanization make up for lost interest by next generation

8. France

The French case study is set in the central region, corresponding to the Allier department, and it revolves around the Extensive livestock farming sector. The region is dominated by a grassland landscape, suitable for beef cattle farms, but which is also particularly susceptible to environmental change (i.e. drought). The grassland also constitutes a limiting factor in the possible intensification of the sector because the unavailability of locally resourced feed hinders the expansion

opportunities. Moreover, environmental protection and conservancy is seen as a necessity for the maintenance of the *bocage*, a characteristic grassland landscape punctuated by systems of hedges and pastures. Accordingly, the use of pesticides and herbicide is limited, and greater attention is given to environmental schemes.

Most farms are family run businesses, and in some cases partnership organizations exists. The labour is therefore provided mainly by the family relations and seldom sourced outside the household. Interest and passion for agriculture are cited as the main drivers for the familial inheritance of the farm business.

The development of the farm businesses in this case study does not entail the intensification by increasing the size of the herd. Rather, the production is focused on increasing the quality of the final consumer product, by investing in better breeding, quality feed and increment animal welfare. Consequently, self-sufficiency in feed production is seen as a necessary coping strategy to ensure high quality products. Increasing land owned and farmed becomes an obvious prerequisite for self-sufficiency, this however cannot always happen due to high land prices and/or land unavailability. While past business development typically involved the expansion of land and the acquisition of a larger number of animals, the future developments will most likely involve further diversification of the enterprises, such as broadening the number of breed in the herd, or diversifying the possible marketing channels

Table A8: background information on French case study – extensive cattle farming

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Extensive beef rearing	• External hired labour is too costly, the businesses rely solely on family labour. • Far legal form is adapted to farm human resources structure and needs	• Lack of profitability can lead to a less productive agriculture	• Production pushes towards quality (animal welfare) • Collective organizational structure (cooperative) to share investments

9. Poland

Mazovian is a central-eastern Polish region, characterized by small and medium family farms, primarily devoted to horticulture and fruit production. The farms of this case study are specialized in fruit and vegetable production. The region itself is thriving part of the polish economy, with agriculture having an important role. As in nearly all parts of Europe, Poland witnesses the process of gradual intensification and concentration of agricultural land in fewer and larger businesses.

Family farms dominate the organization ecosystem and are predominantly still quite limited in extension. The family farm structure induces that the succession process is very important to the survival of the farm: the recent trends see a dwindling of the generational renewal, mostly because the income from agriculture is not competitive to the possibilities obtainable from off-farm labour. The economic situation that the farms withstand is one of low profitability mainly caused by the continuously soaring costs of input and stagnation of sale prices. The low profitability of agricultural activity is a strong deterrent to new entrants and prospective successors. The extrafamilial labour provision relies heavily on seasonal workers, especially during the harvest period. The availability of seasonal labour, and the ability of the farm manager to pay the worker's wages, are two fundamental factors affecting the productivity of farms. Risks associated with labour scarcity are mainly associated with institutional mechanisms, ability to cope with these risks depend mostly on institutional presence, such as government making it easier for small farms to have precarious contracts or rely on the incremental mechanization of certain activities, which requires investment. Investments in new machinery and business enlargement are being made possible especially using available CAP subsidies available.

The main developments in the farm enterprises are being dictated by changes in consumer taste and demands, as well as in developments in the distribution channels. Contracts with wholesalers - while giving the assurance of the future sale - also often include the adherence to quality certification schemes requiring additional bureaucracy and time. In order to be able to face the growing demand for quality produce, farmers gather in a newly created producers group, which can invest jointly in communal storage facilities, as well as improving the farmers' bargaining position with other actors in the supply chain.

Table A91: background information on Polish case study – fruit and vegetable farming

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Family owned fruit and vegetable farming	• Higher income from work outside the farm drives labour away from agriculture. • Succession within family is an established process, but not taken up in all cases	• Decrease in income from agricultural activities; • Difficult access to financial resources, land market system; • Direct payments do not promote turnover of land	• Creation of producer groups, to improve the competitive position • Investment are possible through the CAP (innovation and modernization).

10. Belgium

The agricultural sector in Flanders used to consist typically of medium-sized farms, however following the general European trend, the farm population has started to shift increasingly towards larger farms. Regarding organizational and ownership structure, the sector is dominated by traditional family farms. The dairy sector, which is the focus of this case study is facing severe price volatility of input and output products, therefore categorized by the respondents as the least profitable sector of all farming activities. It is not unusual that off-farm income (typically brought in by the spouse) is used to secure farm survival in, as a source of risk management. Entry in the sector is mainly rooted in tradition and family farm succession, in which business and family lifecycles are deeply correlated.

The Belgian dairy sector demands large amounts of capital in terms of the production factors land, labour, and infrastructure. High land prices make non-familial farm transfer very challenging. Although dairy farms are found in the whole case-study region, the agricultural sector in Flanders is clustered and thus dairy farming is predominant in certain regions over others, depending primarily on the soil types and historical demographic trends. Flanders is one of the most densely populated areas of Europe, urban-rural dynamics put a lot pressure on land availability and subsequently on the land market. Consequently, the low availability of land is mentioned by all respondents within the case-study but is accentuated in those areas where extreme intra- and/or intersectoral competition for land exists. The recognized trend within the dairy sector entails overwhelmingly the

intensification and automation of production, in opposition with the past labour-intensive production methods. The consequences of this trend are the push to scale up the business to increase the return on investment.

The main strategy applied on the Flemish farm businesses in this case-study sample could be divided in two groups. The first group of farmers mainly focus on improving profitability by lowering input costs as much as possible and/or by scale enlargement. The second group of farmers concerns the diversification of on-farm activities, such as agritourism, on-farm processing or a selling point. The labour provision will eventually affect both groups, either by increasing the input of family labour or by hiring extra-family workers in order to cope with the workload; furthermore, the trade-off between farm labour costs and increasing investments driven by automation will need to be assessed on the long run.

Table A10: background information on Belgian case study – dairy farming

Information on the farm system	Demographic challenges	Structural challenges	Opportunities
Dairy farming	• Urban-rural competition for production factors of land and labour	• Great drive for intensification to maintain a profitable business. • Low availability of land.	• Two main trends; intensification or direct marketing and selling value added products.