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Swedish University of Agricultural Sciences

Faculty of Landscape Architecture, Horticulture  
and Crop Production Science

# Skills and competencies for sustainable food systems

– Case study of young market gardeners in Sweden

Färdigheter och kompetenser för hållbara livsmedelssystem

– Fallstudie av unga småskaliga trädgårdsproducenter i Sverige

Lotten Lundgren



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## Summary

Global food systems are locked into a sociotechnical regime where actors are dependent on high external inputs and economies of scale, and systemic innovation is necessary to meet sustainability targets. Recent research into the development of education for fostering sustainability leaders, such as the Horizon 2020-project NextFood, have largely focused on mainstream agriculture, despite the importance of niches in driving systems change. The present thesis offers a perspective on one such niche, market gardening in Sweden.

The Swedish food system is characterized by a development towards fewer and larger farms, which has been driven by stakeholders in the supply chain and by national- and EU-policies. Market gardening, on the other hand, is small-scale, typically relies on manual labour and uses organic inputs. Market gardeners sell their products directly to consumers through CSA models, traditional marketplaces or digital platforms. On an aggregated level, market gardening is part of a social movement for systemic innovation of food systems, and therefore it has been useful to use a theoretical framework of sustainability and systems thinking to analyse the empirical material in this thesis. Also, to understand market gardeners in relation to mainstream farmers, the results were closely compared to skills and competencies that were previously identified in the NextFood project.

The aim of this project was to provide insight into the situation of young market gardeners in Sweden. Suggestions for research and education efforts to forward the sustainability transformation were offered by analysing their skills and competencies, and lack therein, as well as their values and perceptions of their own role in the food system. The context-specific yet holistic focus of this study motivated a qualitative methodology consisting of thematic analysis of semi-structured interviews.

The results of this study indicate that an interest in cultivation and social factors, such as personal values and a willingness to contribute to society, are the main drivers for young market gardeners. In their daily work, technical skills for the production of vegetables is of crucial importance, and another important tool is the ability to work innovatively through experimentation, adaptation, development and learning. They typically feel fully at home with digital tools such as social media for the sharing of knowledge and experiences and for their marketing and sales. Like other start-ups, their economic situation is very fragile, something that is exacerbated by their lack of sufficient financial management skills and barriers to applying for financial support. In general, the skills and competencies for sustainable food system, as identified by the market gardeners in this study, corresponded well with the results from the NextFood project. Instead, market gardeners are distinguished from the mainstream by their values and mindset, their will to lead for sustainability. Further, their interactions with other stakeholders are severely impacted by their niche position.

In conclusion, young Swedish market gardeners have the mindset of sustainability leaders and possess many of the necessary skills and competencies for sustainable food systems. There is, however, a need for more practice-oriented education focusing on production techniques and financial management. Furthermore, the transformation of the food system is in essence a political and social process in which there is a need for collective responsibility. Policy makers need to acknowledge a new and more diverse generation of farmers and create more flexible support systems. At the same time, the development of consumer awareness needs to continue, and research and education need collaborate with practitioners to develop practice-oriented education that help foster social entrepreneurship and empower leadership for sustainability.

*Keywords:* market gardening, sustainability, food system, skills, competencies, lock-in, transition

## Sammanfattning

Världens livsmedelssystem är inlåsta i en socioteknisk regim där dess aktörer är beroende av externa insatsmedel och skalfördelar för att kunna konkurrera, och det krävs nu en systeminnovation för att det ska gå att nå uppsatta hållbarhetsmål. Pågående forskning med fokus på färdigheter och kompetenser för hållbarhet, såsom Horizon 2020-projektet NextFood, har framförallt fokuserat på behoven inom matsystemets huvudfåra, trots att nischer är viktiga för att driva systemförändringar. Denna studie sätter fokus på en sådan nisch, s.k. market gardening i Sverige.

Det svenska livsmedelssystemet har genomgått en strukturomvandling där allt större och färre gårdar dominerar inom såväl lantbruk som trädgårdsproduktion, ett resultat av såväl politik som marknadskrafter. Inom market gardening producerar man istället småskaligt, använder få och ekologiska insatsmedel samt förlitar sig främst på mänsklig arbetskraft. Produkterna säljs direkt till konsument via andelsjordbruk, marknader eller med hjälp av digitala plattformar. På systemnivå är market gardening även en del av en folkrörelse för omställning av livsmedelssystemet. Därför användes teorier om hållbarhet och systemtänkande för att analysera det empiriska materialet i denna studie. Dessutom användes resultaten i NextFood-projektet som jämförelse för de färdigheter och kompetenser för hållbarhet som identifierades här, för att kunna jämföra nischen med regimen.

Syftet med projektet var att ge insikt i unga, småskaliga grönsaksproducenters situation i Sverige. Genom att analysera deras motivation, värderingar, färdigheter och kompetenser samt uppfattning om sin egen roll i systemomställningen, var målet att erbjuda förslag på fokusområden för utbildning och forskning. Studiens holistiska ansats motiverade en kvalitativ forskningsmetod bestående av semistrukturerade intervjuer som sedan analyserades utifrån tematik.

Resultaten i detta arbete tyder på att odlingsintresse, personliga värderingar och en vilja att bidra till en positiv samhällsutveckling utgör de huvudsakliga drivkrafterna för unga som startar småskaliga grönsaksföretag. I deras dagliga arbete är tekniska färdigheter för yrkesmässig grönsaksproduktion absolut viktigast, men också förmågan att arbeta innovativt genom experimenterande, anpassning och utveckling. De använder sig obehindrat av digitala verktyg såsom sociala medier för att inhämta och dela kunskap i nätverk samt för sin marknadsföring och försäljning. I likhet med andra nyetablerade företag kämpar de med lönsamheten, vilket ytterligare förstärks av bristande kompetens inom affärsutveckling och svårigheter att få ekonomiskt stöd. De färdigheter och kompetenser som unga svenska market gardeners identifierar som viktiga stämmer på en övergripande nivå överens resultaten i NextFood-projektet. Istället skiljer market gardeners ut sig från jordbrukare i allmänhet genom sina värderingar och sin vilja att skapa förändring. Deras interaktioner med andra aktörer i livsmedelssystemet påverkas negativt av det faktum att de inte passar in, vilket gör att de har svårigheter att få tillgång till ekonomiskt stöd och relevant rådgivning.

Sammanfattningsvis kan unga svenska market gardeners beskrivas som självvalda hållbarhetsledare som de besitter många av de färdigheter och kompetenser som tidigare identifierats som viktiga för ett sådant åtagande. De har dock behov av mer praktiskt inriktad utbildning med ett utökat fokus på produktionstekniker och företagsekonomi. Interaktionerna mellan svenska market gardeners och andra aktörer präglas idag av polarisering och bristande tillit som utgör en barriär mot integration. Omställningen av livsmedelssystemet kan därmed förstås som en politisk och social förändringsprocess med behov av gemensamt ansvarstagande. Myndigheter och politiker behöver inse att mångfalden inom den nya generationen matentreprenörer kräver mer flexibla stödsystem. Samtidigt behöver konsumenternas intresse för hållbar mat fortsätta öka och forskning, utbildning och rådgivning behöver utvecklas i samråd med producenter för att kunna skapa verklig förändring.

# Preface

“Hope locates itself in the premises that we don’t know what will happen and that in the spaciousness of uncertainty is room to act. When you recognize uncertainty, you recognize that you may be able to influence the outcomes – you alone or you in concert with a few dozen or several million others.” – Rebecca Solnit, *Hope in the Dark*

Ten years ago, I found myself in Ecuador among small-scale farmers belonging to the global peasants’ movement *La Vía Campesina*. Two years later, I also experienced the challenges faced by their counterparts in South Africa. Slowly, the need to become more than just a food sovereignty activist began to grow. Coincidentally I became friends with a South African horticulturalist and was inspired by her – which was enough for me to commit to five years of studies. Educating myself would give my voice the legitimacy I felt I lacked as an activist, I thought.

Since then the journey has taken me through the various subjects in horticultural science. There have been times of frustration: the lack of systems perspectives, the lack of criticism of the prevailing world order. My mind was enriched with knowledge of the biological side of plant production, but the absence of political analysis has been conspicuous to the extent that I almost lost it myself.

Luckily, I got the opportunity to write this thesis, which put me in contact with the Swedish counterparts to the social movement that inspired me all those years ago. The topic and focus of this thesis grew organically and the process has not been easy – choosing a field of research that the years of study had not prepared me for, forced me to come into contact with my inner oceans of ignorance. I questioned my choice more than once... *Why didn't I just do a laboratory experiment and stick to the things I know?*

The answer is an obvious cliché – I want to do something that I feel matters. Hearing the participants in this study repeatedly voice my own thoughts gave me a sense of togetherness. More and more people are driving change in the ways they can, even in Sweden. Although I am still full of questions and not sure about my own role in this process, I have more hope than I started out with.

*Lotten Lundgren*  
*May 2020*

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# Abbreviations

AED	Adaptation, experimentation and development
BS	Business planning and strategic management
CAP	Common Agricultural Policy
CSA	Community Supported Agriculture
FAO	Food and Agriculture Organization of the United Nations
LRF	Federation of Swedish Farmers
NF	NextFood
SDG	Sustainable Development Goals
SLU	Swedish University of Agricultural Sciences
UN	United Nations

# 1. Problem background: Attempts to break a locked food system

During the past century, agriculture and the accompanying food system have undergone a complete transformation. In modern agricultural systems, crops are grown in monocultures via high inputs of capital in the form of heavy machinery, synthetic fertilizers and chemical plant protection products. The advent of mineral fertilizers, in particular, enabled yields to rise so that food could be secured for a greater number of people. At the same time, this intensive agricultural production causes and contributes to irreversible damage such as biodiversity loss, land degradation, deforestation, climate change, destruction of local cultures, and public health problems (Braun *et al.*, 2017; Altieri *et al.*, 2015; Berry *et al.*, 2015; Beddington *et al.*, 2012; Altieri & Nicholls, 2005). Paradoxically, the same innovations that lifted the world from hunger is now threatening the food security and livelihoods of current and future generations. To move towards sustainable food systems, food production needs to transition from large-scale monoculture production to diversified smallholder farms using less external inputs, while at the same time moving beyond the boundaries of the current growth-dependent, anthropocentric society (Francis *et al.*, 2017; IAASTD, 2009). This is an intellectual shift of mindset as well as a process of practically implementing new practices in all food system activities, such as production, processing, packaging, retail and consumption. There are already tools to assist in this journey, for example the triple bottom line that considers both economic, social and environmental performance (Slaper & Hall, 2011). Nevertheless, transition is halted by the fact that the food systems of the world are in a state of sociotechnical lock-in, meaning that the current systems and subsystems are held into place by cognitive, economic, social, institutional and technological barriers to change (Wood *et al.*, 2019; Kuokkanen *et al.*, 2017; Magrini *et al.*, 2016).

There is already some effort being undertaken to identify the ways in which the current food systems need to change (Wood *et al.*, 2019) and how policies can align with the United Nations Sustainable Development Goals (SDG) (FAO, 2018b). The vision of the FAO, that productivity can be increased, and natural resources can be protected and enhanced while at the same time

improving livelihoods and enhancing the resilience of communities, is indeed a theoretical leap towards those aims. However, the sustainability transition needs to permeate all the layers of the food system down to the level of each individual, as every single human being is part of a food system. In other words, theory needs to become practice. Despite the relative consensus when it comes to the aims, as articulated in the Sustainable Development Goals (United Nations, 2015) results are far from satisfactory.

Evidence points towards the need for policy makers to address the lock-ins and use both regulations and stimulating measures to help push current systems out of the locked state onto a sustainability trajectory (Kuokkanen *et al.*, 2017; Yarime, 2009). Only after that can entrepreneurs continue to create new paths (Heiskanen *et al.*, 2011). Nevertheless, as the food system is comprised of different sectors of human activity, it is also necessary to provide education for sustainability so that people can start to implement sustainable practices (Burns *et al.*, 2015). Given the complex, adaptive nature of sustainability challenges sustainability education needs to foster leaders with new values, skills, structures, attitudes and ultimately a new understanding of themselves, the sense of possibility for social change and alternative ways of living (Burns *et al.*, 2015; O'Sullivan *et al.*, 2002). The specific skills needed will naturally differ depending on the daily work in each subsector, and some work is being undertaken to map the skills and competencies for individuals in different sectors of the food system (Rosenlund Hansen *et al.*, 2019). However, this research has tended to focus on actors within the dominant regime rather than sustainability niches. Despite the importance of niches in driving the transition of a regime to create a new landscape in food- and other systems (Flinterman *et al.*, 2010; Geels, 2005), studies of the skills and competencies needed for sustainability profiled businesses within agriculture are lacking. In transition and innovation studies, *regime* refers to the dominant set of standards, skills, technologies and government regulations in a system (Flinterman *et al.*, 2010; Schot & Geels, 2008), whereas a *niche* is a protected space with innovative technology or practices that operates on the margins of the regime (Ingram *et al.*, 2015). The *landscape* is the long-term trends and structures in politics, demographics, infrastructure and culture (Flinterman *et al.*, 2010).

Some examples of sustainability niches in the food system are community supported agriculture (CSA), permaculture, care farming, urban agriculture and market gardening. Perhaps these grassroots innovators already hold the keys to some sustainability challenges, as they are managing to run businesses within a regime that has set up considerable barriers to their operations (Seyfang & Smith, 2007). Describing their situation in general and outlining their existing skills and competencies, and gaps therein, can provide valuable insight needed to

further the process of systemic innovation and transformation and the agenda of sustainable food systems.

## 1.1. Aim and research questions of the study

The purpose of this project is to provide insight into the situation for young market gardeners in Sweden and suggest how this group of producers can be supported. Theoretically, this thesis can contribute to the education for sustainable development literature by providing insight into the realities for a group of young vegetable growers that might very well be representing the future food entrepreneurs. The aim of this research study is 1) to understand some of the drivers that lead young people to start market gardens and 2) to gain insight into what skills and competencies that are important to succeed as a young market gardener. Also, based on the analyses of market gardeners' skills, lack of skills and their perception of their role in the food system, the aim is to 3) suggest focus areas for research and education efforts with the aim to encourage more young people to start market gardens or similar horticultural businesses. The overarching research question is therefore loosely formulated as: *understanding the situation for young market gardeners in Sweden – what drives them, what are they good at and what do they need to be a successful part of the sustainability transition of the food system?* My assumption is that the views and perceptions of young market gardeners will give valuable insight to their situation. In turn, this will enable me to offer a fresh perspective on market gardening and its advance in Sweden.

The following sub-questions were developed to guide data collection and analysis:

1. What motivates young market gardeners?
2. What skills and competencies do young market gardeners regard as important?
3. What important skills and competencies do young market gardeners need to develop further?
4. How do the identified skills compare with skills and competencies in related studies, i.e. the inventory of skills in the NextFood project?
5. How are external factors affecting the perceived opportunities for young market gardeners to run sustainable businesses?

## 1.2. Scope and significance

The study includes a brief statistical overview of the Swedish food system, which will provide the backdrop together with an introduction to market gardening in Sweden. In reporting the results of this study, emphasis will be on young market gardeners' perceptions of their own skills, lack of skills and their role in the food system. Understanding the values, beliefs and attitudes of these young horticultural producers will give a holistic insight necessary to support and promote the start-up of more market gardens in Sweden. Additionally, this master's thesis is going to act as a contribution to the Horizon2020 NextFood project (NF) ([www.nextfood-project.eu](http://www.nextfood-project.eu)) and therefore uses similar methods. The NextFood-project involves collaboration between different countries and the objectives of the project, the ones related to this study, are to 1) create an inventory of the skills needed for a transition to more sustainable agriculture, 2) facilitate case studies to identify gaps and needs and 3) identify policy instruments that support the transition towards action-, and practice-oriented learning methods. Thus, this master's thesis will contribute to the project and to the research community in general with a perspective on young horticultural entrepreneurs who are presently trying to push sustainable food system transformation in Sweden.

## 1.3. Thesis outline

The report is divided into seven chapters, of which this is the first. The second chapter provides the reader with an overview of the Swedish food system and a definition of market gardening and its position in Sweden. The third chapter contains the theoretical and conceptual framework for this study, based on a brief literature review around sustainability, systems thinking and skills and competencies. The fourth chapter describes the methodology used in this study. In the fifth chapter, we move on to the findings from the interviews. These findings are then discussed in the sixth chapter. Lastly, the conclusions and recommendations are presented in the seventh chapter.



## 2. Context and describing the case

In this chapter, a background to the selected case is presented by describing the surrounding Swedish food system. The central concept of inquiry, market gardening, is also outlined and contextualised. Together, this will aid the understanding of the challenges and opportunities faced by young Swedish market gardeners outlined in subsequent chapters.

### 2.1. Swedish food system

Firstly, it is not entirely clear what is normally meant by the term ‘food system’ when it is used in the contemporary sustainability debate. One way to approach the concept is to start with the food supply chain, from primary production to processing, packaging and distribution and finally food consumption (Ingram, 2011). However, the concept does not end here. Ingram (2011) argues that not just the *activities* of the food system need to be included, but also the *outcomes* contributing to food security and social- and environmental welfare (Figure 1). This interpretation later inspired the FAO (FAO, 2018a), who define food systems as:

“Food systems (FS) encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded.”

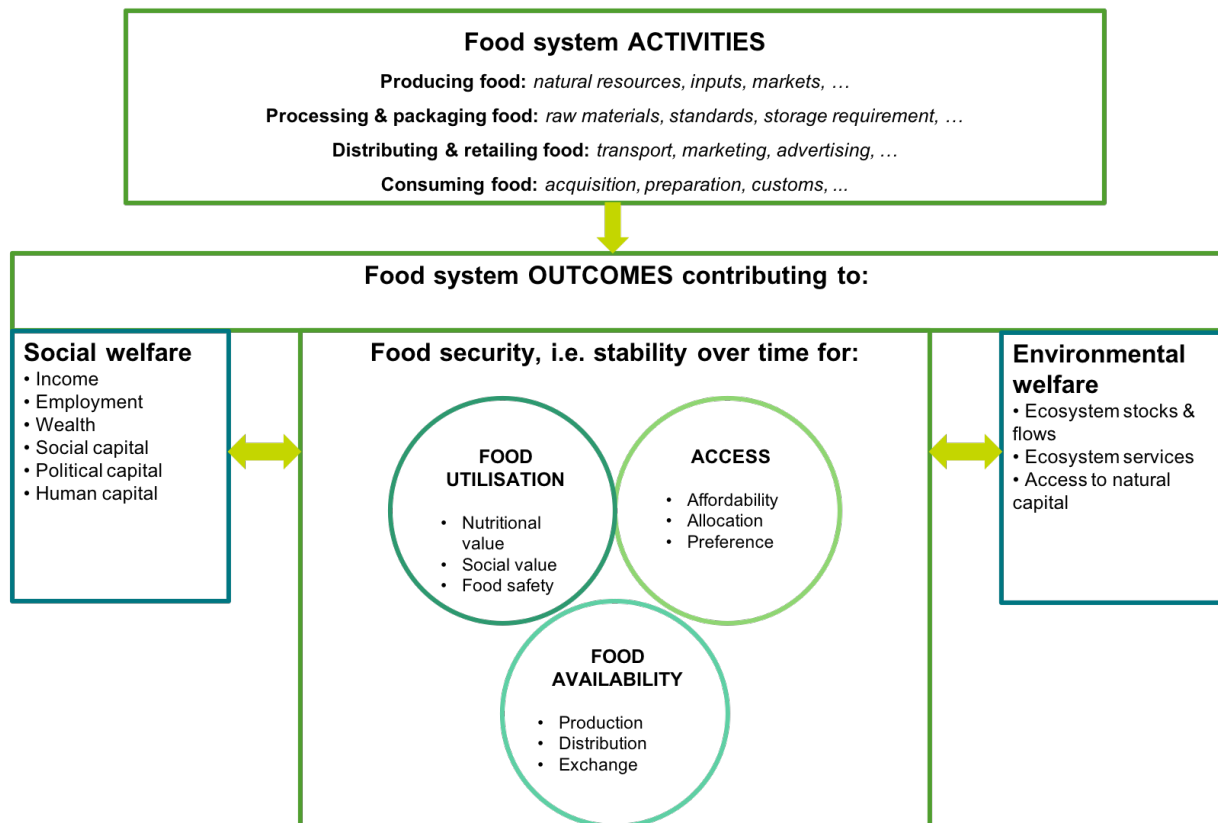


Figure 1. Visual representation of food system activities and outcomes. Source: Ingram (2011).

Consequently, a food systems perspective is holistic and, as such, allows us to deal with complex problems that transcend societal sectors, national borders and scientific disciplines. The modern food system is global by nature. Nevertheless, the actors involved in the food system activities differ between countries and I will therefore offer a description of the structure of Swedish food production, retail and consumption. Although the focus later in this thesis is on horticulture, a food system perspective requires inclusion of the general characteristics of agriculture as a whole.

### 2.1.1. Land use

In Sweden, around 2,4 million hectares of arable land is used for production (Statistics Sweden, 2019). Of this, around 20% is farmed using organic production methods (Swedish Board of Agriculture, 2019). Approximately 70% of arable land is used for feed production (Statistics Sweden, 2019; Karlsson et al., 2017). The remaining 30% is used to produce food crops, mainly cereals, rape seed, legumes, potatoes and sugar beets. A small proportion, 0,5% of the total

arable land, is used for horticultural production (Swedish Board of Agriculture, 2018). As indicated by the proportion of arable land used for feed production, animal husbandry is the dominant line of production. Cattle, pig, sheep and poultry production all have their place, even though both cattle and pig production have recently declined and made way for an increased poultry production (Antman et al., 2015). Another nationally important production line, which is not included in the food system, is forestry. The further north in Sweden, the more forests dominate the landscape. There are obvious climactic restraints on the possibilities for crop production in the country, which is the historical reason behind the dominance of animal husbandry and forestry. Consequently, horticulture is only a marginalised part of Swedish land use on the whole.

### 2.1.2. Farm size

If not otherwise stated, the data used in this section is from *Agricultural Statistics 2019*, Statistics Sweden (2019). Over the last few decades, the direction of structural development has been towards fewer but larger farms although around 60% of farms still cultivate 20 ha or less (Figure 2). The average farm size in Sweden is 41 hectares, but farms are generally larger in southern Sweden. The horticultural sector is also moving towards by fewer and larger farms, and currently the largest 10% of farms cultivate 65% of the total area of field grown crops and 59% of greenhouse area (Swedish Board of Agriculture, 2018). However, for obvious reasons, horticultural holdings are generally smaller than agricultural. The average horticultural holding cultivates 8,2 hectares of open field crops (Swedish Board of Agriculture, 2018).

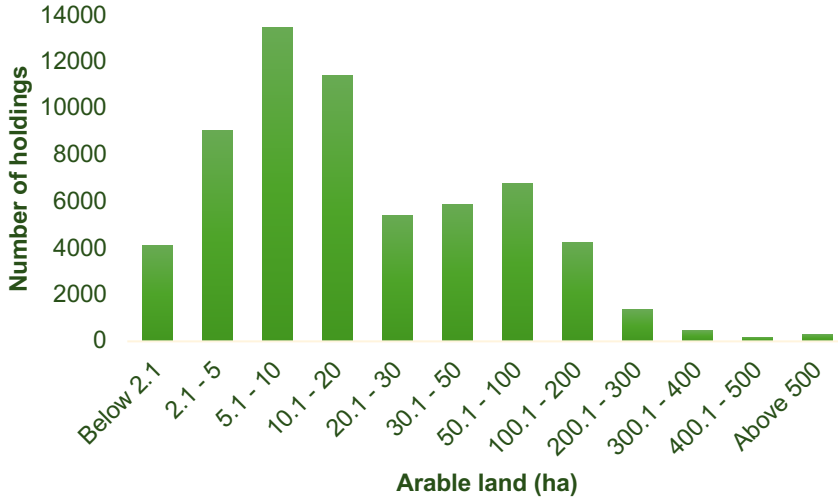


Figure 2. Number of holdings by size group, hectares of arable land. Data from Statistics Sweden (2019).

### 2.1.3. Employment and farmer age

If not otherwise stated, the data used in this section is also from *Agricultural Statistics 2019*, Statistics Sweden (2019). The number of people employed in farming is steadily decreasing, and now comprises 2% of the economically active population. Further, farmers in Sweden are aging, 74% are older than 50 years. Horticultural production leaders are slightly younger than farmers in general, although 68% are older than 50 years (Figure 3) (Swedish Board of Agriculture, 2018). Given the focus on future challenges in this study, the aim was to sample horticultural production leaders below the age of 35 years, a group that represents 7% of production leaders in total.

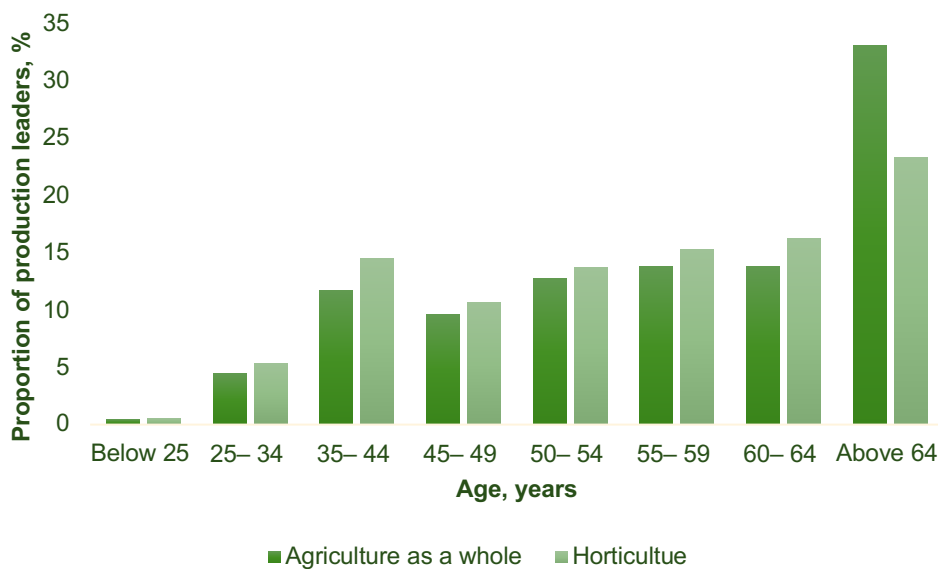


Figure 3. Age distribution of production leaders within agri- and horticulture in Sweden 2017. Data from Swedish Board of Agriculture (2018) and (Statistics Sweden, 2019).

### 2.1.4. Food industry and retail

From primary production, the food value chain progresses to food industry and retail. The food industry in Sweden employ just below 350 000 people, which includes areas as diverse as bakeries, restaurants, manufacturing of alcoholic beverages, charcuteries, cheese and wholesale of any food products (Statistics Sweden, 2019). Of these, almost one third work within food retail. Swedish food retail is dominated by three chains of food stores (Ica, Coop and Axfood) who together own 86% of the market shares, of which Ica holds 50.2% (Swedish Competition Authority, 2018). The low population density in Sweden demands retailers to have well

organized and efficient logistics, which partly explains the concentration of market shares into few corporations (Swedish Competition Authority, 2018). Farmers are often financially dependent on Ica, given the high market share, making it a highly debated subject that sometimes evokes strong feelings.

### 2.1.5. Food consumption

Sweden, dietary guidelines are provided by the Swedish Food Agency. Compared to these guidelines, Swedish people eat too much meat, added sugar, salt and alcohol and too little vegetables, pulses, fruits, berries, fish, seafood, nuts and seeds (Nordic Council of Ministers, 2012). In fact, the adult population in Sweden generally get 15% of their energy intake from sugar. However, there are positive trends as well. For example, vegetable consumption in Sweden increased by 52 g/day between the two most recent dietary surveys (Wood *et al.*, 2019). The most recent dietary survey showed that two out of ten people actually eat more than 500 g of fruit and vegetables per day and that women in general have better diets than men (Amcoff *et al.*, 2012). Moreover, young Swedes are increasingly taking ethics and moral, such as climate impact and working conditions, into account when purchasing food (Herngren, 2019). Nevertheless, 45% of food consumed in Sweden is imported, even foods that could be produced within the country (FAO, 2017). Some of the import is of course comprised of food products that cannot be produced in Sweden, such as coffee, cocoa, seeds, spices and rice. However, even those fruits and vegetables that could be produced in Sweden are imported to a relatively large extent, thus exporting the negative externalities of production (Wood *et al.*, 2019).

### 2.1.6. Policy and support

The rural development policy in Sweden is linked to the Common Agricultural Policy (CAP) in the European Union (EU) and the discourse in CAP therefore is an important driving force in Swedish agriculture. Every seven years, the CAP is reformed, and the present version (2014-2020) is on its last year. The European Commission (2013) set the aims of CAP to:

- support farmers and improve agricultural productivity
- safeguard European Union farmers to make a reasonable living
- help tackle climate change and the sustainable management of natural resources
- maintain rural areas and landscapes across the EU
- keep the rural economy alive by promoting jobs in farming, agri-foods industries and associated sectors

In summary, CAP aims to help farmers meet the challenges in agricultural production. In practice it is comprised of two so-called pillars. The first pillar consists of direct payments and market management measures, in all seven different components of which the first three are compulsory (European Parliament, 2020). Pillar 1 is often criticized by smallholders, as the core of the direct payments is based on the number of hectares utilized, and the minimum requirement is 4 hectares. For those who meet the minimum requirements, there are many possibilities for receiving financial support. In the compulsory part of pillar 1, there is a 'greening' component and additional payment for young farmers. The other parts of pillar 1 are voluntary for the member states and include, for example, a redistribution scheme, additional support in areas with natural constraints and a voluntary simplified system for "small farmers". Pillar 1 comes from the EU budget, while pillar 2 is co-financed by the member states. The second pillar focuses on rural development, in which the priorities are on innovation, competitiveness, risk management, resource efficiency and enhancing ecosystems and social and economic development (European Commission, 2013). In Sweden, the Swedish Board of Agriculture is responsible for the national Rural Development Programme (RDP). The financial support from the RDP most relevant to the participants in this study was the start-up support. Individuals who are below 40 years of age and are starting an agri- or horticultural business for the first time can apply for start-up support, and the total amount is 250 000 SEK (Swedish Board of Agriculture, 2020).

### 2.1.7. Sustainability performance

Within Sweden, the domestic food production is normally praised by market actors for its adoption of environmental considerations, such as support systems for organic agriculture, safe pesticide management and responsible use of mineral nutrients (Nordström, 2020; Federation of Swedish Farmers, 2018; Livsmedelssverige, 2018; Rapp, 2018). However, mainly due to the focus on meat production, Swedish food production is placing high pressure on the environment. Furthermore, Swedish food consumption is contributing to both poor health and climate change and degradation of ecosystems abroad. The current Swedish diet has an environmental impact that is approximately three times the climate boundary and twice the land boundary (Wood *et al.*, 2019). An increased production and consumption on plant-based food would be beneficial for overall sustainability of Swedish food systems. Environmental, social and economic impacts of any food system innovation need to be evaluated in order to tackle potential trade-offs. Some such trade-offs are involved in the issues of national self-sufficiency, dietary guidelines and farmer livelihoods. On a systemic level, market gardening could potentially contribute to sustainability by, for example, increasing biodiversity, strengthening rural economy and providing fresh vegetables with a smaller ecological footprint.

## 2.2. Market gardening

### 2.2.1. What is a market garden?

Market gardening is a branch of horticultural production. The term ‘market garden’ has recently been popularized by Fortier’s *The Market Gardener* (2014) and the ongoing ‘back to the land’-movement. A pioneer within the movement is Eliot Coleman, and the current influencer Curtis Stone focuses on market gardening in an urban setting. However, there is a long tradition of referring to horticulture as ‘gardening’ and agriculture as ‘farming’, and consequently a market garden is literally *a small farm where fruit and vegetables are grown for selling to the public*<sup>1</sup>. Whereas this is also descriptive of the contemporary use of the term, there are several additional characteristics that define modern market gardens. Here, if not otherwise stated, I use the collective information from various YouTube-channels, Facebook groups and blog posts (e.g. Horvath, 2015 ) to outline the general identity of modern market gardeners and their businesses.

Contemporary market gardens are small, normally less than 1 ha, but very intensive operations, both in terms of production and knowledge. The production methods might vary, but it is common to use organic inputs only (i.e. no mineral fertilizer or synthetic plant protection products), grow in permanent, raised beds and rely on manual labour. A wide variety of vegetables and/or fruit is normally grown, and it is common to have both field crops and greenhouses or polytunnels for season extension.

However, the lowest common denominator of market gardeners is not in their production methods, but in the general characteristics of their business model. Instead of relying on a supply chain of wholesalers, packaging industry and retailers, market gardeners sell the majority of their produce directly to consumers. The specific sales channels vary, but include any combination of the following: farmers’ or other markets (Figure 4), community supported agriculture (CSA), digital platforms such as REKO-rings on Facebook or the Local Food Nodes application. Initially a way to capture a larger share of the value, direct sales is now also used in marketing because it harnesses consumer demand for organic, locally produced food and facilitates local food networking (Fortier, 2014).

Further, what is unique to contemporary market gardening, as opposed to their historical counterparts, is that it now attracts people looking for an alternative lifestyle and business

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<sup>1</sup> “market garden”, Cambridge Dictionary (online), Available at:  
<https://dictionary.cambridge.org/dictionary/english/market-garden> [2020-05-05]

choice. As Business Market News (2020) notes, this can even be “high-flying finance executives” or people from otherwise relatively privileged circumstances. In this sense, market gardening is not just a way of producing and distributing food, but also a social movement for food system transformation.



*Figure 4. Market stand full of freshly harvested vegetables. Photo: Erik Wangsten*

### 2.2.2. Market gardening in Sweden

The English term ‘market garden’ should translate to the Swedish ‘handelsträdgård’ but this is unfortunately a term that is primarily used in a historical context (Olausson, 2016). Instead, ‘market gardening’ is typically used as an English loan word in the Swedish language.

The traditional food supply chain in Sweden is dominated by a few, powerful food retailers, so market gardens operate in a niche distinctly separated from the mainstream food system regime. Partly for this reason, and because of its recent emergence in the country, nothing has previously been published on market gardening in a Swedish context.

Neither is there official statistics on market gardening in Sweden. The Swedish Board of Agriculture is responsible for statistics within agri- and horticulture and it includes businesses



with production units on a minimum of 0,25 ha (Swedish Board of Agriculture, 2018). Whereas this includes some businesses that identify as market gardens, the growers cultivating smaller production units operate entirely ‘under the radar’.

However, some previous student projects have shed light on the CSA movement in Sweden (Svensson, 2018; Nilsson & Wejåker, 2016; Stigson, 2016; Sjöblom, 2015; Andersson, 2006). The principal difference between CSA and market gardening is that market gardening refers to businesses whose main line of production is within horticulture, whereas CSA includes any agri- or horticultural production. Additionally, small scale is intrinsic to the concept of market gardening and other sales channels than community-based ones may be used. Yet there is significant overlap between the two concepts; a market garden can be a CSA and vice versa. Many of the CSA farms studied by the above-mentioned authors have a vegetable-focus and the issues highlighted might thus apply to market gardens as well. In her thesis, Svensson (2018) presents a SWOT-analysis of CSA in Sweden (Figure 5).

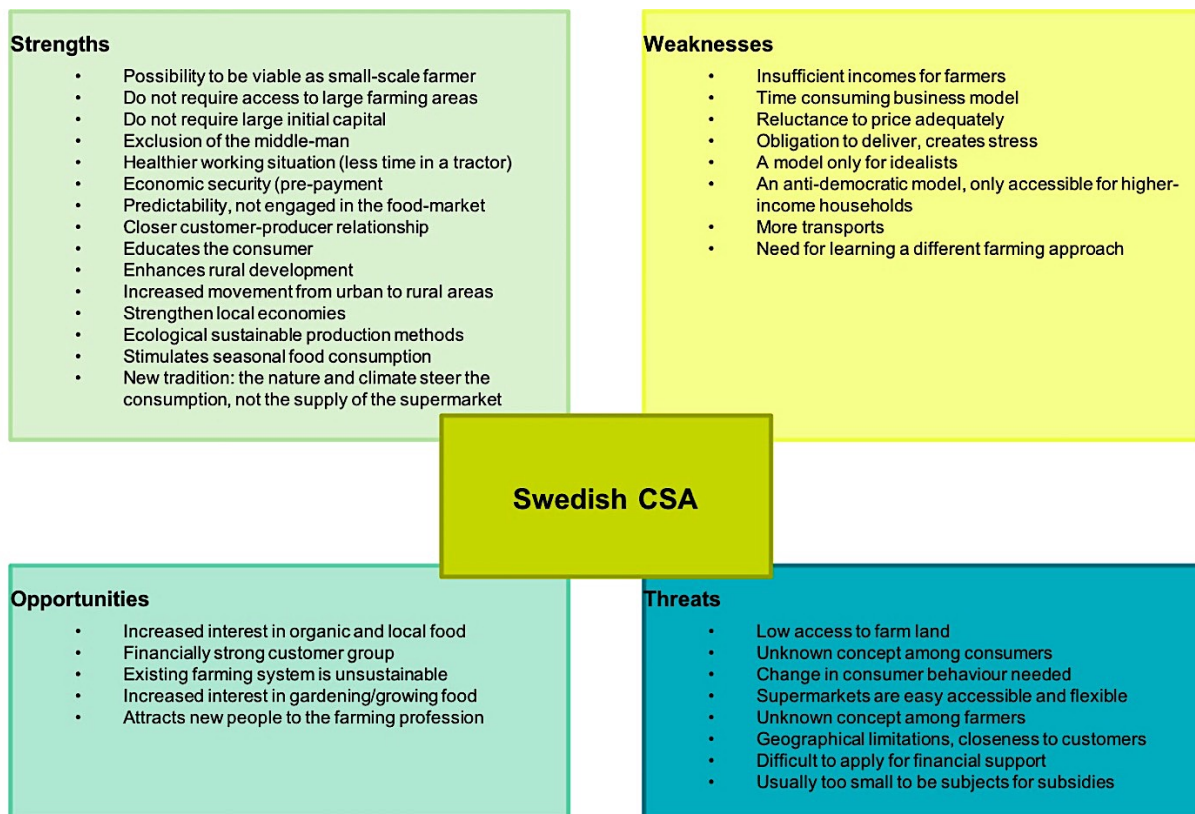


Figure 5. SWOT-analysis of Swedish CSA. Source: Svensson (2018).

As Svensson (2018) notes, “*farmers are conserving natural resources and try to not exploit nature by using ecologically sustainable production methods and the concept stimulates local and seasonal consumption*”, which holds true for market gardening models as well. Market gardeners in Sweden similarly benefit from the growing interest in organic and local food and face financial situations similar to those of CSA farmers.

Another indicator of the advance of market gardening in Sweden is the recent emergence of courses in small-scale vegetable production. In May 2020, there are at least 13 courses on Swedish residential colleges for adult education (in Swedish: *folkhögskolor*) focusing on small-scale production of vegetables<sup>2</sup>. Several of these have appeared in the last few years. Also, Jonas Ringqvist’s *Odling till försäljning – att försörja sig på småskalig grönsaksproduktion* (2018) is in many regards a Swedish counterpart to Fortier’s *The Market Gardener*. Similar production methods and strategies are presented, and the possibility to read about it in Swedish can lower the threshold for aspiring market gardeners in Sweden and facilitate the advance of the movement.

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<sup>2</sup> The search term “odling” (=cultivation) was used at the online platform for Swedish colleges for adult education and the relevant results were counted. Available: <https://www.folkhogskola.nu/sok-kurser/?query=odling> [2020-05-09]

## 3. Theories, concepts and tools

This chapter contains four subchapters in which the theoretical framework for this thesis is presented. The first subchapter outlines the concept of sustainability and sustainable agriculture. In the second subchapter I focus on systems thinking, a tool that has been essential for my understanding of the case under study and that has guided my interpretation of the interview data. Lastly, in the third subchapter I explore the concepts of skills and competencies, especially in the context of a sustainable transformation of the food system.

### 3.1. Sustainability

Firstly, although there is a clear semantic difference between the terms ‘sustainability’ and ‘sustainable development’, they are often used interchangeably, and I will make no attempt to elaborate the distinction between the two. One of the most widespread definitions of sustainable development comes from the UN Report *Our Common Future*, describing it as “*development which meets the needs of the present, without compromising the ability of future generations to meet their own needs*” (World Commission on Environment and Development, 1987). At a first glance, this seems straightforward enough even though one inevitably asks what those needs really are (and who’s?) and if the present and future needs are indeed possible to reconcile. As sustainable development rose to the global agenda in the 1980s and 1990s, the need for a generally accepted definition of sustainability increased. Today, the description of sustainability as being upheld by three pillars is ubiquitous, although the conceptual origin is not yet elucidated (Purvis *et al.*, 2019). Visually, sustainability is commonly shown as three actual pillars holding the ‘roof’ of sustainability (not shown) or as the intersection of three interlocking circles with the labels ‘environment’, ‘economic’ and ‘social’ (Figure 6).

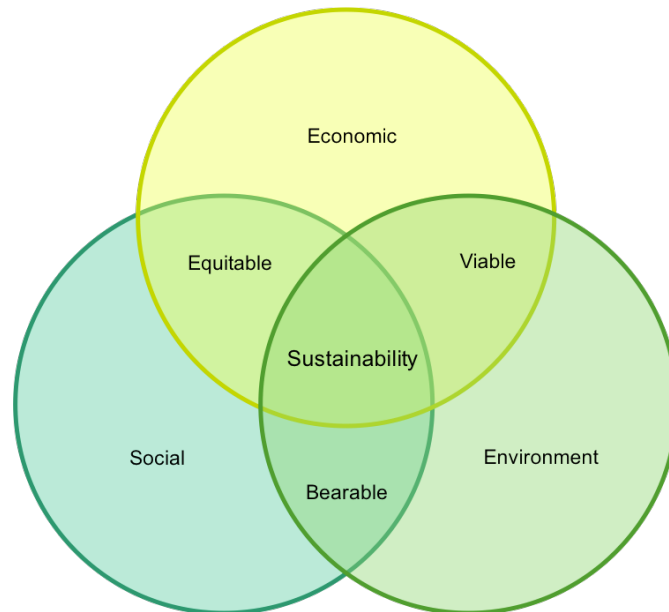


Figure 6. The three interlocking circles of sustainability, depicted as equal in size to imply their equal importance.

The reason for using the three pillars ‘economic’, ‘social’ and ‘environment’ is supposedly because we have equally desirable goals or needs within these realms, and the adjectives placed at the intersections imply that there are some inevitable trade-offs between these (Figure 6). Some authors are more positivist, seeing the possibility that the systems can enhance each other, as Basiago (1995) expressed it:

“...humanity will only succeed in a cosmic sense if it finds a way to meet human needs, while at the same time maintaining the integrity of biological systems, accounting for the loss of natural resources from the economy, working social equity, regenerating human settlements and conserving natural capital.”

Whether a sustainable development means that we optimize each of the three systems or that we meet a compromise between them is still an open question (Purvis *et al.*, 2019). One key question concerns economic growth; from a biological perspective economic growth and thriving ecosystems is deeply contradicting (Francis *et al.*, 2017; Morse, 2010; Francis *et al.*, 2003). Nevertheless, the UN sees economic growth as imperative to sustainable development, and believes that it can enable social and economic goals to be met by trickle-down effects (United Nations, 2015). Since the Sustainable Development Goals (SDGs) put forward by the UN in the above cited Agenda 2030 has become a working definition of sustainable development in political contexts, their perspective is very influential in practice. Academically, however, it is troubling that a concept such as sustainable development, which

is supposed to be guiding global and national policy, is so undertheorized so that there is not even agreement on the relationship between its constituent parts.

To stay within the scope of this study, we now turn to sustainable agriculture. There are numerous definitions of sustainable agriculture that give different emphasis to the three pillars of sustainability (Morse, 2010). Recurring in most definitions is the centrality of production, that sustainable agriculture ensures present and future production of food and fibre to fulfil human needs. The more elaborate definitions also bring in the economic wellbeing of farmers and conservation of environmental resources. A short and concise example of a definition, although somewhat ambiguous, is:

“A sustainable agriculture must be economically viable, environmentally sound, and socially acceptable... it must also be politically achievable.” (Zimdahl, 2005)

The above definition makes no attempt in defining how a sustainable agricultural system might look. There is no, nor should be, single definition of such a system. Instead, the components of sustainable systems must vary across the globe due to varying economic, social, environmental and political circumstances. One attempt to approach this question is through agroecology, “*the integrative study of the ecology of the entire food system, encompassing ecological, economic and social dimensions*” (Francis *et al.*, 2003). In other words, agroecology incorporates the pillars of sustainability into its approach to food systems. It is both a science, a set of practices, a social movement and innovative approach to sustainable food systems for food security and nutrition, and its guiding principles have been defined by both scientists and civil society networks (HLPE, 2019). Within agroecology it is acknowledged that we “*have to combine elements of both traditional and modern scientific knowledge*” (Altieri, 1987), rather than trying to turn back time or trust that modern technology will solve all problems. Issues like resource efficiency and minimal negative externalities are highlighted, and they are approached through promoting of closed cycles, leveraging natural processes, making use of local knowledge and participatory processes of transformation (HLPE, 2019). There are, of course, other approaches to sustainable agriculture, such as precision agriculture or permaculture, but due to its plasticity and comprehensive scope, agroecology has been chosen to serve as a guiding concept for sustainable agriculture in this study.

## 3.2. Systems thinking

Building on the definition of sustainability and using agroecology as a guiding concept, systems thinking is the logical next step. Agroecology, being a holistic study of food systems, is in its essence a systems thinking approach to agriculture. Using systems thinking, one moves away from reductionism and sees the world as a whole. Hence ‘food system’ instead of seeing ‘food production’ and ‘food consumption’ separately. However, it is practically impossible to maintain a holistic view throughout a research process, as that would inevitably obscure relevant details. I have used an approach in which it is not primarily the object under study that is systemic, but rather the cognitive process, something normally described as ‘soft systems thinking’ (Checkland, 2000).

“Systems thinking is a set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviours, and devising modifications to them in order to produce desired effects. These skills work together as a system.” (Arnold & Wade, 2015)

Each system, whether it is biological, social, economic or political, consists of smaller subsystems that are interconnected. In order to understand the details of each subsystem, one often needs to simultaneously have the holistic view in mind to understand how these systems strengthen or inhibit each other. Using systemic inquiry allows us manage “*complexity which is adaptive to changing circumstances*” (Ison, 2008). It can thus be used to better understand how to reconcile some of the sustainability trade-offs, by acknowledging complexity and connectivity between dimensions and scales. Sustainability transitions call for an on-going systemic inquiry, successively innovating the system itself (Colvin *et al.*, 2014).

In this case, the central system of inquiry is Swedish market gardens, and the overarching system is the Swedish, and ultimately the global, food system. While the market gardeners are in focus here, I try to unveil some of the interconnections between them and the context of which they are part. This, as we will see, turned out be an important skill to the market gardeners own experience as well, and to their daily handling of wicked problems.

## 3.3. Skills and competencies

### 3.3.1. Defining skills and competencies

The word ‘skill’ is used frequently in everyday language, and one example of a dictionary definition is “*the ability to use one's knowledge effectively and readily in execution or*

*performance*”<sup>3</sup>. Key words in this definition are ‘ability’, ‘knowledge’ and ‘execution’, indicating that a skill consists of these three elements. In other words, a skill must involve the practical doing of something, but is also reliant on the individual’s underlying knowledge and ability. Next, a competency is a related concept, but it usually involves measurement against a standard. A competent person has *sufficient* skill, ability or knowledge for a particular duty or respect<sup>4</sup>. In other words, competence requires skill, but a person is competent when she or he does something (i.e. the skill in question) well in a specific context. However, sometimes skills is described as relating to practice only, whereas competencies are what link the theoretical knowledge with practice (Rosenlund Hansen *et al.*, 2019).

For the purposes of this study, it was not proven useful to distinguish between the concepts although attempts were initially made to do so. Participants were presented with a definition of ‘skill’ and ‘competency’ to enable a common understanding of the concepts (Appendix 1, interview guide). However, the result was that the participants, after mentioning an important skill, asked whether the mentioned skill was actually a skill or in fact a competency. Hence, it created confusion rather than clarity. Furthermore, many participants reported knowledge in various areas as important ‘skills’ for their daily work. I have therefore decided to hereafter use the word ‘skill’ as a broad term that can include what strictly could be defined as either skills, competencies or knowledge. Rosenlund Hansen *et al.* (2019) faced the same issues in the NextFood focus groups and handled the definition of skills and competencies similarly.

It can also be noted that the interviews were conducted in Swedish and there is no Swedish word that is used in the same way as the English ‘skill’. The literal translation gives the word ‘färdighet’, but that is unfortunately perceived as rather archaic by many. Furthermore, the Swedish word for ‘competency’ is commonly only used as its related adjective or in job ads. In conclusion, using words that the participants were probably not accustomed in relation to their daily work might have influenced their responses.

### 3.3.2. Skills for sustainable food systems

As noted in the introduction of this thesis, a transition towards sustainability calls for leaders who can drive that transformation in the different sectors of society. Our increasingly complex world and the pursuit of sustainability create challenges that call for new leaders, i.e. individuals who choose to take responsibility (Ferdig, 2007). Ferdig’s idea of leadership for sustainability

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<sup>3</sup> ”skill”. *Merriam-Webster Online Dictionary*. Available: <https://www.merriam-webster.com/dictionary/skill> [2020-04-30]

<sup>4</sup> ”competence”. *Merriam-Webster Online Dictionary*. Available: <https://www.merriam-webster.com/dictionary/competence> [2020-04-30]

is founded in complexity science, where the universe is in constant flux and paradoxes omnipresent. She argues that this in many senses is defining for the world of human activity as well. In such a world, leadership should be an “inclusive, collaborative, and reflective process” that is rooted in a “living processes paradigm” (Burns *et al.*, 2015). Living processes demonstrate sustainable properties and patterns, meaning that they are multifunctional, adaptive and resilient. This acknowledgement of living processes, the natural world, lies close to the daily work in food production. Living processes, ecological principles and the interconnectedness of soil, plant, climate and human is at the heart of sustainable agriculture. Following this line of reasoning, the human leaders of the food system should incorporate this logic to other aspects than production, such as business models and ways of collaborating with others.

While it is important to identify the mindset for sustainability leadership, food production obviously also requires skills that are more hands-on or context specific. Identifying those skills for the different stakeholders in the food system, such as farmers, advisors, researchers and employees within the food industry, is an ongoing process to which this thesis aims to contribute. More specifically, the Horizon 2020 project *NextFood – Educating the next generation of professionals in the agrifood system* (NF) has created an inventory of skills for sustainable agriculture (Rosenlund Hansen *et al.*, 2019) that will be used as a baseline to which the results of this study will be compared. The inventory was created using four different datasets: a literature review of peer-reviewed sources, a literature review of non-peer reviewed sources, focus groups with agrifood professionals in several countries and an online questionnaire. There were both similarities and differences as to what skills and competencies that were emphasized in the different datasets. Skills that were highlighted in at least two datasets were:

- Collaboration and interdisciplinarity
- Adaptation and experimentation
- System thinking/applying holistic knowledge
- Motivation and consciousness
- Lifelong learning
- Networking



What should be noted here is that these skills may or may not apply to primary producers, since the datasets used included professionals across the agrifood system. For instance, the questionnaire was only completed by academics and NGO activists. It was only the results from NF focus groups that allowed for a categorization of skills based on the group of professionals to which the skills applied. Therefore, the skills identified specifically for farmers were the focus in the comparative part of this study (Table 1). Note that some of the skills needed by farmers may also apply to other professionals, especially future skills.

Table 1. List of skills needed now and in the future and gaps in today’s skills, identified in the focus groups of the NextFood project. Adapted from Rosenlund Hansen et al. (2019).

<b>Present skills</b>	<ul style="list-style-type: none"> <li>• Learning continuously</li> <li>• Collaboration/teamwork (including interdisciplinary, multicultural)</li> <li>• Adaptation, experimentation and development</li> <li>• Providing leadership</li> <li>• Marketing (strategies and techniques)</li> <li>• Communicating</li> <li>• System thinking/applying holistic knowledge</li> <li>• Business planning and strategic management</li> <li>• Digital skills</li> <li>• Being conscious and responsible</li> </ul>
<b>Skills of increasing importance in the future</b>	<ul style="list-style-type: none"> <li>• Digital skills</li> <li>• Adopting modern technology, including robotics</li> <li>• Adaptation, experimentation and development</li> <li>• Collaboration, teamwork and interdisciplinary</li> <li>• Adaptability and marketing in relation to new (global) trends</li> <li>• System thinking/applying holistic knowledge</li> <li>• Motivation and consciousness</li> <li>• Lifelong learning</li> <li>• Applying tools for sustainable farming/replacing former practice</li> <li>• Communicate added-value of the food produced locally and/or sustainably</li> <li>• Soft skills in general</li> <li>• Innovation</li> <li>• Circular business models (less waste)</li> </ul>
<b>Gaps in farmers’ skills today</b>	<ul style="list-style-type: none"> <li>• Lack of connection between theory and practice</li> <li>• Lack of digital skills</li> <li>• Lack of knowledge about the local environment and landscape and how to apply such knowledge</li> <li>• Lack of holistic knowledge (too specialized knowledge)</li> <li>• Lack of tools for sustainable farming (e.g. reduce dependence on pesticides) and skills in how to apply them</li> </ul>

Table 1 shows that there is a difference between the skills that are needed by actors in the food systems of today and the skills that are predicted to be of increasing importance in the future. For example, adoption of modern technology, communicating added-value of local food and circular business models are highlighted as future skills. Some skills are expressed using different words but are in practice very similar, such as “lifelong learning” and “learning continuously”. In summary, the results from the focus groups point at the increased importance of digital skills and skills to apply sustainable production practices. Further, knowledge is also needed in the areas of sustainability and an accompanying systems perspective.

Both the skills and competencies presented in Table 1 and other skills mentioned in peer-reviewed literature will be analysed and discussed further together with the empirical data from this study (chapters 5.5. and 6.).

## 4. Methodological approach

### 4.1. Research design

This is a case-based qualitative research study. Qualitative research allows us to understand and interpret phenomena that are difficult to measure quantitatively (Guest *et al.*, 2013). Normally this is done by analysing the views, behaviours, opinions and experiences of people acting in a specific social context. Understanding the values, beliefs and attitudes of the participants, as well as some of the characteristics of the complex food system in which they operate, was therefore central to this study and clearly motivates choosing a qualitative research approach. Further, this study is an applied research study, meaning that its “*primary focus is on collecting and generating data to further out understanding of real-world problems*” (Guest *et al.*, 2013). In order to meet the initial objectives of the research but also be able to explore new angles, a combination of a deductive and an inductive approach was used. The methods used in this study were analysis of scientific and non-scientific data, semi-structured interviews and an online survey.

### 4.2. Participants

Chain-referral-sampling, also known as snowball sampling, was used to recruit participants. In order to make use of a random sampling technique a suitable sampling frame would have been needed (Bryman, 2012), and as this does not exist for young market gardeners, snowball sampling was the only feasible strategy despite the fact that it hardly generates a representative sample. First, a convenience sample of contact persons at several producers’ associations and networks and some teachers at vegetable production courses or urban agriculture incubators were contacted via e-mail (Table 2). No participant was recruited at this first step. Instead, the

teachers or office holders at associations provided lists of potential participants or suggestions for other producer's networks to contact.

*Table 2. Lists of the producers' associations and networks, schools and incubators for urban agriculture that were contacted in the first step of the sampling procedure. Names are in Swedish.*

<b>Producers' associations and networks</b>	<ul style="list-style-type: none"> <li>• Andelsjordbruk Sverige</li> <li>• Förbundet Sveriges Småbrukare</li> <li>• Lantbrukarnas Riksförbund</li> <li>• Permakultur i Sverige</li> <li>• Föreningen Organisk-Biologisk Odling</li> <li>• Småskalig grönsaksproduktion (Facebook group)</li> </ul>
<b>Teachers or headmasters at courses directed at horticultural production</b>	<ul style="list-style-type: none"> <li>• Holma folkhögskola</li> <li>• Hvilan Utbildning</li> <li>• Mora folkhögskola</li> </ul>
<b>Incubators for urban agriculture</b>	<ul style="list-style-type: none"> <li>• Stadsbruk Malmö</li> <li>• Stadsbruk Göteborg</li> </ul>

All participants were initially contacted in writing, via e-mail or Facebook Messenger, with information about the purpose and content of the study. The ones who replied were asked to help recruit more participants by providing contact details to acquaintances or producers in the same association or network. Those who did not reply to e-mails were contacted by phone. The ones who were older than 35 years were excluded from the sample itself, but they sometimes provided a list of other potential participants. In total, 19 participants in the age category 18-35 years agreed to take part in the interview study. In the end 14 interviews were conducted, with 8 female and 6 male participants aged 25-37 years. It only turned out during the interviews that two participants were 36 and 37 years old – outside of the original age span. Nevertheless, those interviews were included in the study since they otherwise met the requirements of the sample and belong to the youngest 20% of horticultural production leaders in Sweden (Swedish Board of Agriculture, 2018). Also, being born between 1983 and 1995, the participants were held together as a group by the fact that they belong to the same generation, i.e. 'millennials' or 'generation Y' (Dimock, 2019).

## 4.3. Qualitative method

### 4.3.1. Semi-structured interviews

Semi-structured interviews are based on questions listed in an interview guide, but the interviewer is also allowed to ask follow-up questions to encourage participants to go into detail (Bryman, 2012). It gives the interviewer an opportunity to understand a specific situation from the participant's own perspective (Kvale, 2014), which is in line with the objectives of this study. Further, semi-structured interviews were chosen over e.g. focus groups because they offered flexibility in the sense that participants in remote locations were able to participate, as the interviews were conducted via phone.

All interviews were conducted in Swedish using an interview guide consisting mainly of open-ended and intermediate questions, but also some ending questions (Appendix 1). The interview guide was adapted from a focus group outline provided by NextFood (Appendix 2). The main differences were that I added more background questions, the theme 'motivation', excluded the theme on education and research and did not provide participants with a list of skills. Before the actual interview, participants were informed about the purpose and objectives of the research study. They were also asked if they consented to the interviews being recorded and were assured anonymity. Each interview lasted around 1 hour, sometimes up to 1 hour 30 minutes. The recordings were transcribed using a combination of verbatim and intelligent transcription. The transcripts were then used for further analysis.

### 4.3.2. Online survey

After the completion of every interview, the participants were asked to take part in an online survey consisting of three questions (Appendix 3). The main question of the survey asked participants to rank the 10 skills and competencies that previously had been identified by the NextFood project as most important for food producers. This allowed for some comparison between the participants of this study and the participants in the focus groups conducted within the NextFood project.

## 4.4. Data analysis

After verbatim transcription was complete, the transcripts were inserted to the software Quirkos (Quirkos Limited, 2020), a software developed specifically for qualitative analysis. The transcripts were coded using around 40 different codes, of which some were decided beforehand and some emerged from the data as the coding proceeded. Coding was done both at the manifest level and at an underlying, thematic level.

## 4.5. Reliability and validity

Whether or not it is relevant to discuss reliability and validity in qualitative research is under constant debate and sometimes other concepts are used to address similar issues. Regardless of what terminology that is adopted, it is important to discuss the quality of a research study. This section aims at highlighting some factors that influenced the quality of this thesis.

Regarding the validity of this study, one aspect to discuss is the connection to the NextFood project. The interview guide used was very similar to the interview guide developed by researchers in the NF project for use in focus groups. Since in-depth interviews were used in this study rather than the original focus groups, some questions were added to allow participants to go into detail. It also made the focus of this study slightly different from work package 1 in the NF project. Whereas work package 1 in the NF project aimed at creating an inventory of skills for sustainable food production, the aim of this study was to give a detailed description of the situation for young, small-scale vegetable producers in Sweden. This included a description of their business, the goals and values that motivated them, their skills and competences, their views on sustainability in the food system and their opinions on the sustainability transition of the food system and their own role within it. To ensure validity of the comparison with NF, the online survey used the same terminology.

Further, some aspects of the sample should be mentioned. Being a case-study with a small sample the results are hardly generalizable to a broader category of vegetable producers. Instead, the sample represents a small group of frontrunners selected to give an indication of the direction of development that the food system could take. By offering a thick description of their context and situation, the reader gets an indication of the impact and importance of this particular group of food producers.

Throughout the research process, a thorough, systematic approach was adopted to ensure transparency and coherence. For example, all interviews were recorded and subsequently

transcribed sentence by sentence. When the transcripts were later coded, memos with reflections about the coding process were written. The coding was repeated several times so that all relevant statements were assigned a suitable code. When the coded data was to be assimilated into a coherent analysis, the memos were used to maintain a reflexive stance. Also, care was taken to report both sides when participants' viewpoints differed and the total number of quotes from each participant was more or less balanced. In this way, effort was made to ensure that any conclusions drawn were credible and plausible in the sense that many potential interpretations of participants' accounts had been considered.

## 4.6. Reflections

At the start of this research study, I had hardly any experience of qualitative research. This resulted in an overestimation of the amount of data that was possible to collect and analyse within the given time frame. Also, some time had to be dedicated to studying qualitative research methods in order to understand the methodology well enough to work effectively. Although starting out with well-defined research questions, these had to be adjusted as the project progressed and more interesting, and perhaps more relevant topics emerged from the participants themselves. The exploration of the structure, mindset and tools of qualitative research continued throughout the process.

## 5. Results

In this chapter, my findings based on the interview transcripts are presented. When quotes are used, these are translations of direct citations from respondents and are used to present the respondents' views. The aim was for the translation to be as close to the original wording as possible while avoiding literal translations of idiomatic expressions.

The first subchapter offers a description of the participants and their businesses. In the following subchapters I systematically go through the research questions that have been studied:

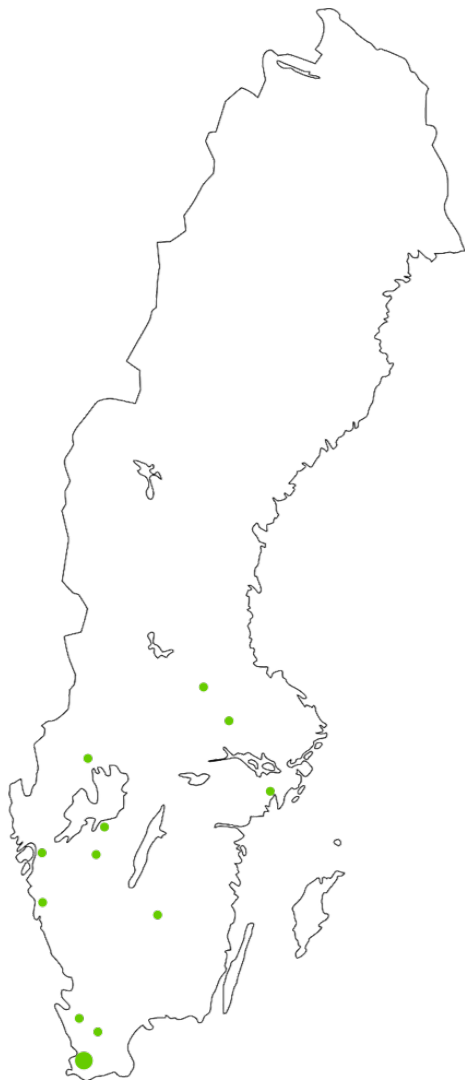
1. What motivates young market gardeners?
2. What skills and competencies do young market gardeners regard as important?
3. What important skills and competencies do young market gardeners need to develop further?
4. How do the identified skills compare with skills and competencies in related studies, i.e. the inventory of skills in the NextFood project?
5. How are external factors affecting the perceived opportunities for young market gardeners to run sustainable businesses?

### 5.1. Participants in the study

Respondents were between 25 and 37 years old, of which 8 identified as female and 6 as male. Their businesses were situated in 7 different counties dispersed in Southern- and Mid-Sweden (Figure 7). Out of the 14 respondents' businesses, 4 were urban farms whereas the other 10 businesses were located in more or less rural areas. More than two-thirds of the respondents were educated in farming and/or business management. Most of these had taken courses at



residential colleges for adult education that focused on small-scale horticulture for sales or self-sufficiency, but some had also studied at university level. Few of the participants had prior experience of business management. Questions about their highest completed level of education and prior work experience were not included in the interview guide. However, at least a quarter of the participants had a university degree (regardless of the field of study) and examples of participants' prior occupations include chef, programmer and international aid worker.



*Figure 7. The approximate locations of the participating market gardens are shown using green dots. The large dot indicates that several businesses were located close together.*

### 5.1.1. Production system

The business with the smallest production area cultivated 200 m<sup>2</sup>, and the largest production area was 4 hectares, i.e. 40 000 m<sup>2</sup>. More than two thirds of the respondents produced on less than 1 hectare. The most common line of production was field vegetables combined with vegetables grown in polytunnels (Figure 8). Commonly, each business cultivated a wide variety of leafy vegetables, root and fruit vegetables, in total around 20-50 different cultivars. Only two respondents had greenhouses and two respondents had animals, of which one had a very diversified garden with vegetables, berries, fruit and animals. One third of the respondents farmed in systems designed for tractor-driven tools, whereas two thirds farmed in permanent beds, using mainly handheld equipment such as wheel hoes, broadforks and rakes. Some experimented with technology designed for market gardening, such as quick cut greens harvesters, tilthers and two-wheeled tractors. The main source of plant nutrients was cow-, horse-, sheep- or chicken manure, which some supplemented with compost, bone- and blood meal and different homemade biostimulants. None of the respondents used chemical plant protection products nor mineral fertilizers.



Figure 8. Market gardening on approximately 2200 m<sup>2</sup> in September. Photo: Axel Isidorsson

### 5.1.2. Economic situation

All businesses were relatively new, ranging from 1-10 years of operation. Many were still in a start-up phase where the business was not yet making a profit. Yearly revenues ranged between 11 000 SEK to 1 000 000 SEK, with an average of 290 000 SEK. Businesses with larger production units naturally had higher total revenues, but their revenue per m<sup>2</sup> was lower than those with a smaller production unit (Figure 9). Some of the smallest production units, with an area around 200 m<sup>2</sup>, managed to turn over 500 SEK per m<sup>2</sup>, compared to 15-30 SEK/m<sup>2</sup> for the businesses with production units of more than 1 hectare. Of course, yearly revenue alone is not a measure of economic performance. Most importantly, the revenues need to outperform the expenses of the business' operations, such as labour and equipment. Instead of entering a loop of investments and a need for increasing returns, some of the market gardeners in this study adopted the strategy of “*being able to cut our costs so that we don't need to make as much money*” (Participant 6). The specific conditions for each business determined which strategy they saw as most viable, but it is outside of the scope of this study to offer an evaluation of their different strategies for profitability. What the description of revenues per area indicates is rather that there is a variety of production systems within Swedish market gardening with slightly different strategies to reach a financially balanced situation.

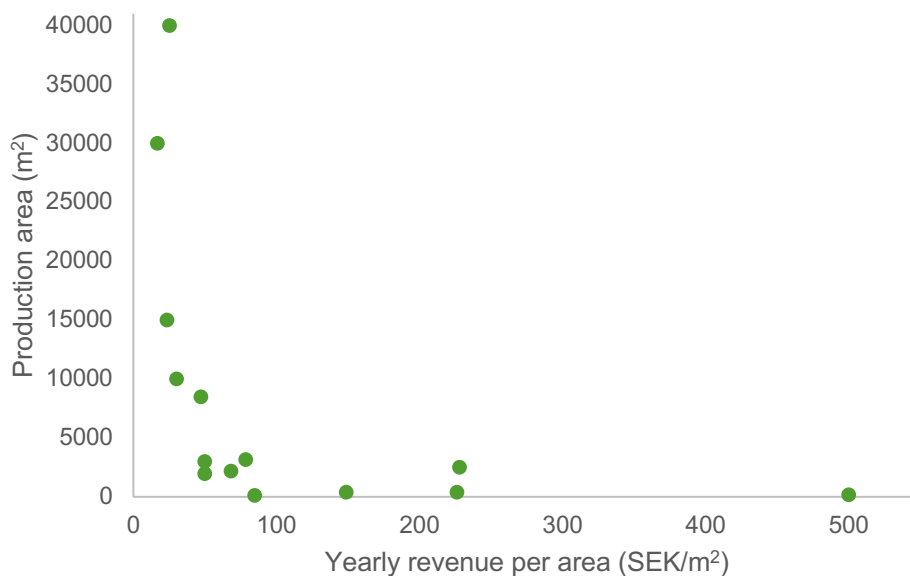


Figure 9. The relationship between production area (m<sup>2</sup>) and yearly revenue per area unit (SEK/m<sup>2</sup>) for the businesses that participated in this study. There is a tendency for smaller production units to have a higher turnover per area unit (not significant).

When asked about optimal business size for their business model, most respondents replied in terms of employment rather than production area or revenue, saying that “*area doesn’t matter, it depends on how you use the area*” (Participant 5). All respondents aimed to support themselves and their families based on their market garden in the long run, but half of the respondents were still financially dependent on incomes outside of the business. In order to reach their goal, some planned to diversify whereas others planned to rationalize, and yet others did not have a defined strategy for long-term financial stability. Being in a start-up phase, they saw a need for the business to grow both from a financial and a social perspective. One respondent was particularly concerned about “*being big enough to afford becoming sick*” (Participant 9). Finding a business size that would be socio-economically sustainable in the long run emerged as a very case-specific issue, every participant reasoning about it from somewhat different perspectives.

### 5.1.3. Business models

When the respondents described their business model, it became clear that they shared the basic traits of market gardens in general (section 2.2.1). The marketing and sales channels were most thoroughly described, but the participants also identified their key partners, customer relationships and targeted customer segments.

The core feature of the businesses in this study was their short value chains. In one way or another, the produce was sold directly to end consumers. They used different combinations of CSA, farmer’s markets, REKO-rings and on-farm shops depending on what sales channel that suited their needs and conditions. Half of the respondents reported selling a portion of their harvest to restaurants and a few also sold some to local grocery stores. Despite having only slightly different takes on the same value proposition (organic, locally produced vegetables), they reported very different experiences from using the same sales channels. For example, some participants relied almost entirely on farmer’s markets and said that it worked perfectly, whereas others could not resolve the inherent conflict in the old saying about markets: “stack ‘em high, watch ‘em fly”. Instead, they liked REKO-rings because they only harvested that which had been ordered and thus avoided food waste. Yet others disliked REKO-ring for their uncertainty, that the ordered quantities could vary greatly between weeks.

Marketing was done via two main strategies: social media and personal contact. The most cited social media platforms were Instagram and Facebook. Direct sales were seen as a way of marketing in itself, the personal meeting being part of the value proposition. Their customer relationships were, of course, affected by the sales channels. For example, the CSA model

grants customers for at least one season whereas a successful REKO-ring delivery gives no guarantee for returning customers. In general, the perception was that they had good customer relationships, mentioning their customers as one of their key partners.

#### 5.1.4. Interpretation of sustainability

The participants were confronted with a direct question on what sustainable food “production” meant to them, using the wording from the original NextFood question guide (Appendix 2). Interestingly enough, they spontaneously introduced a food systems perspective by, for example, bringing in the impact of consumption patterns, health or just a general holism.

“... to get used to not eating vegetables that we can’t grow here but first and foremost not eating vegetables that are out of season. We have been spoiled on that point, and we need to understand that we can’t keep being spoiled if we want a sustainable food production.” (Participant 12)

“We want to give our child food that does not have such a huge impact on the environment, and which also contains more nutrition.” (Participant 5)

“Well, it’s all connected. It such a damn complex system. But in terms of production: down with fossil fuels and in with biodiversity and carbon sequestration and social meeting place that is economically sustainable for the one who is farming. That is sustainable food production. And it is not transported worldwide, it is local.” (Participant 8)

When they described the different components of sustainability it was evident that some had a prior experience in using the conceptual three pillars, economic, environmental and social sustainability. Others had a more experience-oriented perspective, where they pointed that primary producers need to be able to make a living and should not have to work excessively, but without explicit use of the terms “economic” and “social”. Two participants were not familiar with the three pillars at all, and instead talked mostly about the environmental aspects of sustainability.

Overall, the tendency was to mention environmental sustainability first and to describe the environmental or biological aspects in more detail than the other two dimensions. Aspects that were mentioned include, for example, resource regeneration and recycling, soil health, reduced use of fossil fuels in production and transportation, carbon sequestration, biodiversity, not using pesticides or mineral fertilizers and contributing to ecosystem health. They also conveyed the basic premise of sustainability as being a long-term endeavour, expressed as, for example, a stewardship of the soil. In addition, there was a strong emphasis on creating local systems, both in terms of recycling the means for production and in terms of distribution and consumption.

“In my understanding it’s about local food systems, short transportation routes and few stops between production and consumption” (Participant 6)

When describing the social aspects of sustainability, most focused on the social wellbeing of the food producers and described some of the challenges in combining long working days with trying to nurture personal relationships and family life.

Respondents were very much aware of the economic aspects of sustainability, even though they struggled to make their companies survive. The main barriers to economic sustainability, as they perceived it, were the low price on food, the high costs of labour and the ‘subsidies’ on unsustainable means of production such as fossil fuels. One participant brought in an example of how pricing is sometimes misleading, that employing people to do the work is more expensive even though less energy is used compared to the diesel that is required to drive the tractor. In other words, the tendency was to point towards the erroneous design of the food system as being responsible for the economic unsustainability of farming.

“It has to be possible for farmers to take the measures that are necessary. And I think society has to pay for it. If it’s about carbon sequestration, for example, that is a service society must pay farmers for, if we want it to work.” (Participant 4)

It became evident that visions of sustainability were deeply embedded in the design of their businesses and that it shaped their day to day decisions (elaborated further in section 5.3.4).

“It permeates everything you do, your thinking about the crops and so on. I think it’s important, all of these parts we have been talking about are with you, so to speak. That’s how it is.” (Participant 10)

## 5.2. Motivation

In this subchapter, I present the findings for research question 1: *What motivates young market gardeners?* The perceptions, values and goals of the respondents are used to portray the inner driving forces that are shaping their day to day motivation and long-term lifestyle aims.

“We started this farm partly because it is fun to work with the soil and grow vegetables, but also with a kind of transition thought, that you can produce food in a different way, you can sell it in a different way.”  
(Participant 1)

The multidimensional nature of motivation and its interconnectedness with both personal identity and the surrounding food system emerged in dialogue with the respondents. As implied by participant 1 above, running a vegetable business enabled them to pursue a personal interest while at the same time creating economic, social and ecological value for themselves and for others. Contributing to what they perceive as the future sustainable food system creates meaning, and this meaning in turn act as a motivation to continue (Figure 10). Taking a systems perspective, it is clear that all links were important in motivating the respondents. For clarity purposes, the main constituents of their motivation are described separately below.

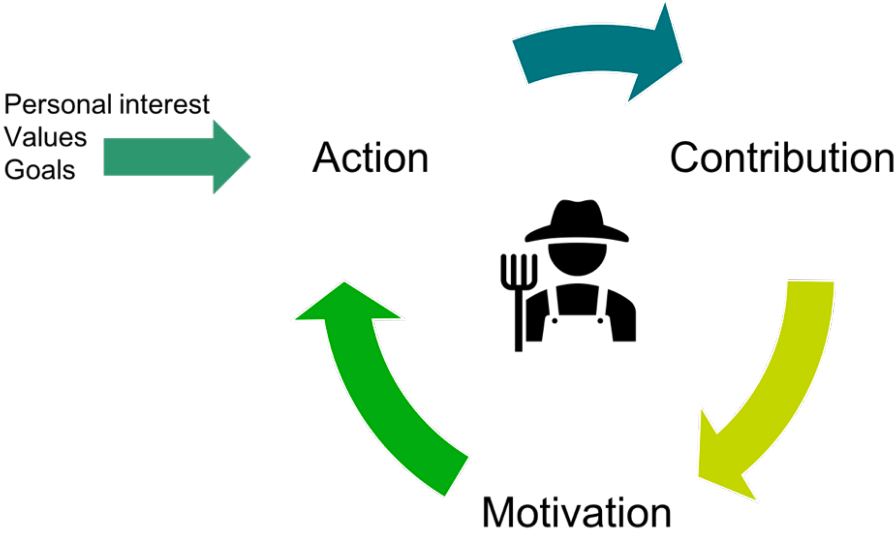


Figure 10. Starting a market garden was commonly an action that came from personal interest, values and goals. The action lead to a sense of contributing to desired changes in society, which then acted as a motivator for continued action.

### 5.2.1. Personal interest and wellbeing

Firstly, what all respondents had in common was their personal interest in cultivation, for some with an emphasis on the cultivation of food. This is hardly surprising but is nevertheless the basis for their motivation: to pursue an interest that they find creative, stimulating, fun and challenging.

“I am interested in farming generally, but it’s vegetable farming I’m stuck for. It’s that I think vegetables are exciting plants to cultivate.” (Participant 10)

“I think vegetable cultivation is the type of farming and the type of business where I get an outlet for most of my interests and needs.” (Participant 13)

For some participants, working with cultivating vegetables was not just an interest, but a kind of therapy, curative as well as preventative. They have been driven by a need to heal mentally through the return to the land and the possibility to control their own workload.

“It was also with a backdrop of a life crisis. [...] I realized that the work load I had back then wasn’t reasonable. I thought a lot about the meaning of my life, what I enjoy. [...] I thought I needed more of having my ‘fingers in the soil’. It’s about being able to feel good yourself and receiving the therapeutic qualities that are there.” (Participant 6)

### 5.2.2. Leading for sustainability

When specifically asked about what motivates them in their work, the most common answer was that it creates a sense of meaning in life and that they feel that they are contributing to a food system transition. Often there was no clear distinction between the two as they were seen as different aspects of the same thing. Being part of a sustainability transition was seen as meaningful, and the sense of meaning acted as a motivator (Figure 10).

“I think food is incredibly important and to me and to have a work that I believe creates meaning in the world is the only thing I find it reasonable to lay my time, my life, on.” (Participant 8)

“I feel that I am creating something concrete that is important, that is also very motivating for me.” (Participant 4)

“I want to be part of a bigger change; be able to change how we produce food here in Sweden. So, I want to farm and sell to others and have them understand how food is produced and what difference it makes to spray or not to spray, to import or not to import.” (Participant 7)



“To be able to create something that can inspire and show others a way, an alternative, is really a big driving force.” (Participant 9)

Something that was implied, for example by participant 7 and 9 above, was the sense of being an innovator or pioneer. Rather than just being part of a sustainability transition, several of the respondents described it as leading a transition. They wanted to “*to set an example for people who don't have farming background*” (Participant 9), “*inspire others to get involved*” (Participant 12) and “*show that it is possible*” (Participant 4). One respondent reported being entirely driven by the aim:

“We want to change Swedish food production to a more sustainable food production. And we think that the only way to do it is by showing how it's done.” (Participant 3)

### 5.2.3. Income generation

Supporting themselves and their families based on their farming was an aim for all participants. They can be understood as opportunity entrepreneurs, exploiting the opportunity to earn a living from an activity that in its essence creates other types of value. So, income generation was not the ultimate goal, rather a means to an end. The prospect of generating an income acted as a motivation to improve their production and their business model. They were determined to support themselves through their market garden, but it was merely a business goal, not a personal goal.

“We should be able to live off this and be able to put money aside, that is the goal of the whole business. It should be a justifiable business considering how much work one puts into it. You can't work for free, no one can.” (Participant 11)

“This isn't charity, it's a business that should do well enough for me to be able to life off it to 100%.” (Participant 14)

Around half of the respondents did not have other sources of income and were instead living on very little and on savings. In a long-term perspective, generating an income from their business will be essential to their livelihoods. Whereas income generation thus can be assumed to be an important motivator for them, it is important to note that they seemed to see it as a secondary motivation, that it is necessary to generate an income from market gardening because that is what they want to spend their time doing.

“The financial part, it permeates it all because we want to support ourselves. But we don't have the need of measuring success financially, to put it that way.” (Participant 5)

### 5.3. Skills and competencies

In this section, I present the findings for research question 2: *What skills and competencies do young market gardeners regard as important?* Some of the skills described below were explicitly mentioned by the respondents, whereas others were described indirectly and then concretized during the data analysis. Several respondents found it difficult to think of important skills and competencies, possibly because they were not used to conceptualizing their own work. It is also important to note that they sometimes reported skills they regarded as generally important for market gardeners, whereas they in other cases highlighted those of their own skills that they found most important and useful in their daily work.

In all, 23 different important skills and competencies were highlighted by the respondents and these were then grouped into the six themes: subject specific knowledge, business management, innovation and continuous learning, systems thinking, pioneering and networking (Table 3). The wording and categorization used to label the skills and themes differs somewhat from the skills and competencies described in section 5.5., as those were defined by previous research within the NextFood project (Table 1). This is a semantic indication of some of the differences between market gardeners and the broader farming community targeted by other similar research endeavours.

Table 3. The most important skills for Swedish market gardeners, based on interviews. Skills are grouped into the six main themes: subject specific knowledge, business management, innovation and continuous learning, systems thinking, pioneering and networking.

Theme	Important skills and competencies
<b>Subject specific knowledge</b>	<ul style="list-style-type: none"> <li>• Technical skills for the use of tools and machinery</li> <li>• Knowledge of ecological principles and specific requirements of a diversity of crops</li> <li>• Ability to plan and organize biodiverse production units and processes</li> <li>• Knowledge of sustainability and the ability to apply sustainable practices</li> <li>• Building and maintaining farm buildings and equipment</li> <li>• Maintaining physical health through implementing good ergonomics</li> </ul>
<b>Business management</b>	<ul style="list-style-type: none"> <li>• Entrepreneurship</li> <li>• Accounting and finance</li> <li>• Strategic planning</li> <li>• Providing leadership</li> <li>• Marketing and sales: storytelling and communicating added-value of local food</li> </ul>
<b>Innovation and continuous learning</b>	<ul style="list-style-type: none"> <li>• Constant experimentation, adaptation and development in both production- and business-related practices</li> <li>• Critically seeking reliable information</li> <li>• Ability to bridge the gap between theory and practice</li> <li>• Practical problem solving</li> </ul>
<b>Systems thinking</b>	<ul style="list-style-type: none"> <li>• Skill to see the interconnections between stakeholders in the food system</li> <li>• Skill to handle complex sustainability trade-offs</li> </ul>
<b>Pioneering</b>	<ul style="list-style-type: none"> <li>• Motivation, consciousness and perseverance</li> <li>• Teaching and creating awareness among consumers</li> <li>• Advocacy</li> </ul>
<b>Networking</b>	<ul style="list-style-type: none"> <li>• Skill to use opportunities</li> <li>• Digital skills</li> <li>• Sharing of skills</li> </ul>

### 5.3.1. Subject specific knowledge

First of all, the subjects that can be considered as specific to market gardening are many and they are intertwined. It is obvious that **technical skills for the use of tools and machinery** are essential to any farming activities, something many of the respondents pointed out. The specific technical skills required for market gardeners were the ability to handle fairly simple tools and equipment such as wheeled hoes, broadforks and in only in some cases tractors. Other practical skills mentioned were preparation of beds, setting up irrigation systems and poly tunnels and knowing how to sow, grow and harvest specific vegetables successfully. This was integrated with the aim for sustainability and the daily work the respondents described thus demonstrated the ability of market gardeners to **apply sustainable practices**, for example farming biodiversity and minimizing the use of fossil fuels.

“We could use the rotary cultivator a lot more, for example. But if we can do it with the broadfork and the rake, we will.” (Participant 3)

The high proportion of manual labour in many of the market gardens required skills in **maintaining physical health through implementing good ergonomics**, which was also mentioned as a component of social sustainability.

Although most participants had taken at least one course in cultivating vegetables, their lack of experience within farming required them to learn the technical skills as time went on (see section 5.3.3). They were generally convinced that this was a challenge they could handle but also that it nevertheless would require a lot of time and energy. There was some frustration that practical skills are undervalued in present society and few appropriate courses exist, making it difficult to learn without prior experience.

“There is this idea right now that you do well with theoretical knowledge about everything. It is important with the scientific method and all, but in THIS profession the practical knowledge is more important. Even if you do need to be able to do marketing and these other things, you have nothing if you don’t know the practical part. And it’s probably the biggest part, too.” (Participant 4)

On the other hand, the amount of subject specific knowledge that inevitably preceded the actual field work was also highlighted. Small-scale cultivation of a diversity of vegetables requires a unique mix of certain theoretical knowledge and practical skills. Working towards the aim of ecological sustainability, **knowledge of ecological principles** and how they relate to the **specific requirements of a diversity of crops** was essential.

“Primarily it’s that I have a reasonable understanding of what nourishes or consumes the soil, a basic understanding of agricultural biology. Also, to understand how different farming systems affect the soil.” (Participant 13)

“...there is such a huge amount of skills that you need. Both about biology and the practical work. Sure, I know how to drive a tractor or a BCF and I know how to use a wheeled hoe... But then you need the competency to time the work right, and how things look best when you post them in a Facebook ad so that people are attracted by your ad and see that ‘this is good stuff.’” (Participant 11)

What Participant 11 mentions about timing in the above quote was highlighted in the interview material as a whole. Coming from a background of hobby farming, the respondents perceived **the ability to plan and organize biodiverse production units and processes** as one of the main areas in which they had to develop: “*Many of the things I have learnt to use before are completely useless when I am cultivating on 400 m<sup>2</sup>*” (Participant 7). For example, they talked about timing the harvest of a diversity of crops to ensure a continuous and even supply of vegetables to their customers throughout the harvest season. Additionally, “*simplifying and streamlining the flows in a small production unit*” (Participant 8) was emphasized to survive economically. Because the area under cultivation was generally small, efficiency in both time, space and labour was imperative to profitability. In other words, planning and organizing was a context-specific, interdisciplinary competency in the market gardens, requiring knowledge in areas as diverse as ecology, logistics and marketing.

### 5.3.2. Business management

Practically all participants highlighted the importance of standard business management skills, since such skills are essential to running a business operation. This realisation had emerged when the participants had shifted from hobby farming to making it their livelihood. Whereas many mentioned **accounting and finance** as one of the areas in which they perceived a lack of skills (section 5.4.), others described how they “*...use accounting as a tool for planning.*” (Participant 9). In other words, skills in finance was seen as a tool necessary for **strategic planning** (Figure 11). For example, one participant described how she had a surplus of carrots at the end of the season. While she could have hired a neighbour to help her using his carrot harvester, she quickly calculated that since the fresh produce season (with higher prices) was over, the profit earned would not outweigh the costs. Instead, she chose to plough down the carrots, saying that it was important to actually do the calculation because “*it’s easy to be fooled about what is profitable*” (Participant 4).



*Figure 11. Winter-work in the market garden means thinking, strategically planning and structuring next season.  
Photo: Axel Isidorsson*

One of the reasons why business management is important for market gardeners lies at the heart of the business model, i.e. that the business is built on direct sales. This was described by participants as skills in **marketing and sales**.

“In our case, where we want to shorten the chain from us, we don’t want middlemen, it is not just to reach out to a wholesaler to reach customers. Instead, we need to find a way to reach out to customers directly. And that’s when it starts to become sales.” (Participant 2)

Whereas Participant 2 mentioned the importance of being able to reach out to customers, some respondents also described the content of their marketing strategy. In short, the value proposition of market gardeners included both quality food and added-value in terms of social and environmental benefits in the local society. Being able to **communicate the added-value of local food** was not something the participants were trained in, instead they claimed it was more of a personal ability, to be able to convey feelings.

Interestingly, there was an idea that growers are in general bad salespeople. Nevertheless, the respondents described how they worked consciously with customer relationships by communicating the benefits of their products and creating a brand built on care for people and planet. On the other hand, this was not always a conscious effort from their part. Instead, the direct contact with every customer enabled them to spend less time on branding. Some of the respondents consequently claimed that they didn't really need to engage in marketing, although it was evident that they nurtured customer relationships.

Something that was explicitly mentioned by relatively few respondents was the **entrepreneurial skills**, although they reported that they enjoyed the freedom and creativity of being self-employed. Instead, their entrepreneurial identity and mindset was revealed indirectly, especially through their skills in constant experimentation and development (section 5.3.3.).

“You should be risk-conscious but not be afraid. You should of course know what you are getting into or have control over what you are doing, but you shouldn't be guided by fear. You must not be afraid to try.” (Participant 9)

Further, the entrepreneurial skills among market gardeners were somewhat surprising, as there was an expectation for them to primarily identify as idealists and not business leaders. From the interviews it became clear that they can be described as typical social entrepreneurs, pursuing ideals through a business venture and being very serious about the business side of things.

“... there are so few concrete things you can do to get anywhere. This is a small way to try to contribute to a more sustainable food industry. [...] I quit my job to invest in this and build up a company that I can live off. I will not become a millionaire, but I am not going to do it half-free either. Then you need to think like 'I need to get paid for my crops'. This is not a hobby, but a business where I will make money.” (Participant 7)

### 5.3.3. Innovation and continuous learning

While they to some extent lacked technical skills and skills for business management, the interviewed market gardeners emerged as strikingly competent in continuous learning through **experimentation, adaptation and development** or 'learning by doing'. To some extent, this is probably a necessity for market gardeners in today's Sweden, since “*It is not a model that exists today to the extent that you can just jump on and follow.*” (Participant 9). Instead, respondents explained that they constantly tested new ways to solve all types of problems and the lack of appropriately scaled tools on the Swedish market had required some to invent their own tools. Interestingly, the skills within experimentation was described as a mindset, of

constantly evaluating performance and making adjustments along the way, being open to change and willing to innovate.

“Well, something I think we had in the beginning is some kind of openness to try new things, we experimented a lot with different crops and so on. And I believe we need to maintain that openness but maybe shift it to focusing on what we are already producing instead of trying to produce even more strange things.”  
(Participant 1)

#### 5.3.4. Systems thinking

In a broad sense, system thinking provided the backdrop and the motivation for the participants. The combination of personal interests, values and goals and having a problem description of the current Swedish food system enabled participants to envision the system while at the same time taking action to change that system. Often the insight about the **food system and the interconnectedness between stakeholders** was just that, the basic premise that had inspired the willingness to change and the design of the business model, but that was not thereafter part of the daily work.

“Once you start working with it, as long as you feel somewhat confident in it, you can stop thinking and just do it.” (Participant 12)

A form of systems perspective that many brought up was circularity as opposed to the classical linear representation of the food supply chain. One respondent described how he tried to take responsibility for the whole system, “*from the soil to the table*” (Participant 2) and had tried to implement everything he had learnt about the soil microflora, plant requirements, compost techniques and cooking. Another, very practically oriented approach was the respondent who had a three-point bullet list for **sustainability trade-offs**.

“I have list of priorities, with three bullet points. The first one is that I prioritize to grow good quality products – nice vegetables that people want to buy. Because if no one wants to buy it there is no point in doing it. That is point one. And point two is that it should be reasonably profitable, it should feel motivating to do it. [...] And the third point on my list is that it should feel environmentally sustainable. The reason they are in that order is because unless the first ones work the third one doesn’t matter because you can’t keep going.”  
(Participant 13)

A similar, but less structured approach was highlighted, with the basic balance between “*what can we afford, what do we prioritize, where is it more important to have the absolute most sustainable alternative*” (Participant 6). One participant explained how her skills in permaculture design were important as a tool for the reconciliation of competing objectives and



to get whatever she wanted to do “*to be in as much agreement with the ecosystem as possible*” (Participant 8). Contrastingly, another participant described her ability to see things in black and white, and not make compromises with her choices’ impact on planetary health. This, according to her, enabled her to truly align the business with sustainability. It was evident that the different participants gave slightly different weight to the three dimensions of sustainability but that consciously weighing pros and cons in different scales of time and space was a part of their decision-making process.

### 5.3.5. Pioneering

Operating outside of the established regime within a sector, with the aim of expanding one’s niche, requires a certain set of skills and competencies. Some relate to skills for innovation, described in section 5.3.3, to adapt and survive in a market environment. Participants also described a need to constantly justify one’s own business model, to be prepared to explain it to both customers and policy makers. This was perceived as being positive and motivating as well as draining from time to time. Over time it required **perseverance**, holding on to the **motivation** even in difficult times.

Wanting to **create awareness among consumers** was an important motivator (section 5.2.2). However, to be able to achieve this, participants needed skills in communication, networking and **teaching**. The extent of skill required appeared to be dependent on the micro-context of the market garden. There seemed to be a negative correlation with their closeness to an urban centre or an especially sustainability-oriented local community. In other words, those in very rural areas had to struggle to reach out to customers at all, whereas those close to urban centres could rest assured that customers demanded their products. Instead, they could use their teaching skills to hold courses and reach out to new customer segments. For some, the possibilities of spreading the word about sustainable food was the personally most important part of their business while others saw it more as an added value.

Something that was mentioned as important was to be able to raise the issues to the public debate and to influence policy makers. However, the respondents had little time to engage in this as they were busy managing their own business. They instead wished that producer’s associations or other organizations with a shared vision could do lobbying for them, just as the Federation of Swedish Farmers (LRF) bring forth the agenda of mainstream farmers. So, while mentioning **advocacy** as an important skill, there predominant strategy was not classical lobbying, but rather a form of activism.

“...it is something else that attracts people. It is this view that there is something fundamentally wrong in society, and then you try to change it yourself in an active way. You could get involved in politics too, but if you want to... well, some of us are more attracted to trying for ourselves, influencing from the inside so to speak.” (Participant 3)

“It’s really about how we can build the local food system instead of having this extremely complex, fossil fuel-demanding and food-un-sovereign system. [...] An alternative system, to be a model farm. [...] I would like this to become the norm, not just a niche.” (Participant 6)

### 5.3.6. Networking

There is a growing network of market gardeners in Sweden. According to the respondents this network is built and maintained through social media, primarily the Facebook-group *Småskalig grönsaksproduktion* (Small-scale vegetable production) with 1 5 41 members<sup>5</sup> but to some extent through the international *Market Gardening Success Group* with 33 125 members<sup>5</sup>. In the groups, members can ask questions about cultivation or market-related issues and receive knowledgeable replies within hours or even minutes. In this way they work as effective platforms for the **sharing of skills** and knowledge. The Swedish Facebook group has also been used for direct networking purposes, for example the event *Odlardagarna 2020* (Grower’s days 2020) was largely organized and marketed via the group.

Using social media for skill sharing in this way demonstrates an adequate level of **digital skills**. Social media was often multifunctional, acting as a source of information, a platform for collaboration and a marketplace. For many, digital platforms such as Facebook and Instagram were central to their marketing and for at least a proportion of their sales. Further, they used YouTube to learn new skills and to communicate with market gardeners across the globe. Nevertheless, digital skills were not mentioned as a prioritized area by any of the respondents. Instead, they seemed to see it as an obvious and unproblematic component of their daily work.

In addition, some of the respondents were members of the associations *Andelsjordbruk Sverige* (Community Supported Agriculture Sweden) or *Småbrukarna – Förbundet Sveriges Småbrukare* (Smallholders – Association of Swedish Smallholders), which contributed to their ability to build and maintain a network to facilitate their continued business operations. For example, *Småbrukarna* engage in lobbying and building public opinion to improve the conditions for small-scale farmers (Småbrukarna, 2020). The association *Andelsjordbruk Sverige* recently released a handbook on CSA to spread their agenda and help guide those wishing to start a farm of their own (Söderberg *et al.*, 2020).

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<sup>5</sup> On April 30th 2020.

The residential colleges for adult education in Sweden also seemed to participate in the networking of market gardeners. It was common that the participants had stayed in touch with their teachers after they completed their own education. Particularly in southern Sweden, the teachers organized study visits and sometimes students from these colleges volunteered in the market gardens.

It was also common to **use random opportunities** to initiate formal or informal cooperation with other local businesses. For example, one respondent sold vegetables outside a local bakery every week, and described how it had begun: “*It is often pretty spontaneous. Someone tips you or has heard about this or that, and then it sort of happens that you collaborate.*” (Participant 13). In a similar way, one respondent had started a farm shop together with neighbouring farmers and had discussed the possibilities of forming a CSA together.

However, several respondents challenged the definition of a partner or collaborator, saying that “*My customers are my main partners*” (Participant 14). One participant described the customers as driven by the same ideals: “*...it might be a bag (of vegetables, my remark) that doesn't really suit them, but they still shop to support me and what I am doing. Even though not all of these products suit them.*” (Participant 2). In another case, the customers had been invited to participate in planning for the next season's choice of crops. The sense of being supported and encouraged by customers helped strengthen the motivation to continue trying to push for sustainable food system. The market gardeners demonstrated skills in participatory processes and stimulating local networks with a variety of stakeholders, skills that are associated with the principles of agroecology and sustainable agriculture.

## 5.4. Lack of skills and competencies

In this section, I present the findings for research question 3: *What important skills and competencies do young market gardeners need to develop further?* In many cases, respondents wanted to improve the same skills as they regarded as the most important, i.e. the skills that were described in section 5.3. Lack of a skill in this context was often not a complete lack, but rather a perceived need to develop the skill further in order to improve business success. The categories of lacking skills that were identified were subject specific knowledge, business management, innovation and continuous learning and pioneering (Table 4). Of these, only the first two were described elaborately by the respondents and I will therefore not go into detail into the other two categories.

*Table 4. Important skills that Swedish market gardeners perceive a lack of, based on interview data. The 10 skills identified were grouped into the four themes: subject specific knowledge, business management, innovation and continuous learning and pioneering.*

Theme	Important skills and competencies
<b>Subject specific knowledge</b>	<ul style="list-style-type: none"> <li>• Technical skills for the use of tools and machinery</li> <li>• Knowledge of ecological principles and specific requirements of a diversity of crops</li> <li>• Ability to plan and organize biodiverse production units and processes</li> <li>• Building and maintaining farm buildings and equipment</li> </ul>
<b>Business management</b>	<ul style="list-style-type: none"> <li>• Accounting and finance</li> <li>• Strategic planning</li> <li>• Providing leadership</li> <li>• Marketing and sales</li> </ul>
<b>Innovation and continuous learning</b>	<ul style="list-style-type: none"> <li>• Accumulated skill through years of experience</li> <li>• Critically seeking reliable information</li> </ul>
<b>Pioneering</b>	<ul style="list-style-type: none"> <li>• Teaching and creating awareness among consumers</li> </ul>

### 5.4.1. Business management

The main area in which the market gardeners expressed a lack of skills was the economic side of business management. Initially driven by personal interests, values and goals and with no experience in business management, accounting, budgeting and making economic forecasts based on previous performance were big challenges. While they had the basic skills in accounting to comply with legal requirements, they expressed a need “... *to be able to fine-tune the whole business... and become more skilled at following up and calculating to see what is going well and what is going bad.*” (Participant 13). In other words, to “*optimize it, to make it as good as possible, not just make it work*” (Participant 2).

However, there were two differing approaches to the lack of skills in finance. Some saw it more or less as a necessary evil that they needed to improve at to ensure economic sustainability, but they would rather just cultivate vegetables. Others enjoyed the sense of security that arose when judging their production practices “black-on-white” and saw finance as a tool at their service. They were also gratified by the prospect of showing that “*it is possible gain profit in small-scale businesses*” (Participant 7), but nevertheless saw a need to improve.

When respondents were asked to look into the future, they also saw a need to develop better marketing skills. In this case it was not because they presently lacked marketing skills, but rather because of an expected rise in competition from other small-scale vegetable producers. Some also saw a need for skills in providing leadership and organizing the daily work, as the projected growth of their business could require seasonal employees.

### 5.4.2. Subject specific knowledge and continuous learning

Several respondents described a need for skills in mechanics, electrical works, constructing and fixing farm buildings and equipment. “*I lack that farmer dad who I can ask about things.*” (Participant 1), as expressed by one respondent. Many also expressed a need to develop their practical skills for growing vegetables. They wanted to learn more about soil chemical and microbial processes and to optimize their production systems to suit the needs of the diversity of crops being grown. Further, they wanted to learn more about the ecosystem and how they could improve their production system to assist other organisms in the natural environment. Moreover, refining skills in structure and planning was said to be desirable in order to further streamline processes and to improve profitability. However, all of these skills and competencies were seen as part of the continuous learning process and the current lack of skill was therefore not perceived as a serious problem. Most respondents were confident that if they managed to

keep reading, doing and learning, the accumulated experience would give them the skills that they lacked today.

## 5.5. Comparison with a related study: the NextFood project

Here, the results from the online survey forms the basis for comparison, as this was the purpose of the survey. In section 5.3., I defined the overall themes and specific skills and competencies based on interview data. Here, I have chosen to use the categories of skills and competencies as defined by Rosenlund Hansen *et al.* (2019) in the NextFood project (Table 1), to assist comparison across the two datasets. This forms the basis for answering research question 4: *How do the identified skills compare with the skills and competencies in related studies, i.e. the inventory of skills in the NextFood project?* When relevant, the results from the interviews presented in sections 5.3. and 5.4. are used to aid the comparison here. The analysis and impact of the similarities and differences will be further elaborated in the sixth chapter of this thesis.

Of the 14 interviewed market gardeners, 10 completed the online survey. First, they were asked to rank a list of skills from the most to the least important for their daily work. From this, business planning and strategic management (BS) and adaptation, experimentation and development (AED) received an almost equal score, although AED had a higher frequency of top rankings (Figure 12). Being conscious and responsible also received generally high ranking. In contrast, the skills that were frequently ranked lowest were digital skills, providing leadership and systems thinking/applying holistic knowledge. Apart from the pervading high importance given to AED and BS, it is difficult to outline a general trend. For example, being conscious and responsible is quite closely related to systems thinking, but these were obviously interpreted as quite different given their disparate ranking.

Comparing the results shown in Figure 12 to the general trends described in Rosenlund Hansen *et al.* (2019), there are inevitable similarities because the same categories were used. Whereas NextFood did not ask focus groups to rank skills, there is a dimension that does not allow for comparison. The most similar trend in the two datasets is the importance given to AED. In NF, this is described as necessary to *“keep adapting to new challenges and possibilities, but also have the skills to push such development through skills in life-long learning, problem-solving, innovation and experimentation”* (Rosenlund Hansen *et al.*, 2019). The interviewed market gardeners seem to share this view, as AED was spontaneously mentioned in the semi-structured interviews as well.

On the other hand, it is striking that digital skills were the least prioritized skills by young market gardeners, whereas digital skills within communication, sales and management were mentioned as central in NF focus groups. As shown in section 5.3.6, digital skills are indeed very much used by the interviewees of this study, but it is obvious that they see other skills as more important. The emphasis on business planning and strategic management is present both studies, but with a stronger direction towards sustainability-oriented strategies in the NF focus groups. As evident from the interview data presented in section 5.3.2 and 5.4.1, participants in this study express a need for business management skills in general.



Figure 12. Results for the question "Based on this list, which are the most important skills and competencies for your daily work? Rank from most to least important."

When it comes to gaps in today’s skills, the two datasets contain both similarities and differences as well. Whereas gaps in skills was not the primary focus of either study, the picture is not as rich. In general, the same patterns that emerged from the interviews (section 5.4) are repeated in the online survey results, meaning that the respondents have a general desire to become more experienced, and specifically within business management and the accumulated knowledge from years of continuous learning. The need to develop skills in continuous learning (Figure 13) could also correspond to the lack of connection between theory and practice that

was expressed in NF focus groups, but it is not possible to conclude. The lack of holistic knowledge highlighted in NF focus groups seems to apply to the participants in this study as well, judging from the fact that almost half of the respondent viewed systems thinking/applying holistic knowledge as something they need to develop (Figure 13).



Figure 13. The total score (on X-axis) for each category of skills, when given the question: "What skills and competencies would you need to develop to obtain a more sustainable business? It is possible to choose several options."

A lack of skill expressed in NF focus groups was tools for sustainable farming and skills in how to apply them, and this is probably the greatest discrepancy between the data sets. The market gardeners did not even mention this as an issue. Sustainable tools and how to apply them was the basis of their production systems. Because they had entered horticulture coming from other fields of work, they had no prior skill in using conventional tools such as pesticides. Again, the market gardeners paid little attention to digital skills, whereas this was highlighted in the NF focus groups.



## 5.6. External factors

The results for the fifth and final research question: *How are external factors affecting the perceived opportunities for young market gardeners to run sustainable businesses?* are presented in this section. In this context, ‘external factors’ refers to factors or stakeholders outside the market garden itself, but they are obviously part of the same, larger food system. It is necessary to include some such ‘external factors’ in order to understand the previous sections from a systems perspective. Many of the respondents gave detailed accounts about the ways in which they felt supported or counteracted by other stakeholders in the food system.

In general, they felt a strong support from their customers, from some NGOs and from each other, but they felt counteracted by agricultural policies and the capitalist logic of society. More specifically, it was highly emphasized that there is a lack of financial support suitable for small-scale producers. Around a third of the respondents had received the start-up support for young farmers offered by the Swedish Board of Agriculture, but others reported that they could not apply since they fell between the cracks. Either they did not own their own land, or their production area was too small; in one way or another they did not manage to fulfil the requirements. However, one respondent had received a grant from a private foundation and two respondents had received support through LEADER, part of the EU-programme for rural development that allocates financial support to local initiatives for innovation and cooperation (European Commission, 2020). Most participants were not aware of the possibilities of applying for such financial aid, meaning that the problem was not only the scarce availability of financial support, but often also awareness of the details of the existing support system.

Furthermore, it was pointed out that the direct payments to farmers favour large-scale agriculture with low labour intensity anyway, skewing the competition to the disadvantage of small-scale producers. Following this line of reasoning, they further claimed that the whole system is flawed and some suggested an employment-based support system instead. Sometimes the contempt of the prevailing political and economic regime was very evident.

“Actually, I think it’s just empty words when politicians and LRF are saying things like “now we need to produce more and provide food for the world” or “now we are going to get more young people into the green industry”, when the system... There is nothing in politics moving in that direction. So that whole discussion is just silly, I think.” (Participant 13)

The sense of falling between the cracks extended to other areas as well. For example, it was sometimes difficult for the interviewees to find tools and equipment suitable for their scale of operations, *“it’s not just in your garden but neither is it big enough so that you can buy tools*

*for the tractor or anything*” (Participant 1). Additionally, the available information and advisory services suffered from the same problem.

“Many of the systems that exist, the Swedish Board of Agriculture and research too, they often focus on that which is the norm. We fall outside of the norm and then it is often difficult to apply all that knowledge to what we are doing.” (Participant 6)

“We haven’t been able to squeeze ourselves into a regular programme, or standard form of any kind, if you know what I mean. It can be everything from the fact that we don’t own our land so we can’t go to the bank... and then LRF or the Board of Agriculture, they think we are too small. And the municipality, they don’t understand what we are up to. Like that.” (Participant 8)

These accounts are all signs that market gardeners are operating in a niche locked outside a very strong sociotechnical regime. However, this lack of support from some important external stakeholders seemed to strengthen the cohesion within the social movement, the sense of being part of a global community of smallholders and the associated social value. The sharing of skills via social media, the education via more or less radical folk high schools, the organizing of events and the personally valuable contact with friendly customers, all of these aspects bear signs of the “living-processes paradigm” that characterize sustainability.

When asked who they turn to if they need new knowledge or skills, only one participant suggested turning to research. The most common answer was to use the internet in one way or another, normally Google, YouTube or the previously mentioned Facebook groups. Many had tried to contact advisors at their regional County Administrative Board, but few felt that the advisors had enough knowledge about small-scale production to be helpful. The binder on organic cultivation provided by the Swedish Board of Agriculture was appreciated, but one respondent called for an update. For issues not directly related to production, it was more common to use personal contacts such as neighbour farmers or relatives.

All participants were asked to not only describe problems but also to offer suggestions as to what kind of reforms that would be needed to improve their opportunities to run economically, environmentally and socially sustainable businesses. Some economic reforms were suggested, such as raising the basic deduction or lowering taxes on employment. As implied above there would also be a need to change the requirements of e.g. the start-up support to enable more market gardeners to benefit from it. Reforms connected to land access were also suggested, one of which was a project idea to involve existing farmers (landowners) in the transition. Across the suggestions a general sense of urgency was conveyed, which is especially present in the two concluding quotes.

“The authorities, and maybe also SLU, need to understand that there is a new generation of farmers, and in this generation, there are those, like me, who need to start from scratch. And if we really want to reach all those goals, we need to support them too and realise that they have other problems than those coming from a multigenerational farm.” (Participant 4)

“A lot of young people come to us, they see the dream to contribute through farming, just like I have done. They really **want** to start up and they would do so any minute if only the reply wasn’t “No, it doesn’t work economically”. Losing that resource is the saddest thing there is in our time. That there are thousands who **want to**, but we haven’t figured out how to pave the way to enable them to start. And it’s about access to land, it’s about start-up support, it’s about skills development – it’s about society starting to value all aspects of small-scale vegetable production so you can get things back in more areas.” (Participant 8)

## 6. Discussion

In the previous chapter, I presented market gardeners' perspective in the theoretical context of sustainability theory, systems thinking and skills and competencies for sustainable food systems. I have also outlined the main similarities and differences between the set of skills identified in this study and the inventory of skills identified in the NextFood project. These empirical results will now be linked and analysed in a holistic manner, by integrating the market gardener's accounts with previous research on both skills and external factors for successful sustainability transformation of food systems. I will also discuss how external factors are affecting the current performance of market gardeners and suggest research or educational efforts that might potentially support the growth of market gardening as a movement in Sweden.

### 6.1. Motivation, identity and entrepreneurship

In this study, I explored market gardeners' motivation, and found that personal values and political and societal ideals were important motivators. What was striking, however, was the entrepreneurial aspect of their motivation, that they were determined to pursue ideals through entrepreneurial activities as opposed to political activism. In other words, given their quest for sustainable food systems, they can be described as typical 'social' or 'sustainability' entrepreneurs, striving for sustainability transformation while at the same time making a living from it (Parrish & Tilley, 2010). Social entrepreneurship was central to their motivation and their entrepreneurial identity. However, entrepreneurship can also be understood as a set of skills and a mindset. As such, entrepreneurship emerged as a central and multidimensional concept although it was neither explicitly mentioned nor studied in depth.

Identity has been found to be especially important to agricultural entrepreneurship by allowing agricultural entrepreneurs to unite their business activities with their quest to follow what they value most and create a sense of meaning in life (Fitz-Koch *et al.*, 2017). This was confirmed by the results in this study, as the market gardeners frequently described that their motivation was founded in personal interests, values and both personal and societal goals. Further, it has

been suggested that millennials, the generation born between 1981-1996, might have an entrepreneurial identity with more 'social' aspects than previous generations of entrepreneurs, although this has not yet been statistically determined (Liu *et al.*, 2019). The results of this study point in that direction since the group under study were both millennials and social entrepreneurs. Continued research into the entrepreneurial identity and activities of this generation might give valuable insight into how future food systems are being shaped, and what role social entrepreneurship can play.

## 6.2. Interpretation of sustainability

Before diving into the skills of market gardeners and how these can be understood in the light of previous research on skills for sustainable food systems, I must return to the concept of 'sustainability'. It proved a challenge both for NF focus groups and for the participants of this study to agree fully on a definition, and as was noted in the second chapter of this thesis, not even academia or policy has reached consensus. All definitions encountered during this research process make an effort to include the three pillars: social, economic and environmental sustainability, but there is reluctance to be too precise about the balance and instead the tendency is to describe it as 'complex', 'holistic' or 'dynamic'.

However, the ambiguity in the sustainability concept is more pronounced for NF focus groups than for the interviewed market gardeners. The NF focus groups disagreed about whether economic and ecological sustainability are supporting or contrasting to each other (Rosenlund Hansen *et al.*, 2019). Although market gardeners acknowledged that there might be trade-offs between ecology and economy, they generally saw economic sustainability as a means to reach ecological sustainability. The two aspects were seen as inseparable. Further, they clearly emphasized the need to move away from economic growth dependence and towards circularity, something that seems to have been less pronounced among NF focus groups. Hence, the results of this study indicate that market gardeners handle the negotiation of sustainability differently than farmers in general. This is not surprising given that their motivation was, to some extent, the prospect of being able to drive the sustainability transformation of the food system.

## 6.3. Market gardeners' skills similar to farmers'

Becoming a successful market gardener requires skills and competencies in very diverse areas. The most important skills, emphasized in both the interviews and the online survey, were

subject-specific skills, business management skills and skills for innovation and continuous learning. On an overall scale, this is in agreement with the NextFood inventory of skills for sustainable food systems (Rosenlund Hansen *et al.*, 2019), even though the prioritization, interpretation, categorization and context of these skills differ somewhat between farmers in general<sup>6</sup> and young, Swedish market gardeners. It should also be noted that the inventory of skills created within NF included other stakeholders than farmers, such as researchers, students, agricultural advisors, policy makers and food industry employees. Any direct comparisons here attempts to include only the most relevant stakeholder, farmers, but in Rosenlund Hansen *et al.* (2019) it was not always clear who the mentioned skills applied to.

Being able to work innovatively, that is, the ability to work proactively through experimentation, practical problem-solving, adaptation and development, is generally highlighted as important skills for present and future agrifood professionals (Charatsari & Lioutas, 2019; Rosenlund Hansen *et al.*, 2019; Duru *et al.*, 2015; Kerry *et al.*, 2012; Darnhofer *et al.*, 2010; Ashby *et al.*, 2009). The principal reason for this is that the context in which primary producers manage their businesses is in a process of perpetual change. To some extent this is the inevitable truth of farming, but in recent years the process of change has accelerated and perhaps become more unpredictable. Climate change, the seven-year cycles of CAP, consumer demand and the general local and global political and cultural landscape all exert pressure on producers' priorities in short- and long-term decision making.

In itself, market gardening is an innovation in progress, designed to meet some of the present challenges and loops of change. Aiming for sustainability and trying to maximise the production and income on a small area of land is unquestionably challenging, and the market gardeners in this study described how they sought improvements by constantly evaluating their own performance. Managing unpredictable challenges and finding solutions was described as part of the daily prioritizing, problem-solving and decision-making processes. Many tried to grow a large, and changing, diversity of crops both to meet consumer demand and to experiment with what worked best in their soil and climate, something that also acts as a resilience insurance (Darnhofer *et al.*, 2010). New tools and equipment to rationalize small-scale production was also a frequently mentioned area of experimentation. Both failed and successful experiments were subsequently shared with other markets gardeners using social media or sometimes personal contacts. The extensive use of social media networks on a national and international scale enabled inspiration and skills to travel fast across borders, facilitating the systematic process of development needed for innovation.

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<sup>6</sup> Here, the NextFood inventory is assumed to be representative of mainstream farmers in general.

Most of these practices and skills were highlighted in Rosenlund Hansen *et al.* (2019) as well, showing that skills in innovation and continuous learning are not unique to market gardeners, but rather a prerequisite for food producers in general. However, the specific methods and scales of the activities generally differ between the market gardening niche and the overall farming regime. For example, knowledge co-production was typically peer-to-peer within market gardening whereas mainstream actors tended to mention the involvement of multiple stakeholders such as farmers, advisors and researchers.

Another interpretation of continuous learning was broadly expressed as ‘experience’, which can be understood as the successive accumulation of a continuous learning process. A similar concept used in previous research is ‘lifelong learning’, defined as an ongoing process of learning and adapting (Charatsari & Lioutas, 2019; Rosenlund Hansen *et al.*, 2019). However, what is not as emphasized in the NextFood project is the importance of the *outcome* of that process. Nuthall and Old (2018) showed that intuition occupies a central role in farmers’ decision-making process, often more prominent than basic managerial abilities. In turn, the number of years of experience was important to using intuition successfully. Consequently, it is probable that it was skills in intuition that the market gardeners meant when they, somewhat ambiguously, described that the skill they lacked was ‘experience’.

Further, subject specific skills were also mentioned as skills that were both important and in need of improvement. As previously mentioned, it is difficult to distinguish what subject-specific means, since working towards sustainable food systems is interdisciplinary by nature. Rosenlund Hansen *et al.* (2019) primarily interpret subject specific skills as relating to production and specifically highlight skills for implementing new technology and digital skills, but I propose a much broader interpretation of the concept. Indeed, the market gardeners emphasized the importance of technical and practical skills relating to production, but they also described the need to understand ecological principles and to plan and organize biodiverse production units and processes. Since the choice of production practices and implementation of technical equipment is intertwined with the understanding of both market and sustainability, I suggest that having a systems perspective should be seen as a subject-specific skill for agrifood professionals. Although some authors already appear to have this perspective (Pant, 2014; Ingram, 2011), an articulated acknowledgement is probably required for its inclusion into both practically and theoretically aligned educational programmes. As is noted by Rosenlund Hansen *et al.* (2019) a category of skills “*can be taught on different levels and through different methods*”, so that the needs can be met for both practically- and theoretically oriented systems thinking as required by different categories of agrifood professionals.

A more obvious set of skills is perhaps business management skills, such as strategic planning, accounting and finance, leadership, marketing and entrepreneurship. Interestingly, the market gardeners' needs emerged as very similar to farmer groups in India, Bolivia and Uganda, who demanded a collective capacity for sustainable entrepreneurship, understood as the combination of:

1. basic group management skills
2. financial management skills
3. basic marketing skills
4. experimentation and innovation skills
5. sustainable production and natural resource management skills

(Ashby *et al.*, 2009).

Most importantly, the market gardeners perceived a lack of financial management skills, while on the whole being fairly confident in the other above-mentioned categories of skills. Although lack of financial skills threatens the short-term survival and economic sustainability of their businesses, it is relatively easy to overcome this lack in a longer perspective by incorporating more financial management in the curricula of relevant educational programmes. However, it is important that this knowledge is presented in a contextualised manner, so that market gardening students are allowed to make calculations on systems that are applicable to their own businesses.

Strategic development is highlighted by Rosenlund Hansen *et al.* (2019) as well, and the identified focus areas align strikingly well with the agenda of market gardeners. For example, the focus groups in NF discussed the need to focus on sustainable production in their business and marketing strategies. Having the skills to influence market development and communicate the value of local and seasonal food was also mentioned, something that emerged as very important for market gardeners as well. This is hardly surprising, since NF focus groups and literature review specifically focused on skills needed for sustainable food systems, and the interviewed market gardeners had adopted a business and marketing strategy aiming for just that. In other words, there is a consensus around the business and marketing strategies that are predicted to be of increasing importance in the future.

Furthermore, NextFood focus groups highlighted the importance of networking with other stakeholders, whereas the market gardeners had more focus on the internal network. The



existing networks for market gardeners in Sweden were largely informal and spontaneous, although some channelled their networking capabilities into existing associations for small-scale food producers. In Sweden, the Federation of Swedish Farmers is the established association for food, feed and fibre producers, having a relatively powerful influence on policy makers with its 140 000 members and 19 regional offices (Lantbrukarnas Riksförbund, 2019). In this context, the outsider identity of market gardeners was apparent, since most did not even mention LRF, or described LRF using words with a negative connotation. So, whereas networking skills have been highlighted in this dataset as well as in NF, the market gardeners display a different preference when it comes to the way in which internal networking is done. On the other hand, this might be a generational preference, since LRF is struggling to reach out to the youth in a way that appeals to the younger generation's ways of organizing and committing to a cause (Rådberg, 2019). When it comes to networking with other stakeholders, both NF farmers and market gardeners would benefit from increased collaboration with e.g. researchers, advisors and authorities such as the Swedish Board of Agriculture.

Another issue that is connected to both generation and niche is the need for digital skills. Liu *et al.* (2019) states that millennials is the first generation that feels fully at home in the digital world, which partly explains the unproblematic stance towards the digital sphere that was expressed by market gardeners in this study. Digital skills were integrated in their marketing, trade and networking and were their primary asset in searching for new knowledge or skills. Contrastingly, focus groups in the NextFood project highlighted the increasing need for digital skills to ensure the integration of new technology involving increasingly complex sensors and software (Rosenlund Hansen *et al.*, 2019). Given their low-tech strategy and small scale, this type of digital skills is likely not relevant to market gardeners. However, NF focus groups also expressed a need to use digital skills for marketing, in order to both respond to- and influence consumer trends and to get involved in web trade – something that overlaps the needs of market gardeners and might thus be an area to develop with both groups in mind.

## 6.4. Market gardeners seek an alternative

As I have shown, the most important categories of skills for sustainable food systems, as identified by market gardeners, are largely similar to those identified by previous research. Instead, the way in which market gardeners distinguish themselves relative to farmers in general is essentially through their mindset and values. Interestingly, it has been shown that qualities, rather than skills, such as awareness, motivation, responsibility, empathy, curiosity, optimism, openness, consciousness and mindfulness are also important for tackling sustainability

challenges (Rosenlund Hansen *et al.*, 2019; Burns *et al.*, 2015; Kerry *et al.*, 2012; Ferdig, 2007). Many, if not all of these qualities, defined the market gardeners who participated in this study.

Self-awareness is important to empower leadership (Burns *et al.*, 2015), and it was very clear from the interviews that the participants self-identified as leaders for sustainability, a kind of pioneers in creating the new food system. This was generally lacking among participants in NF focus groups (Rosenlund Hansen *et al.*, 2019). Furthermore, the market gardeners expressed a desire to spread awareness and motivation to others through selling their products and the story that came with them. In this process they regarded the customers not just as customers, but rather as partners or members of the same social movement. Relating to stakeholders in this way is a way of creating a collective identity or togetherness, which is an important aspect of the building and maintaining of networks (Rosenlund Hansen *et al.*, 2019; Juárez *et al.*, 2018). Although networking, as discussed in the previous section, has been identified as important for agrifood professionals in general, its role for the interviewees likely differs from mainstream actors in the sense that these Swedish market gardeners are also in the process of spreading an innovation. It has been argued that the successful spread of an innovation is dependent on the functions present in the innovation network, rather than individuals' skills and competencies (Hermans *et al.*, 2013). The functions necessary to spread an innovation is, according to Hermans *et al.* (2013), knowledge co-creation, upscaling done by institutional entrepreneurs and outscaling done by innovation brokers. Studying the presence and extent of these functions could allow for a greater understanding of the spread of market gardening in Sweden, but unfortunately that lies beyond the scope of this thesis. This study has contributed to a greater understanding of the innovative mindset and skills of market gardeners, but the spread of market gardening might be misinterpreted if too much focus is placed on the individual actors rather than the innovation network as a whole. A network perspective is a promising next step.

However, studies of grassroots innovations<sup>7</sup> have shown that it is not enough to study the network among the grassroots. It is also necessary to create positive feedback loops between policy and research on the one hand, and niche activists on the other (Seyfang & Smith, 2007). So, again, maintaining a systems perspective allows for an understanding that goes beyond individual business leaders and their competencies. The success or failure of market gardeners in Sweden will not only depend on market gardeners themselves, but also the way in which they are allowed to interact with the dominant regime. Such interactions are generally complex and dynamic processes, as both regime and niche are heterogenous and overlapping rather than

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<sup>7</sup> The concept of grassroots innovation can be used to describe bottom-up initiatives to create new products, knowledge systems, business models or other solutions to a perceived problem (Seyfang & Smith, 2007).

fixed entities (Ingram, 2015). In the next section, I will outline some of the characteristics of the interactions, or lack thereof, between Swedish market gardeners and the incumbent food system regime.

## 6.5. Interactions between niche and regime

The general tendency was for market gardeners not to interact with the most powerful food system actors, such as food retailers and policy makers. Nevertheless, two main types of interactions between the market gardening niche and the established food system regime can be distinguished: 1) knowledge-based- and 2) economic interactions.

Firstly, the knowledge-based interactions took the form of advisory services or research. Many market gardeners had reached out to advisors for advice on technical issues, but they had generally not received the support that they had hoped for. In short, advisors lacked the necessary understanding for the specific production system and its challenges. It has previously been found that agronomists lack the necessary skills and competencies to promote sustainable agriculture, such as bridging the gap between scientific theory and practical knowledge to solve problems that go beyond the one size fits all strategy of conventional agriculture (Charatsari & Lioutas, 2019). The negative experience of advisors entrenched market gardeners' sense of being outsiders and the lack of trust for the established scientific knowledge set up the kind of barrier that has been found to further hamper effective knowledge transfer between stakeholders (Charatsari *et al.*, 2019). So, in this case, it can be argued that is primarily advisors who need skills development to become trustworthy partners for market gardeners.

When seeking new knowledge or skills, market gardeners generally turned to peers through social media or to their former teachers. This lateral mode of information seeking, approaching actors in the same value niche only, has been described for related movements such as the Permaculture Association in England (Ingram, 2015). These value-based niches have transformative aspirations and, as a consequence, are in opposition to the food system regime (Ingram, 2015). Although they might create strong lateral networks, such as the Facebook groups that market gardeners'' describe as very efficient platforms for knowledge co-creation, the lack of contact with mainstream actors renders market gardeners invisible to the regime and hampers their opportunities to influence it. From the interviews it seems like market gardeners do not wish to operate parallel to the regime, but they do not wish to involve themselves in more formalised advocacy work either, mainly due to time constraints. They instead, as mentioned earlier, view their customers as their principal partners whom they trust to build a

public opinion strong enough to influence the market and successively the overall regime. Given the complex and adaptive nature of niche-regime interactions, it is not possible to say if this is the trajectory they will follow, or if an adaptation arises in which their niche is partially integrated to the regime in a different way.

When it comes to economic interactions, the interviews show that these were mostly seen as challenges. Struggling with economic sustainability was emphasized as the biggest challenge faced by the respondents. However, this does not allow for the judgement that market gardening is not economically sustainable since there were several factors that influenced their financial performance. Most notably, these were the fact that most respondents were in the start-up phase, had insufficient skill in accounting and finance and the fact that farming in general suffers from low profitability. The first two can be overcome through education and a continuous learning process, whereas the low profitability faced by market gardeners is to a large extent an effect of the prevailing food system regime.

It should be noted that there are examples of profitable market gardens, although there are few Swedish examples that have proven resilient, Ringqvist (2018) being one of the few. In a Canadian context, Fortier (2014) reports being able to bring in \$140 000 on their 1.5-acre market garden, which corresponds to around 170 SEK per m<sup>2</sup>. As can be seen in Figure 9, only 3 of the interviewed market gardeners have a turnover per m<sup>2</sup> that is at least on that level. Most earn below 100 SEK per m<sup>2</sup>, and it is unclear if this is an economically sustainable level that can motivate them to continue with their businesses. Their own suggestions for improving their economic sustainability extend to the raising the general price of food and reforming the financial support system.

Finding customers presents another economic challenge. The Swedish food system is characterized by a development away from small-scale production and the dominance of few, powerful chains of food stores. Given the convenience of this system to many consumers, market gardeners in some regions have difficulties in finding customer segments that are prepared to make sustainability-oriented decisions even when those are time-consuming. This problem has been observed earlier for CSA farms in Sweden (Sjöblom, 2015, Nilsson and Wejåker, 2016) but there are also indications that it is becoming easier to find less price-sensitive customers by adopting a CSA model (Svensson, 2018) or possibly also new, digital solutions such as REKO-rings. So far, there seems to be a low willingness among market gardeners and food retailers to interact and cooperate.

There was some frustration about the financial support available for small-scale farmers in Sweden. As mentioned, some of the respondents had received different types of financial aid but others did not meet the requirements, since those have been formulated by policy makers who are probably not aware of the needs and characteristics of new categories of food producers such as market gardeners. This is a symptom of the food system lock-in, locking out innovations that do not fit the system. Policies in the form of subsidies or other economic elements such as regulations or trading schemes need to be reformed to break the lock-in and to enable the effective spread of grassroots innovation or other niche initiatives for sustainability (Kuokkanen *et al.*, 2017; Schot & Geels, 2008; Seyfang & Smith, 2007). However, the interview data largely lacks suggestions for how to persuade policy makers to take action supportive of systemic transformation. It is precisely this lack of understanding among politicians that had contributed to driving the entrepreneurial actions of the respondents, trying to change things in a more practically oriented way. Paradoxically, the effects of lock-in is one of the drivers that have inspired market gardening as a disruptive innovation but at the same time it is one of the most important barriers that are threatening the economic survival of market gardening businesses.

## 7. Conclusions and recommendations

The overarching research effort in this thesis was *understanding the situation for young market gardeners in Sweden – what drives them, what are they good at and what do they need to be a successful part of the sustainability transition of the food system?* By analysing interview data through a focus on skills and competencies for sustainable food systems and closely linking results to similar research within the Horizon 2020 project *NextFood – Educating the next generation of professionals in the agrifood system*, this thesis offers both insight into the situation for market gardeners and highlights the potential for advancing their agenda in Sweden.

On the level of the individual market gardening businesses, they generally possess a sufficient level of skills and competencies for sustainable food systems. They are competent in using practically oriented systems thinking, engaging in a continuous learning and innovation process and they demonstrate some networking and pioneering capabilities. The skills that are lacking lie close to the daily work in the market garden, such as financial management and subject-specific skills. This lack could be overcome in a relatively short-term perspective by increased focus on finance and entrepreneurship in existing courses at residential colleges for adult education and the development of supplementary, short and practically oriented courses in vegetable cultivation techniques for small-scale systems. Further, facilitation and, to some extent, formalization of market gardening networks could improve the sharing of knowledge and both help aspiring market gardeners and other stakeholders to access that knowledge.

However, to encourage more young people to start market gardens or other small-scale horticultural businesses and to forward the transformative agenda of market gardening as a social movement, the lock-in of the food system must be addressed by actors outside of the market gardens themselves. More specifically, there seems to be a lack of awareness of the characteristics and needs of market gardeners among advisors, researchers and policy makers. Overcoming this knowledge barrier and the lack of trust between innovators and mainstream actors should be the primary focus, to create an integrative sense of togetherness that cuts across scales and allow for joint efforts towards sustainability. Policy makers need to acknowledge

that future farmers might be a more diverse group of people than the current mainstream, aging farmers and that there will be a need for more flexible support systems to allow for that diversity.

The general direction of educational efforts in order to support the development of skills for sustainable food system is to integrate theory and practice to a larger extent. Systems perspectives need to be present not only on a theoretical, societal level, but also the skills to implement systems thinking in practice. Also, research and education must address the sustainability trade-offs directly to provide support and guidance for agrifood professionals, including market gardeners, who need to negotiate sustainability dimensions in their daily work. Lastly, more practically oriented courses in cultivation techniques and business management are needed to meet the needs of aspiring sustainability leaders who wish to contribute to food system transformation through farming but have no prior experience of professional food production.

In conclusion, the sustainability transformation of food systems will require some development of skills and competencies, but in its essence it is a political process. This thesis points towards clear signs of a new generation of food producers who are willing to tackle some of the sustainability challenges, but they do not seem to currently be on a trajectory towards success. Systemic transformation requires collective responsibility and collective effort, and in this case consumers need to pay more for sustainable food, policy makers need to wake up and advisors, research and education need to deliver to practice.

## 8. Personal reflections

Working with this thesis was an explorative process, since both the field of research and its connected methodology were new to me as a student and researcher. While the data collection and analysis took a large share of the available time, being able to select a relevant theoretical framework was a great challenge. The research fields of sustainability, systems thinking, skills and competencies appeared central. But as I studied these fields, I discovered my inner oceans of ignorance and new insights started to emerge. Towards the end of the work with this thesis, transition theory and theories of path dependency and lock-ins seemed to offer insightful perspectives on the interactions between market gardeners and the food system regime. Unfortunately, time started to run out as I felt my ability to understand my own research increase. I only managed to start sketching a conceptual framework with which to understand this specific food system innovation and its advance in Sweden. If I would be given the opportunity to continue researching market gardening in Sweden, it would also be necessary to collect more data to be able to highlight the perspectives of other stakeholders.

Also, I have had to reflect on my role as a researcher and how action-oriented qualitative research turned out to be a balancing act between the object of study, academia and politics. Scientific research is supposed to offer advice based on empirical findings and conceptual linkages, but it borders politics when the empirical data consists of the perspective of a small group of people. Whether it is possible, or even desirable, to separate science and politics is, to me, not entirely clear. It is, however, clearer than ever that scientific findings have political implications that need to be acknowledged and managed.

Lastly, I am truly grateful to have taken the opportunity to dive into this project, and it is my sincere hope that I will be able, in one way or another, to continue reflecting on societal changes and to use my skills and competencies to contribute to sustainable food systems.



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# Appendix 1. Interview guide (in Swedish)

## *Inledning:*

*Berätta vem jag är och syftet med studien. Tack för att du vill vara med. Fråga om inspelning och garantera anonymitet. Frågor?*

## **Kvantitativ del**

1. Vilket län är du verksam i?
2. Hur gammal är du?
3. Identifierar du dig som man, kvinna eller annat?
4. Är du utbildad inom odling eller företagande?
5. Hur stor yta odlar du på? (friland vs växthus)
6. Vad är din produktionsinriktning?
7. Vad odlar du?
8. Vilka maskiner eller tekniska hjälpmedel använder du i odlingen? Vad använder du dem till?
9. Vad är dina huvudsakliga källor till växtnäring?
10. Använder du kemiska bekämpningsmedel?
11. Hur många personer arbetar i företaget? Helår? Säsongs?
12. Hur länge har du varit verksam som yrkesodlare?
13. Startade du företaget själv eller har du tagit över befintligt företag, t ex familjeföretag?
14. Har du någon annan sysselsättning vid sidan av odlingsföretaget?
15. Har du tagit emot bidrag eller stöd, t.ex. investeringsstöd eller startstöd?
16. Hur stor är företagets omsättning?

## **Tema 1: Motivation**

- 1.1. Vad är målet med ditt företag? Vad är din vision?
- 1.2. Vad driver dig att fortsätta med verksamheten?
- 1.3. Hur ser affärsmodellen ut?
- 1.4. Vad är en lagom storlek på ett företag med din affärsmodell?
- 1.5. Vilka är dina viktigaste samarbetspartners i det dagliga arbetet?
- 1.6. Vilka andra aktörer har du professionell kontakt med? (leverantörer, rådgivare, forskare, kunder, andra företagare inom samma sektor, myndigheter)

## Tema 2: Färdigheter och kompetenser

*Inledning:*

*Färdigheter kan man lära sig på förhållandevis kort tid, de är avgränsade. Exempelvis tekniska färdigheter såsom att köra traktor eller hjulhacka och digitala färdigheter såsom att kunna använda sociala medier eller Excel.*

*Kompetenser är kopplade till ett visst sammanhang, i detta fall livsmedelssystem. Är mer komplexa, innefattar ofta både kunskap och färdighet, t ex problemlösning, kritiskt tänkande, affärsplanering, ledarskap.*

- 2.1. Vilka är de viktigaste färdigheterna och kompetenserna i ditt dagliga arbete?
- 2.2. Jämfört med när du började med yrkesodling, vilka nya färdigheter och kompetenser har du varit tvungen att lära dig?
- 2.3. Finns det några färdigheter och kompetenser som du inte längre använder lika mycket?
- 2.4. Vilka kompetenser upplever du att du saknar för att lyckas bättre med ditt företag?
- 2.5. När du blickar in i framtiden, vilka färdigheter och kompetenser tror du att du eller dina medarbetare kan behöva utveckla?
- 2.6. När du tror att du behöver ny färdighet, kompetens eller kunskap, vart vänder du dig då?  
*(Om de inte nämner följande, fråga – vänder du dig till någon av följande aktörer: släkt, andra företagare inom samma sektor, experter, lokala kontakter, rådgivare, universitet, marknadsaktörer)*
- 2.7. Vilka av dina nuvarande kunskaper och kompetenser kommer bli viktigare inom de närmsta 5-10 åren? Varför?

## Tema 3: Hållbarhet och omställning

- 3.1. Vad är hållbar matproduktion för dig? Dvs vad ingår i din förståelse av begreppet?  
*(Om de inte nämner det, fråga: vad är social hållbarhet, vad är ekonomisk hållbarhet, vad är miljömässig hållbarhet?)*
- 3.2. Vilken roll spelar hållbarhet i ditt dagliga arbete? Formar hållbarhetsmål ditt dagliga arbete? På vilket sätt?
- 3.3. Vilka av dina färdigheter eller kompetenser bidrar till att göra er matproduktion och/eller ert företag mer hållbart? Vilka är dina viktigaste färdigheter och kompetenser när det kommer till hållbarhet?
- 3.4. Hur bidrar ert företag till att samhället som helhet ska uppnå de globala målen för hållbar utveckling?  
*(Dvs SDG, t ex Bekämpa klimatförändringarna, Minskad ojämlikhet, Hållbar konsumtion och produktion, Hav och marina resurser och Ekosystem och biologisk mångfald)*
- 3.5. Vilka aktörer stödjer dig i ditt hållbarhetsarbete?  
*(Om de inte nämner det, fråga: andra företag i samma sektor, rådgivare, utbildningsinstitutioner, föreningar)*
- 3.6. Vad tänker du om begreppet omställning?

## Slutfråga:

Är det något som vi inte har diskuterat som du tycker är viktigt för att bättre stötta unga trädgårdsföretagare, om du tänker på att det samhälleliga målet är ekonomisk, social och miljömässig hållbarhet?

## Appendix 2. NextFood question guide for focus groups

*If the focus group seems to be reluctant, consider starting with this initial theme, to get the discussion going. Otherwise, begin with theme 2.*

### **Optional! Theme 1: Getting started, background information and defining the participants' networks**

Q1.1: Describe a typical work day

Q1.2: Who are your most important collaboration partners in your daily work?

Moderator's notes to theme 1:

### **Theme 2: Skills**

Q2.1: What are the most important skills in your daily work day?

*Note for the moderator: If the focus group includes actors from different parts of the food chain, make sure that skills of farmers/producers is in focus by re-phrasing the question as 'What do you consider to be the most important skills in the daily work of farmers/food producers?'*

Q2.2: Compared with when you started your professional career, what new skills have you had to develop?

Q2.3: Are there any skills that you no longer use the way you used to?

Q2.4: When you look at the future, what kind of new skills do you think that you or the people working for you will have to develop further?

Q2.5: When you think you need new skills or knowledge, who do you turn to?

*Note for the moderator: If the following issues did not come up in the initial discussion, ask the following: Do you go to any of the following actors: Relatives, experts, local community, advisors, universities, market actors*

Q2.6: A list of skills – which do you think are important?

*Note for the moderator: Here is a good time to hand out the list of skills and ask the participants to rank the skills going from least important to most important in their job. They should add skills that they find important if they are not present on the list.*

*The compilation can be conducted in different ways -*

*- each participant gets the list in paper and ranks it by numbers with a pen - discuss afterwards (most*

*suitable for groups with experts or students)*

*- a whiteboard or large poster with the list and the moderator (assistant) ranks with numbers based on the discussion of the participants (most suitable for groups with only farmers/producers)*

Q3.8: Do you think the list and its ranking will change within the next 5-10 years?

Moderator's notes for theme 2:

### **Theme 3: Sustainability**

Q3.1: What is sustainable food production to you?

*Notes to the moderator: If the following does not come up in the discussion, ask: What is social sustainability, What is economic sustainability, What is environmental sustainability?*

Q3.2: What role does sustainability play in your daily work?

Q 3.3 What are your most important skills in relation to sustainability?

Moderators notes for theme 3:

### **Theme 4: Education and research**

Q 4.1: Have you been involved in education of students and if so, what is/was your role?

Q4.2: Do you think that students develop the skills that you are looking for in today's education system?

Q4.3: What are the most critical gaps in student skills and competencies?

Q 4.4: Have you been involved in academic research, and if so, what is/was your role?

Q4.5: Do you think that the research (connected to the agrifood sector) conducted today is relevant for you?

Q4.6: What are the most critical gaps to tackle in order to get research more relevant in the daily practice of food professionals?

Moderator's notes for theme 4:

### **Final Question:**

Is there anything that we have not discussed that you think is important to create a research and education system better fit to deliver to practice?

## List of skills

### NON SECTOR-SPECIFIC SKILLS

#### I. Fundamental Skills

- Communicating
- Managing information
- Using numbers
- Thinking & solving problems
- Providing leadership
- Managing personnel

#### 2. Personal management skills

- Demonstrating positive attitudes & behaviours
- Being responsible
- Being adaptable
- Learning continuously
- Working safely
- Improving own performance

#### 3. Teamworking and interpersonal skills

- Working with others
- Participating in projects & tasks
- Communicating with others

#### 4. Business skills

- Business planning & strategic management
- Sales and marketing
- Finance and resource management
- Customer service

#### 5. Pedagogical skills

- Learning and assessment

### SECTOR NON-SPECIFIC SKILLS

#### 6. Skills for food quality and food safety

- Quality management, quality assurance and quality control
- Food safety management, food hygiene and food safety control

#### 7. Skills for research and development

- Product development

#### 8. Skills for food production and manufacturing

- Engineering maintenance
- Health, safety and the environment
- Production management
- Production operations
- Cleaning and preparation
- Control operations
- Waste disposal

#### 9. Skills for food retail and the supply chain

- Food retail
- Goods received and storage
- Supply to production
- Pick and pack
- Livestock droving

#### 10. Skills for logistics

- Transportation

### SECTOR-SPECIFIC SKILLS

#### 11. Skills for food processing sectors

- Meat and poultry processing – preparation and abattoirs
- Meat and poultry processing – production butchery
- Meat and poultry processing – retail butchery
- Fish and shellfish processing
- Dairy products
- Brewing production
- Beer packaging
- Milling and cereals
- Dough and dough products
- Flour confectionery
- Chocolate
- Sugar confectionery

## Appendix 3 – Online survey template

### Lista över kompetenser för hållbar matproduktion

Välkommen till denna enkät, som är en del av mitt examensarbete inom trädgårdsvetenskap. Detta är ett komplement till den intervju du deltagit i.

Det görs just nu en EU-finansierad kartläggning av kompetenser för hållbar matproduktion. Detta arbete är ett bidrag till den kartläggningen. Syftet är att se vilka av de kompetenser som EU-projektet identifierat som även är viktiga för unga, småskaliga grönsaksproducenter i Sverige. Förhoppningen är att därmed kunna bidra till att skapa bättre utbildnings- och stödsystem.

I begreppet hållbarhet ingår tre dimensioner: social, ekonomisk och miljömässig hållbarhet.

Hör av dig om du har frågor!

Hälsningar

Lotten Lundgren, [lnlu0001@stud.slu.se](mailto:lnlu0001@stud.slu.se)

1. Utifrån denna lista, vilka är de viktigaste färdigheterna eller kompetenserna för ditt arbete idag? Rangordna med det viktigaste överst.

- Affärsplanering och strategisk företagsledning
- Anpassning, utveckling och experimenterande
- Att vara medveten och ansvarsfull
- Digitala färdigheter

- Kommunikation
- Kontinuerlig inläring
- Ledarskap
- Marknadsföring (strategier och tekniker)
- Samarbete (inklusive med andra aktörer)
- Systemtänkande, tillämpa holistisk kunskap

2. Vilka färdigheter eller kompetenser skulle du behöva utveckla för att få ett mer hållbart företag? Flera svar är möjliga.

- Affärsplanering och strategisk företagsledning
- Anpassning, utveckling och experimenterande
- Att vara medveten och ansvarsfull
- Digitala färdigheter
- Kommunikation
- Kontinuerlig inläring
- Ledarskap
- Marknadsföring (strategier och tekniker)
- Samarbete (inklusive med andra aktörer)
- Systemtänkande, tillämpa holistisk kunskap

3. Om du tycker att något saknas, nämn ytterligare färdigheter och kompetenser som du tycker är viktiga för att du ska kunna driva ett hållbart företag.