Forces Underlying Sustainability Transition Practices Among Organic Farmers in the Netherlands: Experiences in Transition and Beyond

Author: Hielke Prins
University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands

ABSTRACT,
In recent years, the multiple effects of food, feed and bio-based systems on the environment have been in the research spotlight. According to other literature, agriculture plays a big role in the food industry, especially in the Netherlands. Whereas conventional farming is still regarded as the most common way of farming, organic farming is increasing to grow and gain attention. Since organic farming is not solely focused on productivity and revenue, but also on the environmental and ecological consequences, it is usually already more sustainable than conventional farming. However, it is still quite unclear which forces exactly drive and oppose these sustainability transitions among organic farmers in the Netherlands, making it this paper's main goal to find an answer to that question. Previous research on organic agriculture and the motivations to become an organic farmer by adopting sustainable practices identified several forces already, but this study seeks to investigate the exact intrinsic and extrinsic driving and opposing forces at play during these sustainability transitions among farmers in the Netherlands, to gain a deeper and more sophisticated understanding of this. Through qualitative interviews conducted with 9 Dutch organic farmers or Dutch farmers in transition to organic farming, the data analysis revealed that 16 driving forces as well as 16 opposing forces were found. Among these forces, 5 were found to simultaneously drive and oppose sustainability transition practices.

Graduation Committee members:
1st examiner: Dr. Barbara Kump
2nd examiner: Dr. Martin Stienstra

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1. INTRODUCTION

In recent years, there has been a rise in the number of academic articles addressing the multiple effects of food, feed and bio-based systems on the environment (Notarnicola et al., 2012). The same article states that issues such as global climate change, water quality, water scarcity, soil quality, energy use and biodiversity losses were all identified in several studies on agricultural systems, which is subsequently a part of the food industry. While the food produced on earth does not even properly feed everyone, its production systems harm the environment and place strain on our natural resources like water and fossil fuels (Institute of Medicine of the National Academies, 2014). Several problems linked to the current food production systems like climate change, degradation of the environment and pollution force countries to adapt towards sustainability transitions (Dixon and Isaacs, 2013; Food and Agriculture Organization, 2012; Reisch et al., 2013) and the agri-food sector is one of the top priorities in the aim for developing more sustainable patterns of production and consumption (European Commission, 2008).

Organic agriculture as the solution to replace conventional farming is an increasingly hot topic in many parts of the world, especially over the last 15 years (De Ponti et al., 2012). Biodiversity, biological cycles, and soil biological activity are all concepts being promoted and enhanced by this holistic production management method known as organic agriculture (Codex Alementarius Commission, 2001), and it is seen as a way of farming where not only productivity and revenue are taken into account, but also the environmental and ecological consequences (Tilman, 1998). According to several recent studies, it is expected that the food production has to be increased by at least 50% to keep up with the population growth growing to 9 billion people, changes in people's diet and the increasing use of bioenergy, if no big changes are being made in the consumption of agricultural crops (Muller et al., 2017). Intense conventional agriculture has been the main reason for relatively cheap food products and fibre (FAO, 2008). A big problem, however, is that the production of this often comes with synthetic pesticides and chemically produced fertilisers (Halberg, 2012). In multiple countries in Europe, excessive nitrogen and phosphate emissions have arisen as a result, having caused renewed agri-environmental policies (Halberg, 2012).

The environmental impact that agriculture has forces incumbent farms to change, since ensuring sustainable development is one of the most pressing priorities in society (Dotsenko et al., 2021). However, they are facing different driving and opposing forces. According to Lewin's field theory, which notions a 'field' in which different actors are at play at both individual and group levels with different 'forces' driving behaviour and situations (Kump, 2023), incumbent organisations perpetuate existing regimes when the stronger forces push towards 'regime practices', while the weaker forces are pushing the alternative practices. This means that incumbent farms have to change when the existing industry regime gets destabilised, which is explained as a process of 'unfreezing' the regime (Lewin, 1947; Turnheim and Geels, 2013). As mentioned in the beginning of the introduction, sustainability transitions towards organic agriculture are needed, and these sustainability transitions are mostly powered by 'niche innovations', which are new practices defying the regime's prevailing norms (Kump, 2023). In the case of agriculture, the aforementioned issues like climate change, soil quality and excessive nitrogen and phosphate emissions are examples of this.

In high-income countries, organic agriculture is growing fast, and most inhabitants eat organic food at least now and then (Seufert et al., 2017). For many people, consuming organic food is a way to have control over their lifestyle and health (Allen and Kovach, 2000), but what are the reasons for farmers to adapt or to not adapt their way of farming into using organic, sustainable practices? A study conducted in Austria by Darnhofer et al. in 2005 shows that there are several reasons for farmers to consider or to not consider organic practices in their farms. For this consideration of organic production, a farmer first needs to be convinced that organic farming is a feasible way of production. Also, they often do not set income maximisation as their primary goal, but take other factors, such as their impact on the environment, health issues and ethics into consideration. Another factor was the intensity of the labour coming with organic practices, which is often deemed to be higher than with conventional farming, thus being a reason for farmers not to switch to organic practices. Examples of this are that herbicides cannot be used and weeding must be done by hand, taking up way more time. Lastly, a crucial element are rules and regulations on organic farming. For example, strict regulations would be needed for animal housing, requiring more space per animal as well as more access to outdoor space. There is quite some criticism on the regulations on organic agriculture being vague, thus making it hard for farmers to adapt well to organic practices.

A major drive to start implementing sustainability practices is to gain a sustainable competitive advantage (Bansal and DesJardine, 2014). All sorts of businesses, including farms, can gain a sustainable competitive advantage over others. One of the main goals for organisations to become sustainable in the first place is to create a better image of the brand, enhancing consumer and policy maker reputation (Nidumolu et al., 2009). Sustainable practices can yield bottom-line and top-line returns, because environment-friendly operations can lower costs when reducing inputs and increasing product standards. However, there are also several forces opposing change towards sustainability. A widely known opposing force is that the innovation would be too costly, especially in the beginning (Fujisaka, 1994). This is because the costs are immediate but the benefits of the sustainable innovation in the long term are risky or unknown. Other opposing forces stated by this article are that the innovations are not working properly under certain circumstances, innovations are creating other unknown problems or the benefits of innovations are being overestimated.

The objective of this research is to recognise and understand all the forces underlying sustainable transition practices in organic agriculture in the Netherlands, which in turn catalyse positive environmental impacts and minimise negative impacts while ensuring sustainable food supply coming from the organic farms. By investigating social, economic and ecological factors contributing to the sustainable practices in organic farming and assessing the effectiveness of various farming methods and agricultural policies regarding sustainability, farmers and important stakeholders such as politicians and policy makers can be educated on which important forces are at play, subsequently helping with decision-making, making sure that more sustainable agriculture practices will be supported to benefit both the environment and society.

The research question of this paper is: *What field forces are at play at the sustainability transition practices of organic farmers in the Netherlands?*

To help answering this research question, 9 interviews are held with farmers who have either already made the switch from conventional to organic practices or farmers who are interested in making this change in the near future. Subsequently, this research question will be fully answered with a self-made model showcasing the forces at play in the field of organic agriculture.

2. LITERATURE REVIEW

The main variables of this research paper are organic farming, sustainability transition practices and forces underlying these transitions in the practice of organic farming. This paper will be mainly written upon Lewin's Field Theory.

2.1 Sustainability

Sustainability itself is a development which fulfills people's or companies' current requirements without constraining the requirements of future generations (WCED, 1987) and should not be confused with 'responsibility' or corporate social responsibility practices (CSR). Responsible practices, for example, could still harm surrounding environments or disrupt traditional lifestyles, resulting in perfunctory measures. The biggest difference is that CSR is also focused on the current situation, while sustainability is really focused on the future, by using natural resources and trying to create value for the long-term. In businesses, sustainability practices are implemented to reach these goals and become more sustainable over time, or to at least stay on the same level as in the past, while also aiming for profits (Bansal and DesJardine, 2014). A landmark study of 400 executives showed that almost 4 in 5 executives preferred quick earnings and short-term targets over long-term value creation (Graham et al., 2005). Besides, many practices creating long-term value are still overlooked, according to Dasgupta and Maskin (2005), and this could also apply to farmers. As mentioned in the introduction, Notarnicola et al. (2012) state that several global issues, such as climate change, soil quality, energy use, biodiversity losses and water scarcity and quality were all detected in studies on agricultural systems, and thus harming the environment, while food production is even expected to increase by at least 50% to keep up with population growth (Muller et al., 2017). This makes ensuring sustainable development one of the most pressing priorities in society (Dotsenko et al., 2021) and shows the need for transitions.

2.2 Lewin's Field Theory

A theory that can help displaying this need for transitions is Lewin's Field Theory. This theory notions a 'field' in which different actors are at play at both individual and group level (Kump, 2023). This field encompasses both the individual's attributes (knowledge, attitudes, physical features, etc.) and the environment's characteristics. At the individual level, Lewin assumes that there is a psychological field which consists of coexisting facts at one specific time (Burnes and Bargal, 2017; Burnes and Cooke, 2013; Lewin, 1943, 1946, 1951). At group level, there is a social field consisting of the group and its environment as it exists for the group at a particular time (Lewin, 1951). This group consists of a set of actors relying on one another to accomplish particular goals (Lewin, 1939, 1951), and interdependence is what makes this group unique. All behaviour is a function of an actor's current field at a given time, with different field 'forces' driving behaviour. The combination of all these factors influence actors' behaviour and determines why, in this case, sustainability transitions happen (Kump, 2023). Usually, there are several forces in a psychological or social field, which is why change, such as sustainability, will only occur when forces in favour of the change are stronger than the forces opposing them (Lewin, 1947), making this theory very useful to use for this paper, since a model is made displaying all the forces driving and opposing sustainability transition practices among Dutch organic farmers in transition and beyond. Actors, in this case (organic) farmers, do not need to be conscious of these factors, nor reflect on them. At both individual and group level, these field forces can be intrinsic and extrinsic (Lewin, 1946), which is also showcased in the model in the results section.

2.3 The State of Organic Farming

2.3.1 Definition of Organic Farming

A comprehensive theory on organic agriculture or description of what organic agriculture exactly entails is very hard to give, since there are multiple names, ideologies and definitions of this practice (Stanhill, 1990). These ambiguous meanings and lack of common language and conceptualisation make it difficult to analyse its benefits and problems (Seufert et al., 2017). However, it is widely known that it is a way of practicing farming where a reduced environmental impact is accomplished (Tilman, 1998). According to Rigby and Cáceres (2001), it is also a way of farming accompanied by rules and laws about the management practices, to really distinguish organic farming from conventional farming, and this is the main place where organic agriculture is defined today. That is why the purpose of organic agriculture should be made extremely clear in the legislation and rules. If its main goals would be food safety and residue-free food rather than process standards, those rules should specifically include product criteria, but if the purpose of it would be to remain true to the original principles of organic agriculture, those regulations should incorporate more environmentally sound best practices (Seufert et al., 2017).

2.3.2 The Role of Organic Farming in the Netherlands

Organisations like FOAM and Codex Alimentarius try to create global standards that serve as basic requirements regarding organic agriculture, but these standards may be supplemented by other national or private standards. These regulations generally describe which activities are required (e.g. rotating crops or outdoor access for livestock) and which activities and substances are prohibited to use (e.g. synthetic pesticides, weed killers, genetically modified products or using ionising radiation to treat food). In 2019, 187 countries had organic farming activities, which made up to 72.3 million hectares of land, making about 1.5% of the agricultural land in the world organic with 3.1 million producers in total (Willer et al., 2021). Europe made up 22.9% of those 72.3 million hectares, and the share of the Netherlands in this was 68,068 hectares, meaning 3.7% of the total agricultural land was organic with a total of 1867 organic producers, showcasing a significant growth of 6.7% compared to its share of organic agricultural land in 2018 (Willer et al., 2021). Since organic farming brings several positive effects, and the share of organic farmers in the Netherlands is close to 4%, it introduces the question as to why this share is still so low, and what things prevent conventional farmers to make the switch to organic farming.

2.4 Sustainability in Organic Farming

2.4.1 Potential Disadvantages of Organic Practices

It is sometimes questioned whether organic farming is really that sustainable at all (IAASTD, 2009). The main problem of organic agriculture is that for the same amount of production levels, more land is needed. According to Muller et al. (2017), switching to 100% organic farming would result in an increase of land use between 16-33%, based on assumptions of low or high yield gaps. This directly results in another disadvantage, namely deforestation, which will also increase between 8-15%. Another main disadvantage of organic agriculture is the soil erosion potential, which increases between 10-20%, also directly resulting from the increased use of land (Muller et al., 2017). When having an organic farm with crops being grown in a green way, the average yield on the crops will reduce, meaning that more crops must be grown for the same profits (De Ponti et al., 2012). In resource-poor areas, this is especially a big problem,

since there are less resources available meaning the sustainability goals cannot be reached as easily (IAASTD, 2009).

2.4.2 Positive Sustainable Impacts

Conversely, organic farms significantly reduce the nitrogen leaching compared to conventional farms, since they generally use more land for their livestock, but less external inputs like pesticides or harming fertilisers (Halberg et al., 1995; Mondelaers et al., 2009), meaning the environmental and ecological consequences are less harmful. Optimally, a new way of increased crop production has to be found while simultaneously sustaining the whole process, meaning an efficient way of using and reducing the use of water, nutrients and especially agricultural chemicals is needed (Foley et al., 2011). This shows that there is still a lot of space for improvement regarding sustainability practices and its research in the field of organic farming, which is extremely important for the environment and its consequences with a growing population worldwide.

2.5 Forces Driving and Forces Opposing Organic Farming

Drivers among farmers to become organic, and thus more sustainable, were identified in a study conducted with 13 organic farmers and 52 conventional farmers by Fisher (1989). He found that organic farmers had multiple motives for the switch to organic practices. Using fewer inputs, working together with nature and an intrinsic satisfaction were mainly named, but also the profitability was important. However, some constraining forces coming out of this study were the existence of binding conventional contracts and high levels of debt coming with becoming organic. Another study, conducted by Lockeretz and Madden (1987), found that organic farmers were mainly concerned about the welfare of their own families, their livestock and themselves, which was the main driving force among them to be farming organically. Conacher and Conacher (1982) found that organic farmers mainly farmed organically simply to avoid the harming effects caused by synthetic chemicals, as well as their high costs, to reduce soil and water pollution. Darnhofer et al. (2005) found that switching to organic farming was mainly done by farmers who were not necessarily aiming for income maximisation, and explicitly not done by farmers who thought organic farming to be 'more intense' than conventional farming. They also stated that rules and regulation could have a constraining effect for the transition among farmers. Lastly, some other significant forces found with the use of a decision tree on farmers by Fairweather (1999) were that some farmers just never really thought about organic farming, some could not find feasible products to grow organically and others were prevented to change by family commitments and mortgage.

2.6 Nitrogen Problem in the Netherlands and the Relevance of Organic Farming

2.6.1 Nitrogen Emissions in the Netherlands

Within the European Union, the Netherlands' agriculture has one of the most intensified production systems, with exceptionally high nitrogen emission surpluses, harming its environment (Brouwer and Hellegers, 1997). These surpluses in nitrogen emissions are a really big problem due to high discharges coming directly from the agriculture section. More than 60% of the total land in the Netherlands is being used for agriculture, and the vast majority of it is farmed intensively as well (Oenema et al., 1998; Oenema et al., 2005). Nitrogen emissions into the atmosphere mainly come from NH3 and NOX, and according to the Centraal Bureau voor de Statistiek (CBS), 86,0% of the NH3 emissions, which are being formed when urea from the urine of farm animals reacts with the enzyme urease from the faeces of the cattle in so-called 'slurry', comes from the agriculture sector in the Netherlands. This is already ten times more than private households, coming in second with only 8,6%. This shows that the high amount of nitrogen emissions and the 'nitrogen problem' coming from this are mainly caused by the agricultural section in the Netherlands.

2.6.2 Relevance of Organic Farming and Its Driving and Opposing Field Forces

With agriculture being the main source of these surpluses in the Netherlands, and the major 'nitrogen problem' being caused by this since far too much nitrogen is being emitted (Centraal Bureau voor de Statistiek, 2023), the importance and relevance of knowing which forces are at play regarding sustainability practices in the field of organic agriculture are highlighted, since that way of farming significantly reduces the N-surpluses and pesticide use (Muller et al., 2017), and thus could play a big role in 'fixing' the nitrogen problem and saving the environment as a whole. Therefore, it is seen as one of the main solutions for this significant problem, among several other problems, as already mentioned in the introduction of this paper.

3. METHODOLOGY

This paper's primary objective is to investigate which forces are underlying sustainability transitions among organic farmers in the Netherlands. In this section, the way that the data has been collected, analysed and used for the results section to answer the research question: *What field forces are at play at the sustainability transition practices of organic farmers in the Netherlands?* will be explained in further detail.

For this study, a qualitative study approach has been selected. This means the research strategy is rather focused on words than quantitative data when collecting data (Bryman, 2008). Specifically, a semi-structured interview approach was chosen, meaning questions are made up in advance, but the conversations may vary based on a certain amount of freedom given to the interviewee (Fylan, 2005). When trying to investigate one's experience in a certain field, in-depth interviews are held where open questions are asked to the interviewees, giving them a lot of freedom to elaborate on the specific topic they're experienced in (Hammersley, 2012), which is why this strategy approach has been chosen. With open questions, the interviewees in this case are given the chance to broadly tell about their experiences and opinions on the topic of transitioning to organic and sustainable practices as a farmer in the Netherlands.

3.1 Data Collection

The data collected in this research paper comes from 9 interviews. Most of the (organic) farmers' contact details were found on the internet when searching for 'biologische boeren in Salland', which translates to 'organic farmers in Salland'. Then, on certain websites or Facebook profiles the email addresses of some farmers were found and a formal email was sent, explaining how they were found, the reason the email was sent, the objective of this research and some legal obligations, such as the notice that the interview contained little personal questions, but had to be recorded nevertheless for educational purposes (analysis of the data). Some of the farmers were also contacted after their contact details were given by one of the first few interviewees.

The interviews were semi-structured, making sure the interviewees were asked open questions, meaning not only giving them the opportunity to give broad and well-explained answers, but also giving each interview the chance to be slightly adapted to specific answers from every individual interviewee (Fylan, 2005). All of the interviews were conducted in real life, and the audio of the interviews were directly recorded with the app 'Voice Memos' on an iPhone X.

3.2 Sample Group

The interviews were conducted mainly with farmers who had already switched to organic farming, ensuring they had great motives behind their sustainability transitions and a lot of information to tell. However, farmers who were still (partly) farming conventionally, but were in the middle of the process to become organic, were also connected for an interview.

Farmers who were eligible for participation in this research had to meet these requirements:

- They were Dutch and farming in the Netherlands;

- They were organic farmers at the moment of interviewing, but had switched their farm from a conventional farm to an organic farm in the past, or they were in the middle of the process of switching from conventional to organic farming.

Table 1 shows an overview of the sample group, the types of farms and the interview lengths:

Table 1. Characteristics of the interviews with the farmers

Interview no.	Type of farm	Duration of interview
IP1	Organic dairy farm	00:52:57
IP2	Organic mixed farm	00:53:58
IP3	Organic farm in horticulture	00:42:14
IP4	Dairy farm (in transition to organic)	00:56:48
IP5	Organic dairy farm	00:56:57
IP6	Organic dairy farm	00:43:03
IP7	Organic arable farm	01:02:56
IP8	Organic dairy farm	01:22:33
IP9	Organic dairy farm	01:27:47

3.3 Data Analysis

After conducting and recording all the 9 interviews, which all on average had a duration of approximately 1 hour, the first step of the data analysis was transcribing all the interviews. This is done in order to ensure that further analysis can be done properly. The biggest part of this was done manually, but the last few interviews were transcribed with the help of Amberscript, which is an online transcription tool. Since manual transcription is more accurate than an automated transcription done by an online tool, those transcriptions were still checked and corrected manually where necessary. The interviews were held in Dutch, meaning the transcripts were written in Dutch as well.

After this, the coding process started. This was mainly done in English. First, through deductive coding, several categories were created along with multiple associated subcategories. Deductive coding means that the literature review done prior to the data collection is a conceptual framework for the study, explaining the main things that need to be examined (e.g. key factors, key variables and constructs) and their interrelationships (Pearse, 2019). Then, a first 'code book' can be made which is based on the conceptual framework (Crabtree and Miller, 1992), where the different codes are subsequently granted a label or name. This was done in an Excel file. Based on these codes, interview questions are asked and data is collected (Pearse, 2019). For analysis, the codebook is used when analysing the collected data, where it is revised whether codes do or do not appear in the data (Boyatzis, 1998). This means that all noteworthy statements that had anything to do with either driving or opposing transitions towards sustainability among organic farmers, as well as recommendations, conflicting forces and potential forces, were highlighted and appointed to a category and an associated subcategory.

After this process, inductive coding also took place. This is the process where significant themes and topics are revealed through repeated analysis and comparison of the raw data (Chandra et al., 2019), which can come from different sources, but exclusively coming from interviews in this paper's case. Finally, a model emerges from all the codes, which are created when marking passages and sentences of the text from the raw data with a code for the inductive analysis, combined with the codes created earlier from the deductive analysis. Both deductive and inductive coding were used for this paper, which is done to benefit from the strengths of both approaches, ultimately resulting in a more thorough and perceptive analysis.

Finally, after coding all the transcripts, a model was made displaying all forces driving and opposing transitions towards sustainability practices among organic farmers, as well as conflicting forces, based on Lewin's Field Theory. In the results section, these subtopics are all explained in greater detail, along with other potential forces and recommendations named by the interviewees.

4. RESULTS

The findings from the interviews have a dual aspect to them. Since organic farmers and farmers in transition to organic farming were both interviewed, they told about the driving and opposing forces they experienced during that transition period, which was already a big thing for most of them, but the driving and opposing forces underlying any further sustainability transitions after having become organic already, were also discussed thoroughly. The forces displayed in the model in figure 1 are therefore underlying sustainability transition practices experienced by Dutch organic farmers in transition and beyond.

During the coding process, 7 different categories with associated subcategories were distinguished. Those 7 categories are 'farmer in general', 'knowledge and education', 'environmental concerns', 'market and economics', 'challenges and barriers', 'conflicts' and 'other findings'. Most of the forces are either driving or opposing sustainability transition practices, however, some of the forces are doing both.

The results from the category 'other findings' are not displayed in the model, since they are not current forces underlying sustainability transitions among Dutch organic farmers. However, some examples of them will be discussed.

4.1 Farmer in General

This category is about the farmer in general, and thus the person itself. For this category, 5 subcategories were found after inductive and deductive coding, being 'intrinsic motivation and interest', 'friends, family and colleagues', 'peace of mind in job', 'acknowledgement' and 'responsibility'.

The first driving force, about 'intrinsic motivation and interest', was actually named in all 9 interviews and was one of the most popular forces driving sustainability among the farmers. Two quotes displaying this the best were: *"There was nobody who advised us to become organic. That purely comes from within ourselves."* said by IP9, and: *"This is a funny example: I was the first organic grower of gladioli in the Netherlands. Because there was a conventional grower who said: "Gladiolus organic is impossible. Literally, impossible.". I thought: "Huh? Impossible, what kind of nonsense is that? As if that plant wouldn't be able to grow without chemistry or something.". So then I started growing gladioli."* said by IP7, showing that a strong intrinsic motivation to prove differently drove sustainability practices among them.

Another interesting and frequently named force is 'friends, family and colleagues', since they are both driving and opposing sustainability transition practices for organic farmers. A perfect

example of how the influence of close ones works out was given by IP4: *"We're in the middle of a dilemma. We want to become green, but the older generation says it's impossible and the new generation says we need to."*. The influence colleagues could have is best displayed in a statement made by IP2: *"If all those farmers start protesting at the same time and hang up that flag, and there are fifteen of them and one thinks to himself: "I'll go for organic.", I think there's a huge barrier to telling the others."*.

Peace of mind in job, meaning a calmer and more relaxed way of farming, combined with less stress coming from external parties and policies, was meant by the interviewees when mentioning this intrinsic driving force, which is perfectly and concisely described by IP4: *"And it gives a lot of peace."*.

An extrinsic driving force is the acknowledgement perceived by the farmers from the public because of having switched to organic. IP2 stated: *"If you can earn a living and you can do good for nature and get pats on the back from consumers, well then, you can go really far for that."*, showing that external acknowledgment also drives sustainability transition practices among organic farmers in a way.

Only named by IP7, 'responsibility' is still another interesting force driving sustainability practices. He mentioned: *"We are the owner of a big part of the Netherlands, to say it like that, so we do have a form of responsibility to realise a certain form of basic nature that fits with agriculture."*.

4.2 Knowledge and Education

For this category, 3 subcategories were found after inductive and deductive coding, consisting of 'education', 'sharing of knowledge by others' and 'lack of knowledge or interest'. This category is about the role of knowledge and education driving, but definitely also opposing sustainability transitions among (organic) farmers.

Education explains the positive, but mainly the constraining effects it has had on becoming organic and more sustainable. *"We were trained to become a conventional farmer. And organic farming, yes, they told something about it, but those were 2 paragraphs in the book. So you have to find out on your own."*. This statement made by IP4 shows that, especially when the current generation of farmers grew up, education lacked the subject of sustainability. This was said by more of the interviewees, showing its significance as an opposing force. However, the right education could also have a driving aspect to it, according to IP1: *"After that I observed some colleagues and also studied organic farming myself."*.

The 'sharing of knowledge by others' has been very helpful for most of the farmers, especially knowledge of fellow (organic) farmers who could show the right way of working sustainably. However, courses and magazines written about organic farming were also very helpful. IP1 said this about it: *"Farmers learn best from other farmers or other examples. So, if I observe other farmers and look at how they do things, you can take something out of that."*. The positive influence of courses and magazines on sustainable practices in organic farming are explained by IP5: *"I always say you never stop learning, you always absorb new information, at least if you are open for it. Could be in a form of education and following courses, but newspapers, magazines and trade journals also contribute to this."*.

A 'lack of knowledge or interest' on the side of farmers is a straightforward intrinsic opposing force, also named by some of the interviewees. One example of this given by IP6 is: *"And there will be some saying: "I am not even going to read that, because it does not interest me.". It has to fit you in some way."*.

4.3 Environmental Concerns

This category also consists of 3 subcategories found during coding, existing of intrinsic driving forces only. These are forces covering the concerns farmers have regarding the environment and nature, namely 'improving biodiversity', 'animal welfare' and 'improving nature and lowering ecological footprint'.

Improving biodiversity in the Netherlands has been named in almost every interview. It is often named as a very important goal to strive for. IP3 said: *"Among farmland birds or so, 80% is simply gone. And among some beasts, in some cases, it is much worse. They are completely, or almost completely gone. So those changes are huge and I think there is a lot to be gained there."*, while IP1 said: *"I do see that the way we run this farm, that you're trying to produce food and provide a beautiful environment, and an environment with a lot of biodiversity where there's also room for other wild plants, herbs, trees and a cow that produces slightly less milk, but which is an old breed that occurs here."*.

Taking care of your livestock and ensuring 'animal welfare' is generally seen as a must in the eyes of organic farmers. It definitely plays a role in catalysing the process of becoming more sustainable. IP4: *"But in the end of the year, you actually should look at: how much grass did we produce, do we have enough for my cows? And will my cows give good milk? And won't they get sick?"*.

Another driving force, almost speaking for itself, is 'improving nature and lowering ecological footprint'. This entails taking better care of nature and reducing the ecological footprint by using less harmful products and services. IP7 made some interesting statements about this: *"We want to improve in terms of environment, nature. And so, yes, it is kind of ingrained in what we want with this company."* and: *"In fact you swear off the chemical pesticides and fertilisers, because you are not allowed to, or you don't want to use them."*.

4.4 Market and Economics

This category is about the market and economics in the Netherlands, and not surprisingly, consists of both extrinsic driving and extrinsic opposing forces. 6 subcategories were found during the coding process, and especially the role consumers play in this part has been deemed significant. The subcategories found were 'consumer demand', 'consumer behaviour', 'production costs compared to turnover', 'stability of the organic market', 'quality labels' and 'salary'.

Consumer demand for organic products is very low. As stated in section 2.3.2 of the literature review, only 3.7% of the total agricultural land was organic in the Netherlands in 2019. This low number of organic farmers was confirmed by some interviewees, and they blamed the low consumer demand. IP7: *"The demand, that is incredibly important for organic farmers. You need to have demand equilibrium, or supply and demand equilibrium. And that is, that is not a closed case."*. IP1 said the following: *"At the moment, no new farmers are allowed to the cooperative, because, actually, because the market is already covered."*. However, IP6 stated: *"I became organic because I think the market is more stable, and because demand is increasing."*, showing it is also a driving force for some.

The opposing force 'consumer behaviour' is actually closely related to the previous one, but covers the broader aspect of consumers behaving and acting in a way where they do not really see the value of organic and sustainable products, regardless of the price, better explained by IP3: *"And it is also very worthless: worthless. Everything must always be there, and how it is made, people are very limitedly involved with that. Because those*

farmers will really change if at a certain point the demand is that we no longer just want cheap chicken, but we want something nicely made, a certain fruit or vegetable: they will do it immediately.".

Production costs of organic products are generally higher than the production costs of conventional products. So, the 'production costs compared to turnover' often do not add up, making it an opposing force, explained by IP1: *"And on average in agriculture, the yields are actually too low for the labour, input and the capital risks you take. That is actually not proportional to the yield."*. Another example of this force was given by IP9: *"At a certain point you have to start feeding your cows organically, but the milk is not organic yet so you don't get the organic price yet. […] So concentrates were one and a half times the price since it had to be organic. But the selling price that half year was still regular and that was about 26 cents per liter of milk, so it costs you, well, about 50. And so, the yield was only half."*, showing that the production costs compared to turnover is especially a big problem within the transition period of becoming organic for farmers.

For organic products, the stability of the market is better compared to the market of conventional products, stated by IP6. This is actually one of the reasons he became organic: *"I expect a more stable milk price in my case or meat price because you don't produce for the world market, in our case."*.

Organic products have an organic 'quality label', while there are also labels for products which are, in some way, more sustainable than 'normal' conventional products. This force was not named as a force driving the switch to organic farming, but was named as a driving force to improve some practices after already having become an organic farmer, by IP5: *"The dairy also came my way that I could participate in the 3 stars Beter Leven label from Dierenbescherming. […] I looked through it and it turned out I did not have to change that much in my company to enter that programme. So I met those requirements and since September of last year, we participate in that programme."*.

Based on the previous few forces, 'salary' as a driving force may appear somewhat unusual, but it was still named once, by IP8: *"I think it's a pity, a real pity, that many organic farmers don't eat organic, because then you started farming organically just for the economy and the money, and not for the other reasons which are much more important, and I think that's a pity."*, showing that quite some organic farmers do not even rate 'organic' that high themselves, and that the money plays a big role for them.

4.5 Challenges and Barriers

This category is about the main challenges and barriers and therefore almost only exists of extrinsic opposing forces. This is the biggest category, since 10 subcategories were found. 'Finances and resources', 'uncertainty', 'policies and regulatory barriers', 'finding sufficient suppliers', 'finding market for organic products', 'external cooperatives and institutions', 'structure of the current food industry', 'few good examples and little information', 'Dutch capitalism' and 'mental challenge' were these 10 subcategories found during the coding process.

Big financial investments and a lack of resources, coded as 'finances and resources', was a popular force opposing sustainability practices during the transition period, as well as afterwards. As IP4 said: *"But you need to have a lot of land, and buying land costs a lot of money. And that is an unpleasant thing holding agriculture back to make that switch."*. IP9 confirmed this by saying: *"I would like to switch from slurry to solid manure. So, a barn with more straw or with residual streams from a nature reserve, for example. […] But yes, that requires a major investment."*.

Uncertainty about various things like money, feasibility and the organic market was named by many interviewees as something that was a hard thing to cope with. *"The biggest disadvantage, yes obviously you're going to change your whole business, so you have to learn a lot, because you can prepare very well, but there will always be aspects that will overwhelm you and you need to manage that, so you can call that a disadvantage. There is just a lot of uncertainty, which is bigger in the area of pricing and on the technical side, yield levels, well you can call that a disadvantage as well."* was said by IP7 about this.

Policies and regulatory barriers of the government or other external parties were often called 'constraining' and are another opposing force at play. However, there were also some positive aspects in policies driving sustainability. A constraining policy was explained by IP5: *"Partly due to certain policies, farmers have been pushed in a certain direction, investing conventionally, conventionally adding a piece to the stable, and yes, banks have benefited from that."*. However, according to IP8, policies have also stimulated sustainability: *"And the government has now abolished that, in the next 4 years it will be phased out that conventional farmers are allowed to apply less manure to the land. Everyone disagrees with that because they just want to apply more manure on the land, but I'm actually glad the government has pushed that, because in that way you force the farmer to look at his own business in a different way."*.

As for suppliers, some farmers experience that there is a lack of suppliers providing sustainable products to them, making it hard to 'find sufficient suppliers', for example for concentrates for their cows. The following was stated by IP1: *"At this moment for example we supply concentrates, so those are actually grains. Well, they actually come from all over Europe, so from Spain, Ukraine and Germany, France, but ideally you would like to have a kind of local cycle, that you grow all of that locally."*.

The difference between the force 'finding market for organic products' and 'consumer demand' is that in agriculture, many farmers often sell their products (such as dairy products) to a cooperative, such as FrieslandCampina in the Netherlands, where many of the interviewees sold their milk to as well, instead of directly to consumers. This means they are often directly dependent on this, and indirectly dependent on consumer demand. However, as stated in section 4.4, they do not always allow new organic farmers, constraining sustainable growth in organic agriculture. IP3 also said this about finding market: *"Of course the whole transition, it's searching for market if you will do it. […] If, at a certain point you say: we're going to grow zucchini now, or whatever, or broad bean, or whatever, then you have to find someone who is willing to buy that from you. And it obviously takes a long time before you actually find a stable market for all those products."*.

External cooperatives and institutions have a lot of power in the food industry, according to the interviewees. They sometimes use that power to drive further sustainability practices, but they also constrain this. An example of this force driving sustainability for one farmer, but constraining it for others was given by IP2: *"And they also blame the bank. We actually never experienced that back in 1994. We had a senior client, a man, who was very open to the question: what is that? And he came looking very often, just out of curiosity. And last year he was here once again, when cycling. And then we told him: well, it was always nice that he was like that."*.

The 'structure of the current food industry' in the Netherlands, is also constraining farmers to become organic and more sustainable, since it is built upon farming conventionally and gaining as much profits as possible, which IP1 explained very well: *"It is also a bit misused by supermarkets and so on, to make an extra margin on those products. For example with eggs. An organic chicken farmer gets 8 cents for an egg, an organic egg. And the supermarket sells it for 50 cents."*.

Since only a small part of the farmers in the Netherlands are organic, some interviewees experienced a lack of sufficient help and felt like they only had access to 'a few good examples and little information' about sustainability and organic farming. IP5: *"Yes, well, in any case, when I switched I couldn't go to many addresses. Not to the bookkeeper and not to the neighbours, because they aren't organic. Neither is family, no one is organic."*.

According to IP8, 'Dutch capitalism' among a lot of Dutch people is a big force opposing sustainability transition practices, not only in the agricultural section, but in the whole country: *"And that may be at the expense of our prosperity, but not at the expense of our global prosperity. And that is capitalism, we only think about our own prosperity in the Netherlands. BV Holland has to grow, but I think there's a bit of a limit to our growth. And a lot of people don't want to accept that yet."*.

Switching from conventional farming to organic farming is bigger than it seems. It could be a real 'mental challenge' for farmers, since they have to totally change their way of working, and let go of potential profits as well. IP5 described it this way: *"Yes, that might be mentally. I always say farmers who want to switch to organic, they first need to be ready mentally. Mentally, it is quite an impact. With that I mean that if you don't strive for the maximum, you have the feeling you're missing something. You produce less products, so you get less revenue. So you leave money, freely translated. Well, if you've had a conventional education, you won't score with that."*.

4.6 Conflicts

This category is about the conflicts occurring when farmers want to switch to organic farming and become more sustainable. During the coding process, only one very obvious conflicting force was found, namely the conflict of 'profits versus sustainability'.

After detecting all the previous forces, the big conflict coming out of them is the trade-off between maximising profits and working as sustainably as possible. Two examples displaying this are: *"The more you take nature into account as a farmer, the less yield you get from your land."* said by IP8, and: *"Look, if I don't earn anything, my company doesn't exist. But if I go much further in sustainability, then I won't earn anything and my company will no longer exist either. So you have to find a balance between your sustainability goals on the one hand and having a profitable company on the other."* said by IP1, summing up the conflict of profits versus sustainability efforts.

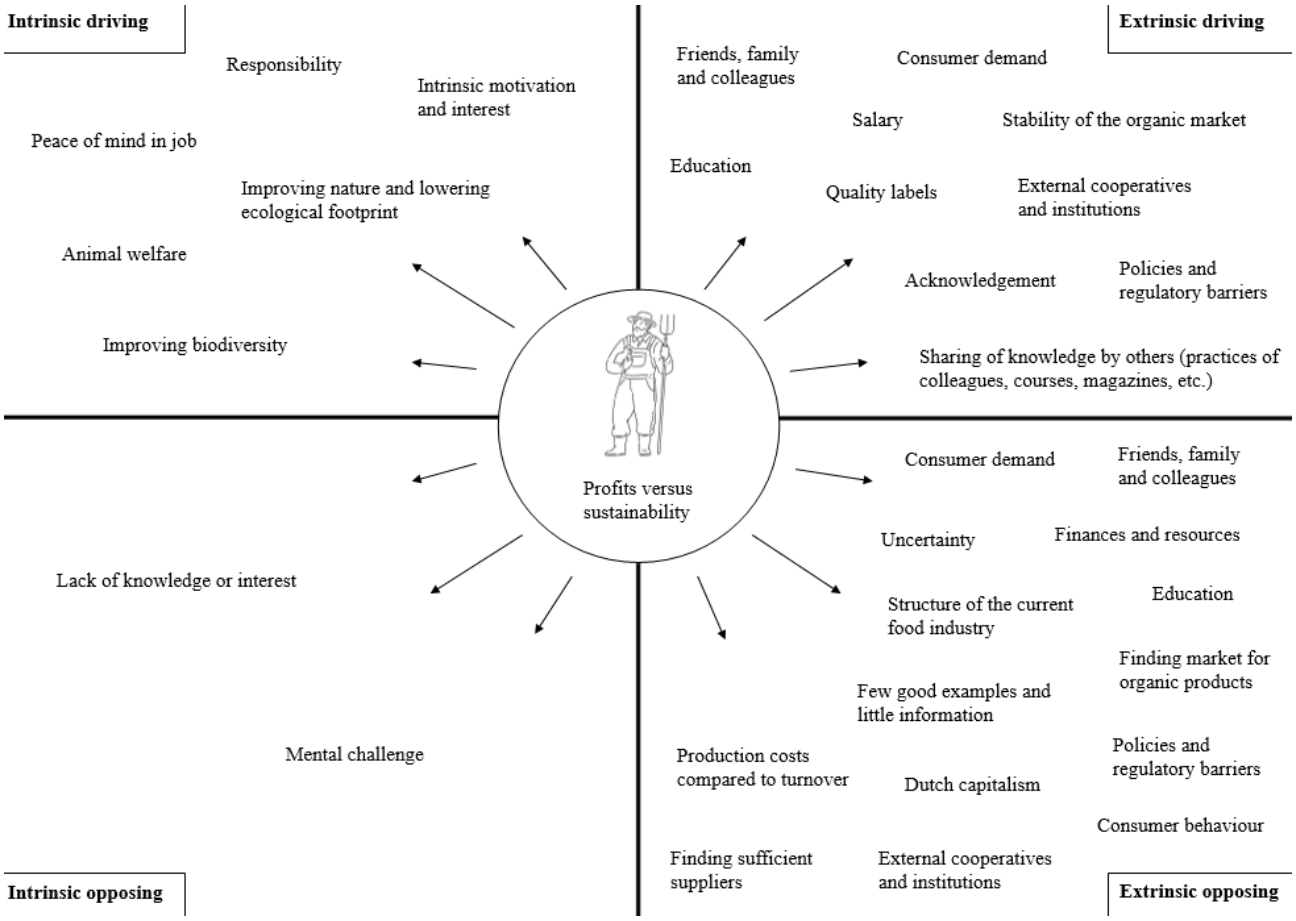

Figure 1. Model of forces underlying sustainability transition practices among organic farmers in the Netherlands: in transition and beyond

4.7 Other Findings

Besides the forces already influencing sustainability transition practices among organic farmers in the Netherlands currently, a lot of recommendations and potential forces were also named. Those recommendations were mainly about how changes in policy and better education could drive sustainability further, which is showcased by this statement of IP8: *"If the consumer does not want to pay for it, perhaps the government should pay for it by taxing conventional products or reducing the tax on organic products."* and this statement of IP2: *"So that buyer and the government should provide much more information about organic and those trade journals."*. Other recommendations named were the use of fundings, stimulating a sustainable lifestyle with a reduced impact, the need of lobbying for organic farming, conducting more research on sustainability in agriculture, lowering the birth rate in some way to lower the overall consumption, improving cooperation within the whole industry, creating a market where farmers are pulled by an increased consumer demand, and the Dutch government needing to find a solution for people who have to go to the food bank, so that everyone can participate in the process of becoming more sustainable.

Some other significant findings mentioned by the interviewees that cannot be left out are the fact that many of the farmers interviewed provide information about their way of working to others, for example during open days, to help them or inspire them about organic farming and farming in a sustainable way. Also, the big gap that exists between conventional farming and organic farming, the fact that agriculture is an interplay of forces between multiple players without enough cooperation, and some future expectations on agriculture were mentioned. For example, two positive statements about future expectations were: *"I think it will turn out a bit more towards that in the future: more diversity and more, at least milk flows, and also more opportunities to issue a certificate, and thereby improving the price."* said by IP5 and: *"I think fewer and fewer chemical pesticides will be needed because the knowledge in organic agriculture is also improving, meaning certain pests can also be prevented or combated, and that you need much less chemicals as a result."* said by IP6. Finally, an example of the difficulty of the interplay of forces in the food industry was given by IP9: *"Still, I think we're now slowly getting to a point, that if organic were to become just a bit bigger, it doesn't have to be more expensive. That it can be found in the store for the same price. But then the question is: who decides what lies where? Well, that's where those forces and powers come into play."*.

5. DISCUSSION

The goal of this paper is to identify the forces which are underlying sustainability transition practices among organic farmers and farmers in transition to organic farming. The research question is: *What field forces are at play at the sustainability transition practices of organic farmers in the Netherlands?*

5.1 Comparison to Existing Literature

When comparing these findings with existing literature, quite some similarities can be found. Highlighted both in the already existing literature and in the results section of this research paper were, for example, the concerns about nature and environmental impact. In the final model, improving nature and lowering the ecological footprint, as well as an intrinsic motivation for sustainability practices were found, and the same was stated by Fisher (1989) about these driving forces. The findings about a desire to stop using pesticides and fertilisers to cause less damage to the environment were consistent with the research conducted by Conacher and Conacher (1982), and the intrinsic driving force about increased welfare of animals is consistent with the research conducted by Lockeretz and Madden (1987). These similarities highlight the relevance, importance and recurring themes in the motivation of farmers to adopt organic and more sustainable practices, and it can be concluded that a lot of driving forces are therefore universal. However, there were also some driving forces which were not found in the literature review, such as responsibility, acknowledgement and the stability of the organic market. These new findings display the unique context and individual motivations of the farmers interviewed in this study and expand the understanding of the motivations for becoming organic and adopting sustainable practices in general.

The force 'peace of mind', which is an intrinsic driving force found during this paper's qualitative research, contradicts with the findings from Darnhofer et al. (2005), who stated that organic farming would be more intense and therefore not preferred by farmers. However, rules and regulations having a constraining effect on the transition to organic, did correspond with their findings. When comparing more opposing forces, the high levels of debt (financial risk) being an opposing force is consistent with the research of Fisher (1989), and the concerns about family commitments are consistent with the findings of Fairweather (1999). Some other opposing forces, such as binding conventional contracts and mortgage limitations which were found in the literature review, were not found in this qualitative research. This distinction, again, highlights the importance of context and individual experience, since different farmers face unique challenges, barriers and motivations.

The findings of this research paper about forces underlying sustainability transition practices among organic farmers in the Netherlands go beyond the already existing literature by providing a more comprehensive understanding of the topic and giving more insight into understanding the motivations and challenges for farmers working in the Netherlands to become organic, and ultimately more sustainable, by having added new perspectives about the intrinsic and extrinsic forces either driving sustainability transition practices, opposing them, or both.

5.2 Academic Relevance

The main academic relevance that can be gained from this research is the understanding of the forces that are underlying the sustainability transitions in an environmentally and socially responsible way of farming, where an extensive way of working is the way of practicing the art of farming instead of using pesticides and fertilisers to gain quick wins. With the findings found in this paper, new advanced insights and understandings of the driving and opposing forces of sustainability transitions in organic agriculture are provided by understanding them better, and the theoretical framework in this field is advanced with a model showcasing all those forces driving or opposing the change towards sustainable practices in organic agriculture.

5.3 Practical Relevance

The practical relevance of this research is that the findings of this paper help farmers, governments and other important parties to understand the driving forces at play, and the benefits of organic farming, resulting in the production of healthy nourishing food while simultaneously protecting the environment, where possible. Since sustainability is quite a new, upcoming and everchanging theme, practitioners need to continuously adapt themselves and keep learning about this topic, to know which forces are at play in their field and how to manage them by developing the right strategies and implementations. The environment, economy and society can benefit from a more responsible approach to agriculture, especially in the Netherlands

due to its excessive nitrogen emissions, which can be promoted by the sustainable practices that organic agriculture offers. This makes it extremely important to know the exact forces driving this transition among farmers. The government, and specifically policymakers in the field of farming, can also use the insights from this paper for the creation and implementation of policies promoting the shift towards organic practices in agriculture. They can contribute to the development of a more resilient and sustainable food system by addressing the forces that drive and hinder sustainability transitions in the field of organic farming.

5.4 Limitations and Future Research

There are several limitations which apply to this research. At first, only 9 farmers have been interviewed, which could never give a perfectly accurate conclusion to the research question, since the sample size is not large enough to capture all perspectives and experiences among (organic) farmers in the Netherlands. Also, this research and the model created are based on forces which are at play when switching from conventional to organic farming, but also based on those farmers striving for more sustainability practices after already having become organic, creating a dual aspect to the research, since the forces solely influencing the switch to organic and the forces influencing becoming more sustainable when already being organic probably differ in some points. Lastly, multiple types of farmers have been interviewed (farmers with a dairy farm, an arable farm, a mixed farm, organic, in transition, etc.), meaning that for future research, a bigger sample group could be used for the qualitative research, the two different aspects of this research could be examined separately and studies could also be done separately on all types of farmers in order to get more accurate findings and models for all these aspects. Also, the 'strength' of the forces could be measured by capturing the amount of times those forces are mentioned during the interviews, and a model could be made based on all forces and their strengths for a deeper understanding of the forces and their exact relevance in the field of organic farming. Despite these limitations, this study still provides good insights into the forces which either drive or oppose sustainability transition practices among organic farmers in the Netherlands in transition and beyond, and thereby offers a starting point for future research in this field.

5.5 Conclusion

In total 16 driving forces were discovered, as well as 16 opposing forces, of which 5 forces were found to be both driving and opposing sustainability transitions. Also, 1 main conflict was found. These findings suggest that organic farmers, or farmers in transition to organic, are intrinsically mostly driven by personal and environmental aspects. An intrinsic motivation and interest, a peace of mind in the job of organic farming and a form of responsibility were all named as driving forces. As far as environmental concerns, the farmers feel responsible for treating the environment in the best way possible by improving biodiversity, taking care of animal welfare and improving nature by reducing their ecological footprint. For the extrinsic driving forces, the perceived acknowledgement and the sharing of knowledge by others were important for many farmers. At last, some market aspects, such as the stability of the organic food market, quality labels for organic and sustainable products and a higher salary were also named as forces driving sustainability transition practices.

For the opposing forces, only 2 intrinsic opposing forces were found, namely the mental challenge involved when making the switch to organic farming and the lack of knowledge or interest. Mainly, external challenges and barriers which the farmers had experienced themselves, or which they had heard from other (conventional) colleagues, were identified. These challenges and barriers consisted of restrictions in finances or resources, uncertainties the farmers had to deal with, and finding sufficient suppliers or a sufficient market for their organic products, but also the way that the current food industry works was deemed to be a constraining force (supermarkets often ask way too much for organic products). The higher production costs of organic farming compared to a lower turnover, a lack of good examples, the Dutch capitalist mindset and consumer behaviour were also mentioned as extrinsic opposing forces.

The 5 forces which were both (extrinsically) driving and opposing sustainability transition practices in some way were the influence of friends, family and colleagues, which could be positive, but surely also negative (e.g., having an old-fashioned farmer as father often has a negative influence on sustainability transitions), the role of education (which especially in the past was mainly targeting conventional practices, but nowadays also covers organic aspects), consumer demand (which is deemed as way too low by some, but was a reason to switch to organic production for another), policies and regulatory barriers (which can be both beneficial and constraining to sustainability in agriculture) and lastly, the influence of external cooperatives and institutions.

In conclusion, the findings from this research paper indicate that sustainability transition practices among organic farmers in the Netherlands are driven by a combination of intrinsic and extrinsic driving and opposing forces. The complexity of the interplay of all these various forces are highlighted in figure 1 in the results section. Understanding and addressing them are important for successful sustainability transitions in (organic) agriculture, being crucial for the food industry in the Netherlands.

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