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Sustainable dairy farming in Gelderland

Obstacles dairy farmers experience in the transition to become more sustainable



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Abstract

The nitrogen crisis in the Netherlands is an issue that a lot of sectors experience trouble with. The sector that is targeted the most is the agricultural sector. For a small country such as the Netherlands, there are a lot of farmers on a small piece of land that together emit a lot of nitrogen. So something has to be done to bring the amount of nitrogen down and the government wants to greatly reduce the amount of farmers. Another possibility for farmers is the convert to a different way of farming, a more sustainable one. Farmers in the Netherlands do not all agree with this and have therefore often revolted recently.

The goal of this thesis is giving the farmers a voice in the debate of sustainability and try to get a better understanding what the problems they run into when becoming more sustainable. For this, the following research question is formulated: *What are the obstacles for dairy farmers in Gelderland when trying to convert to a more sustainable way of farming?*

To answer the research question, qualitative research is conducted. In total, thirteen interviews have been conducted, of which eleven farmers and two employees of the working field. From the research results, it appears that the biggest obstacles farmers experience is the uncertainty in government policies and the market that is not ready for more sustainable products. What was also surprising is that the interviewed farmers were already way more sustainable then thought beforehand. In this research the Theory of Planned Behaviour was used. The most important factors that have influence on the behaviour of the farmers are Attitude, Knowledge and Policy.

The research results can be explained by the misunderstanding between the farmers and the government. The government sets impossible goals for the farmers to become sustainable in a unreasonable pace, whereas the farmers are not against becoming more sustainable but get no clarity from the government causing the process to stall. Follow-up research could cover a wider range of farms, investigate it in a bigger area or even compare the situation in the Netherlands to other countries. This could also improve the generalisability of the research because for this study, due to the specific target group, it is not high.

Table of contents

Abstract	1
List of figures and tables.....	3
1. Introduction.....	4
2. Relevance.....	6
2.1. Societal relevance.....	6
2.2. Scientific relevance.....	7
3. Research goal and question.....	9
4. Theoretical framework	10
4.1. Theory.....	10
4.2. Conceptual model	12
5. Sustainable farming methods - literature research	15
5.1. Sustainable farming.....	15
5.2. Organic agriculture	15
5.3. Nature-inclusive agriculture	16
5.4. Circular agriculture	19
6. Methodology	20
6.1. Study area and group	20
6.2. Methods	22
7. Results	24
7.1. Observations.....	24
7.2. Meaning of sustainability for farmers	25
7.3. Attitudes	27
7.4. Subjective norm.....	28
7.5. PBC.....	30
7.6. Past behaviour	31
7.7. Knowledge	33
7.8. Emotions.....	35
7.9. Policy.....	36
7.10. Behaviour.....	39
7.11. Analysis.....	42
8. Conclusion	47
9. Discussion	48
9.1. Limitations of research	48
9.2. Interpretation results.....	49
9.3. Implications	49

9.4. Further research	49
10. Acknowledgements	50
11. Bibliography.....	51
12. Appendix.....	60
12.1. Questions connection to conceptual model.....	60
12.2. Interview guide farmers	61
12.3. Interview guide others	63

List of figures and tables

Figure 1 - Theory of planned behaviour (Ajzen, 1991).....	10
Figure 2 - Conceptual model	12
Figure 3- Scheme for nature-inclusive agriculture (Erisman et al., 2017)	17
Figure 4 - Map of spread dairy farms interviewed in Gelderland	20
Table 1 - Overview interviews	22
Figure 5 - Observation on the farm (own work).....	24
Table 2- Meaning Sustainability.....	27
Table 3- Attitudes.....	28
Table 4 - Subjective Norm.....	30
Table 5 - PBC	31
Table 6 - Past Behaviour	33
Table 7 - Knowledge.....	35
Table 8 - Emotions	36
Table 9 - Policy	39
Table 10 - Behaviour	42
Figure 6 - A renewed conceptual model	45

1. Introduction

There are many issues currently happening in politics in the Netherlands. From refugee issues (Kamphorst & De Vries, 2022) to a big housing shortage (Klok, 2023), the most important one right now is the nitrogen crisis (NOS, 2022). The nitrogen crisis in the Netherlands has been going on for a long time, since the 1980s (Bol, n.d.). As the amount of nitrogen in the air kept rising, the government intervened. In 2015, the government initiated the Programme Approach to Nitrogen (Dutch: Programma Aanpak Stikstof; in short: PAS), to further reduce nitrogen emissions and limit their negative effects. But according to a 2019 ruling by the Council of State, the PAS is not satisfactory. Therefore, since 2019, no new highways and residential areas, for example, have been allowed to be built without compensating for the additional nitrogen emissions associated with them. This nitrogen issue is also a challenge for the agricultural sector (Plomp & Migchels, 2021). The Netherlands has high application rates in the form of artificial fertilisers and animal manure, partly due to high nitrogen imports in the form of animal feed (Bol, n.d.). Among other things, this leads to large losses to air in the form of ammonia (NH₃). In addition, nitrogen oxides (NO_x) are emitted mainly by traffic and industry.

For a small country like the Netherlands, there is on average a lot of agriculture (CBS, 2020), which also causes a lot of emissions and certainly from livestock farming (NOS, 2022). However, it is proved to be difficult to limit these emissions. In terms of value, the Dutch agricultural sector is the second largest exporter of agricultural products, after the U.S. (Runhaar, 2016). Approximately 60% of Dutch agricultural land is in use by dairy farms, which is 28% of the entire country (Hoes & Aramyan, 2022).

In Gelderland, livestock farming, and in particular dairy farming, is the most defining aspect of the landscape (Provincie Gelderland, 2020). Gelderland counts 2430 dairy farms, which ranks second most dairy farms in the Netherlands (Van Der Aa, 2023). When it comes to agriculture, the Netherlands is often seen as a leader (Ministry of Agriculture, Nature and Food Quality, 2017). The Dutch Eko label has stricter requirements than organic labels in other (European) countries (Milieucentraal, n.d.). With the target of 15% organic farming by 2030, while the EU has set it at 25%, they are setting high standards for agriculture in the Netherlands (Hanhof, 2022; Ministry of Agriculture, Nature and Food Quality, 2022). Although the standards of the European Union are even higher than the goals of the Dutch government, a big transition to more sustainable agriculture will have to take place in the coming years.

These changes will not happen by themselves and farmers will have to cooperate. With many protests and angry farmers, there still has been little consideration paid to the problems farmers have because

of all the policies that keep changing (NOS, 2022b). There are many ways for farms to become more sustainable but this is often still seen as difficult (Provincie Gelderland, 2020). Therefore, this thesis will look at the obstacles farmers face when they want to become more sustainable, in specific, dairy farms in the province of Gelderland.

This thesis is structured into several sections. Firstly, it commences with a discussion on the relevance (Chapter 2) of the research, which encompasses an examination of prior studies within the subject area of the thesis. Subsequently, the research question and the corresponding objective are presented (Chapter 3). A theoretical framework and the associated conceptual model are then expounded upon (Chapter 4). In this context, the Theory of Planned Behaviour is elaborated upon to establish its pertinence to the subject matter of the thesis. In Chapter 5, a comprehensive literature review is conducted to provide a background understanding of the topic, focusing specifically on the various forms of sustainable agriculture. The methodology employed for the research and the specific target group for the study are elucidated in Chapter 6. The findings from interviews are discussed and analyzed in Chapter 7. Chapter 8 subsequently presents the derived conclusions, followed by a comprehensive discussion (Chapter 9).

2. Relevance

As can be read in the introduction chapter, this topic is an ongoing problem, which makes it relevant to research. The relevance of this thesis is divided into two categories, societal and scientific, which can be read below.

2.1. Societal relevance

After the past election results, it became clear that farmers want their voices to be heard (RTL News, 2023). The CDA, which was always known as the party for farmers, suffered a defeat against the new party BBB (In Dutch: Boer Burger Beweging; in English: Farmer-Citizen Movement). The current policy on nitrogen (introduction, chapter 1) is not feasible in the way it is currently looked at and will therefore have to be adjusted (Nieuwenhuis, 2023). The BBB wants to change this, which has an important influence on the farmers and almost every other sector, for example, the food and residential building industry. This is going to have an impact on society, as Van der Plas suggests the cabinet might not make it (Nieuwenhuis, 2023), which makes it a relevant topic.

The nitrogen problem (introduction, chapter 1), also affects the community greatly. Farmers going on strike and blocking the roads is something that every Dutch person has suffered from by now (NOS, 2022c). The news is full of the nitrogen issue and it even makes the news abroad (Van Halm, 2022; Joyner, 2022), this does indicate the seriousness of the problem. This thesis will indicate the struggles of the farmers so that it is more clear what farmers are up against and thus prevent more demonstrations.

Government policies have changed so often in recent years that they also affect farmers' mental health. McGregor et al. (1995) reported that farmers find coping with new legislation as stressful as coping with the weather. Farmers complain that they are not equipped to deal with the administrative aspects of new legislative requirements for farming (Willock et al., 1999). Willock et al even suggested that legislation-related stress was a contributing factor in the increasing suicide and depression rates observed among farmers.

As for this thesis, it is important to acknowledge the obstacles for dairy farmers in Gelderland, so the relevant topics mentioned above can be adjusted. If the government knows these obstacles it would be easier to create a situation that is favourable for the farmer, government and the environment. As can be read in the introduction (chapter 1), there are many dairy farmers in the province of Gelderland. Which makes it relevant to perform the research in Gelderland. All in all, it can be seen that it is relevant on many different levels on a social level.

2.2. Scientific relevance

A lot of research has been done in the area of sustainable farming, nevertheless, there is still a gap to be filled in this research. First of all, the publications often do not look at all the possibilities of sustainable agriculture and are specific to one kind of agriculture. More kinds of sustainable farming are not included in this thesis, because these do not apply to the case of dairy farmers (further explanation can be seen in the literature review, chapter 5). The research of Maleksaeidi and Keshavarz (2019) and Tama et al. (2021) is great for sustainable farming research in other countries, but in the case of sustainable farming in the Netherlands, it is not the best option for the reason that these countries deal with other problems concerning sustainability, as for example the countries have a different climate and even more drought problems.

This thesis will be focussing on three kinds of sustainable agriculture, which include organic farming, nature-inclusive farming and circular farming. These are researched before, even in the context of Dutch farmers, but never in a combination for a specific area or province like Gelderland. In the article of Berentsen et al. (2012) they compare the risks of conventional farming and organic farming in the case of dairy farms in the Netherlands. However, it does not look at the obstacles when trying to convert to a more sustainable way of farming. The other two sustainable farming methods are researched by Dagevos and De Lauwere (2021) and Runhaar (2017), with the same problem of not looking at the obstacles for the specific kinds of farming. Even the research from Bewsell and Kaine (2006) about the adoption of environmental best practices among dairy farmers did not mention the obstacles. An article that is mentioning the obstacles is the article of Siebrecht (2020). However, this article is not focused on a specific kind of sustainable farming but sustainable farming in general and still does not give a good illustration of the problem.

The articles that look at the decision-making of farmers with the theory used in this thesis (Theory of Planned Behaviour) are almost always quantitative research with a survey (e.g. Tama et al., 2021; Bergevoet et al., 2004; Maleksaeidi & Keshavarz 2019). Finding research that makes use of qualitative research is challenging and (almost) impossible. With this research using a qualitative approach, a gap will be filled because the opinion of the farmers can better be grasped than using a quantitative approach. Also, while conducting a semi-structured interview, the researcher is not limited to specific questions and can ask follow-up questions to make the research more relevant and to get a deeper understanding of the topic.

It is also important to take the attitudes of the farmers into consideration, which has not always been done. The assumption that farmers are rational profit maximisers has been central to many agricultural models for many years (Edwards-Jones, 2006). However, simple observations of land use suggest that

this assumption cannot be true in all cases. Income alone is not a significant predictor of conservation behaviour; a positive attitude to the environment is also required (Willock et al., 1999). Nonetheless, several studies suggest that profit motives are stronger than environmental motives, even when awareness of environmental problems exists.

It is relatively easy and non-controversial to say that the decisions made by farmers are partly influenced by a consideration of financial returns and partly by other psychological and social factors (Edwards-Jones, 2006). But despite much work supporting this general assertion, there is little insight available on the relative contributions of financial and psychological variables in any given decision. Regardless of farmers' stated perceptions of legislation, some work has suggested that, when goals are assigned by legitimate authority, they typically influence people's personal goals and attitudes (Willock et al., 1999). Whether this is true of legislation in farming remains to be investigated.

On the other hand, Edwards-Jones (2006) suggests that many of the recent studies which utilised the Theory of Planned Behaviour as their theoretical basis for understanding farmer decision-making, placed too much emphasis on the role of attitudes in the decision-making process, and too little on the two other elements of the theory: namely 'subjective norm' and 'perceived behavioural control' (Edwards-Jones, 2006).

3. Research goal and question

As can be seen in the relevance, the obstacle for dairy farmers is a current topic, and therefore relevant, on which little research has been done. The goal of this thesis is giving the farmers a voice in the debate of sustainability and try to get a better understanding what the problems are they run into when becoming more sustainable. Which means trying to get a clear picture of the obstacles dairy farmers in Gelderland run into when trying to convert to a more sustainable way of farming. With this goal in mind, a research question has been formulated.

What are the obstacles for dairy farmers in Gelderland when trying to convert to a more sustainable way of farming?

4. Theoretical framework

4.1. Theory

A theory that fits well with this research subject is the theory of planned behaviour (TPB). This theory was developed in the 1980s by Icek Ajzen. TPB is based on the Theory of Reasoned Action (TRA), which was a precursor to the theory used (Ajzen & Fishbein, 1980). The main difference is that the TPB is more accurate in predicting the physical behaviour of a person because there is one more component involved,

Perceived Behavioural Control (PBC) (Luenendonk, 2019). PBC takes into account if a person truly believes that they have control over the behaviour which they want to carry out (National Institute of Health, 2005). TPB has been used in a lot of different fields of research but finds its origins in psychology. Nowadays the theory is more widely used in all kinds of fields and industries ranging from healthcare, politics, and even general businesses and organizations (Brown, n.d.). The TPB model can be seen in figure 1, which shows the correlation between the different factors in the model.

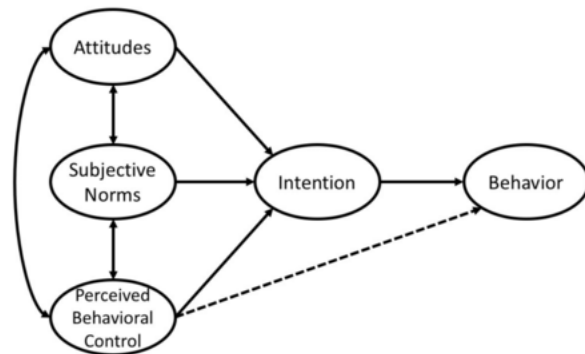


Figure 1 - Theory of planned behaviour (Ajzen, 1991)

A central factor in TPB is the individual's intention to perform a given behaviour (Ajzen, 1991). The theory postulates that individuals that have a strong behavioural intention are more likely to show a certain behaviour compared to individuals with a weaker behavioural intention. Most problems fit this requirement well, although some other factors can influence the intentions of a person (e.g., time, money, skills, and cooperation of others) (Ajzen, 1985).

Three factors influence the intentions of a person (Ajzen, 1991), namely:

- Attitudes, which means the degree to which a person has a favourable or unfavourable evaluation or assessment of a type of behaviour;
- Subjective norms are the social pressure to perform or not to perform a type of behaviour;
- Perceived Behavioural Control (PBC) is also a part of this theory. First of all, when a person is more likely to hold intention constant it is more likely to show a specific behaviour. The second reason for expecting a direct link between PBC and behaviour is that perceived behaviour can often be used as a substitute for a measure of actual control.

These three factors also influence each other and also perceived behavioural control has a direct influence on the behaviour, which means that if one-factor changes, it has an effect on the behaviour and all the other factors.

TPB has been used for a lot of research for explaining environmental intentions and behaviours (Maleksaeidi & Keshavarz, 2019). This article states that the farmers have a moderate level of knowledge about the value and strategies of biodiversity conservation, although they have a favourable attitude towards preserving biodiversity. In this research, they discovered that attitude, perceived threats of intensified agricultural, knowledge, and social and moral norms are the most relevant factors in explaining the behaviour of the farmers towards biodiversity conservation.

From environmental activism (Fielding et al., 2008) to the intention to purchase organic food (Yazdanpanah & Forouzani, 2015), a lot has been covered. Fielding et al. concluded that according to the TPB model, participants that had a greater intention to engage in the behaviour of support for environmental activism also had a more positive attitude and a greater sense of normative support for environmental activism. In the case of Yazdanpanah & Forouzani, it showed that attitude was the main factor in predicting the behaviour to buy more organic foods. The research showed that both perceived behavioural control and subjective norms were not significant factors of the intention.

TPB is not only limited to the research mentioned above but is also applicable to farmers and their (environmental) behaviour. In the literature, this theory is linked to this phenomenon a lot (Edwards-Jones, 2006; Borges et al., 2015; Maleksaeidi & Keshavarz, 2019; Bergevoet et al., 2004; Tama et al., 2021). A decision made by farmers has an influence that goes way beyond the farms' boundary and makes it an important topic (Edwards-Jones, 2006). In this case, it concerns a decision to adopt an innovation, in particular an environmentally friendly innovation (Borges et al., 2015). A positive attitude towards adoption emerges when a person evaluates that performing the behaviour has a higher probability to lead to positive outcomes (benefits) than negative ones (costs).

Something that can be read in a lot of the literature is that TPB is a good theory because it is easy to extend this theory with other factors to make it suitable for the research. Ajzen (1991) notes that TPB is essentially open to including any explanatory constructs that can be used to explain a significant portion of the variance in intention and behaviour. Tama et al. (2021) for example added Knowledge and the Perceived Threat of Conventional Farming as additional constructs. Ajzen and Madden (1986) stated that past behaviour is part of perceived behavioural control. However, the research of Van der Pligt and de Vries (1995) and Bagozzi and Kimmel (1995) showed that the total effect of past behaviour cannot be mediated by including it in perceived behavioural control; it must be added as a separate component to the model (Bergevoet et al., 2004). Moreover, TPB has been criticised for its mere emphasis on logic in behaviour formation and, also, for the vacancy of some emotional, mental and perceptual constructs which have important roles in predicting and changing environment-related

behaviours (Maleksaeidi & Keshavarz, 2019). These are all important factors considered to be added for this research.

4.2. Conceptual model

As can be seen in the last part of the theory, some additional factors can be added to the TPB, the so-called extended theory of planned behaviour (Ajzen, 1991). For this research, this possibility is also used and the factors of Knowledge, Past behaviour and Emotions are added. Below the conceptual model can be seen:

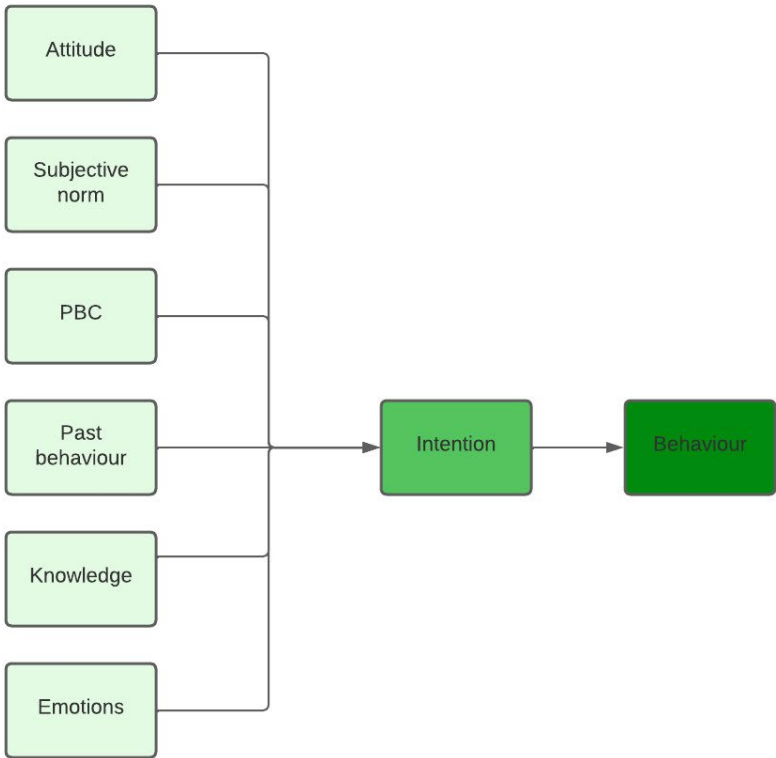


Figure 2 - Conceptual model

As TPB originally shows that there is also a correlation between the factors and the direct effect of PBC on the behaviour, these are not added to the conceptual model for this research. For this reason that including this correlation is difficult and in the context of this research is out of the scope of a bachelor thesis. If during the interviews it is discovered that there is a correlation between the factors in the conceptual model, these will be added later in the analysis (7.11).

To have a clear definition of the concepts in the conceptual model, it is important to define these concepts correctly. The first three factors are already explained a bit in the theory part (4.1) but will be further elaborated below.

First, there is the attitude of the farmer, which is one of the most important factors. When the farmer in question is not engaged with the environment, it is less likely that the farmer will convert to a more sustainable way of farming. Also, the attitude in the case of legislation can be important. Is the farmer up to date with all developments or does the farmer have little knowledge of them?

Second the subjective norm, this is about the social pressure the farmers feel. On the one hand, some people care about the environment a lot, like extinction rebellion (international, activist movement opposing climate change) and left-wing parties. On the other hand, some people support the existing way of farming and do not care about the environment that much. How much is the farmer influenced by these different opinions? And how is this expressed in the way of farming?

Third, the PBC, as explained before, is dependent on the ability of a person to hold his interest. When a person switches from opinion a lot, it makes it more difficult to engage in the behaviour of interest. Also, the perception of the ease or difficulty of a certain behaviour can play a part. In this case, when a farmer hears a lot of stories from other farmers about how easy it is to convert to a more sustainable way of farming, the farmer is more likely to hold an interest in converting their farm to a more sustainable way of farming. Likewise, when the policies regarding farmers are changing constantly, it is harder to hold an interest in a certain change for the farm and the farmer.

The three new factors added to the theory, past behaviour, knowledge and emotions, are explained below. The decision to add these factors is made based on the literature read before. Looking at the case of this thesis, adding past behaviour was a good addition to see if there is a factor from the past that has an influence on the behaviour, as stated before by Bergevoet et al. (2004). Knowledge was added because, for example, Maleksaeidi & Keshavarz (2019) stated that this has a great influence on the behaviour of farmers. The reason for the addition of emotion is that there was a critique of the theory because of the lack of adding this factor, even though this can have a significant influence on the behaviour of the farmers.

For past behaviour, it is important to understand the history of the farm. When a farm used new technologies in the past before, it can be easier to adapt to a sustainable way of farming. When a farmer has never innovated it can be harder to use a different way of farming. Also when an innovation in the past went well, it does not mean it will go as well in the future when trying to add an innovation.

For knowledge, this means that the more a person knows about the topic, in this case, sustainable farming has an influence on the intention to be more sustainable. Some people have a lot of interest in the environment and protecting it, which can mean a person has a lot more knowledge about the different options there are to become more sustainable. Does this also mean that a person with a lot more knowledge will experience fewer obstacles while trying to convert to a more sustainable way of farming?

Emotions are a difficult factor to investigate. For this research, it can be important to look at the affinity the farmer has with the farm. When this is substantial, it can be harder to make a change because they do not know how the more sustainable way of farming on their farm will turn out. Also, emotions considering mental health, as explained in the relevance (2.1.), can have a big influence. The policies regarding (sustainable) farming change a lot, which can have a big impact on the stress levels of a farmer. Do these possible emotions influence the obstacles while becoming more sustainable?

5. Sustainable farming methods - literature research

In this chapter, a literature review has been done on sustainable farming types. The three most used ways of sustainable farming are explained, also specifically in the case of dairy farms. Also, the general meaning of sustainable farming has been added, to better understand the meaning of sustainable farming.

5.1. Sustainable farming

Looking at the future, it is important to look at the more sustainable possibilities of farming. Soil loss, increasing water demand from agricultural practices and environmental pollution caused by the intensive use of agrochemicals, are among the most pressing issues concerning agriculture sustainability (Gomiero et al., 2011b). Preserving or increasing soil organic matter content has to do not only with a farm's long-term sustainability (and benefit) but, maybe most importantly, with preserving a country's long-term food security, guaranteeing that it can overcome and recover from possible future climate extremes (Gomiero et al., 2011a). The need for a more sustainable world is high, still, the concept of sustainable agriculture is vague and ambiguous in its meaning, which renders its use and implementation extremely difficult (Velten et al., 2015). It is widely believed that the transition to sustainability, the massive adoption of cleaner or more sustainable technologies and practices, requires fundamental and deep structural change (Runhaar et al., 2020). For dairy farms, there are a lot of attributes that determine sustainability (Van Calker et al., 2005). Similarly, a distinction has been made between economic, internal social, external social and ecological sustainability. Which again points to how broad the topic is.

There are a lot of sustainable farming methods possible, this thesis is limited to three kinds, organic, nature-inclusive and circular farming. For the reason that other kinds cannot or are hard to apply to dairy farmers like mixed crops use. The three included are further explained below.

5.2. Organic agriculture

The biggest and best-known kind of sustainable farming is Organic Agriculture (OA). OA combines tradition, innovation and science to benefit the shared environment and promote fair relationships and good quality of life for all involved (IFOAM, 2023). It emphasises land management practices that promote biodiversity and soil quality, to maintain sustainable agricultural systems (Underwood et al., 2011). OA operates without pesticides, herbicides and inorganic fertilisers, and usually with a more diverse crop rotation (Bengtsson et al., 2005). The promotion of OA has widely been seen as a way to improve food safety and the environmental quality of food production in Europe (Sipilainen, 2005).

The organic way of farming is fundamentally different from conventional agriculture because its guiding land management paradigm is based on a systems view (Underwood et al., 2011). Organic agricultural

methods are believed to be more environmentally sound than intensive agriculture, which is dependent on the routine use of herbicides, pesticides and inorganic nutrient applications in the production of crops and animals (Bengtsson et al., 2005). When looking at the direct effects of the different kinds of agriculture it is not always clear which one is better. Also, the indirect effects must be taken into account when considering the environmental consequences of farming, in particular concerning energy use and greenhouse gas emissions (Gomiero et al., 2011a).

When looking at dairy farms a difference can be seen. For example, energy use per unit of milk for OA is less than half of that of conventional farming (Gomiero et al., 2011a). Further organic dairy farms tend to have fewer negative environmental effects than conventional farming regarding the production of milk (Müller-Lindenlauf et al., 2010).

Organic milk production has gained importance in Europe (Rosati & Aumaitre, 2004). Although not as big as in other European countries (Verburg et al., 2022), it is becoming more and more important in the Netherlands as well. The basic aim of organic animal husbandry is to stay close to natural ecosystems (Plomp & Migchels, 2021). Organic dairy farming can be one of the ways that can help reduce ammonia emissions around Natura 2000 areas (Migchels, 2022). In organic farming, animal husbandry is conducted with ethical concerns about animal welfare in mind, encouraging the natural behaviour of cattle by, among other things, spending most of the grazing season outdoors, limiting the use of drugs, and reducing the use of fodder. From crops where the use of chemical fertilisers and pesticides is prohibited (Gomiero et al., 2011a). As can be read in the introduction (chapter 1), the amount of nitrogen emissions of a farm is important in the Netherlands. The distinctive aspects of nitrogen of an organic farm compared to a conventional livestock farm play mainly for dairy farming (Plomp & Migchels, 2021):

- The organic sector does not use artificial fertiliser and aims for 100% use of organic manure. They produce less manure overall than conventional farming and what is produced is often used on their land. They also do not use derogation (expanding the use of manure on their land);
- Clover and other leguminous plants fix nitrogen, resulting in lower nitrogen inputs and lower losses per acre.

5.3. Nature-inclusive agriculture

Nature-inclusive agriculture (NIA) is starting to gain more attention in the public consciousness as a form of sustainable agriculture (Erisman et al., 2017). The policy for this concept so far only has been used in the Netherlands, although there is no clear statistic on the exact number of farmers applying for NIA (Westerink et al., 2021; Vermunt et al., 2022).

The concept is so new, that a defined meaning has not been made yet. Vermunt et al. (2022) defined it as “the pursuit of a positive, reciprocal relationship between farm management and natural capital.” It has low emissions and thereby a limited negative impact on biodiversity on the farm or in the surroundings, making use of biodiversity through ecosystem services and taking care of biodiversity through landscape management (Westerink et al., 2021). NIA assumes that agricultural production and care for nature can go hand in hand and aims to create an economically viable agricultural system that optimally manages natural resources and is sustainably integrated into business operations (Van Doorn et al., 2016; Provincie Gelderland, 2020). The concept is appealing because of its flexibility, it has not yet crystallised out (Runhaar, 2017). Since the meaning of nature-inclusive agriculture has not yet been defined, it is also a promising concept that can facilitate the co-production of the meaning and knowledge necessary for the practice of NIA.

Erisman et al. (2017) conveniently presented the various points of NIA in a diagram to see the connections. This scheme can be seen below.

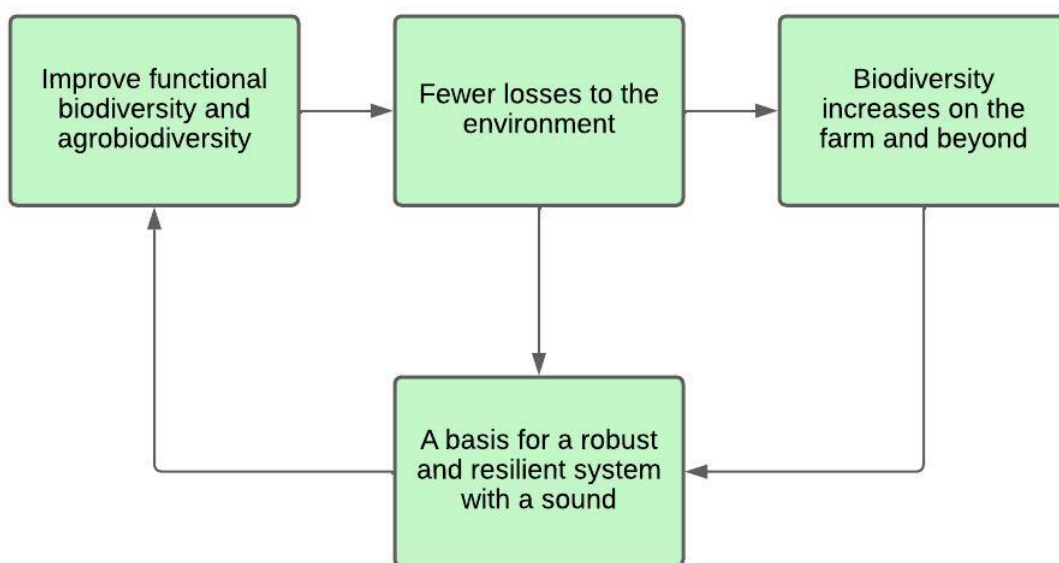


Figure 3- Scheme for nature-inclusive agriculture (Erisman et al., 2017)

As can be seen in the model (figure 3), almost everything is connected. It can be concluded from the model that if the farmer improves the functional biodiversity on the farm, it affects the loss to the environment which leads to an increase in biodiversity on the farm and beyond. This creates a solid base for a good revenue model for the farm.

For a farm, there are different levels of nature inclusiveness (Bouma et al., 2019; Erisman et al. 2017; Provincie of Gelderland, 2020)

- First, there is the legal level, where the legal obligations are met and no further consideration is given to the biodiversity of the farm;
- Second, there is basic nature-inclusive, where part of the farm takes measures for specific species which promotes biodiversity;
- Third, it is consciously nature-inclusive, which means that the farm takes a step toward being land-bound and a farm takes several measures to increase biodiversity on the farm and beyond;
- Finally, there is best nature-inclusive, which is largely land-bound and the cycles are optimised and nature and landscape are part of the business operations.

A problem is that the benefits of NIA are less visible than those of conventional agriculture, not only to farmers but also to citizens (Runhaar, 2017). For farmers especially this can become a problem, because they see their land rather clean, tidy, with straight lines, and without weeds, but this is not good news for NIA (Westerink et al., 2021). This tidy landscape can be seen as the land of a 'good farmer' but it is bad for the biodiversity of the land. Currently, less than 10% of Dutch dairy farmers are considered nature-inclusive, but a much larger group like to become more nature-inclusive (Vermunt et al., 2022). It is not clear how much Dutch consumers are willing to spend extra on dairy products that promote nature conservation, which makes the transition harder because there is no guarantee of a steady income (Runhaar, 2017).

Organic farming often incorporates the necessary elements of nature-inclusive farming but is not the same: the core of organic farming is the non-use of chemical pesticides, while the core of nature-inclusive farming is taking measures to better integrate natural capital into operations. (Bouma et al., 2019). For dairy farms, these measures include (Vermunt et al., 2022):

- Manure management to improve the soil structure and soil health;
- Local feed production that eliminates the impact of overseas feed production;
- Predominantly grass-based feeding due to the higher organic soil content of grasslands compared to arable land;
- Turf diversification and more permanent grasslands to improve aboveground and belowground biodiversity and soil carbon storage.
- Grazing to improve botanical composition and biodiversity of meadows, close nitrogen cycles and reduce ammonia emissions;
- Use of lightweight machinery to reduce soil compaction;
- Gradual mowing to reduce the direct impact on ground-nesting birds and increase chick survival;

- Create landscape features such as wetland systems, dikes, ditch banks, living fences, and tree-lined roads to provide habitat for species;
- Enlarging pastures, i.e. reducing the number of livestock per hectare of pasture.

5.4. Circular agriculture

Circular agriculture (CA) is a form of sustainable agriculture in which the mineral cycle is closed (Provincie Gelderland, 2020). This means that all minerals that disappear from an area due to agriculture are also returned to the area. Available resources are used as efficiently as possible and the farmer tries to keep the outflow and inflow of these resources equal.

The Dutch Minister of Agriculture, Nature and Food Quality has created an agenda to realise circular agriculture. In this agenda, five principles are mentioned to realise CA (De Lauwere et al., 2022):

- Healthy soil forms the basis;
- Use as much animal manure instead of artificial fertiliser as possible;
- Use residual flows from the food industry as feed for animals;
- Food production should improve nature, the environment and the climate;
- Cooperation within regions and agricultural chains is important.

Traditional agriculture follows the “resource - product - waste” mode, which can lead to many serious problems, such as environmental pollution and resource depletion (Sun & Li, 2022). CA, on the other hand, mainly follows the mode of “resource - product - recycling”, is recognised as an effective way to mitigate these problems, and has been widely proposed.

The main difference with conventional farming is that circular farming focuses on getting the farm circular (Natuurinclusief, Wat Is Dat?, 2021). This means minimising resource use, losses and emissions within the farm operation. For example, for livestock farming: make sure to feed locally and with residual streams, and make sure the nutrients in manure are well utilised and benefit arable farming (elsewhere). In addition, soil management with a focus on organic matter and soil life is important in livestock and arable farming. After all, this ensures that nutrients can also circulate in the soil.

6. Methodology

6.1. Study area and group

The study area of this thesis will be dairy farms in the province of Gelderland. This particular form of agriculture was chosen, as said before, because it is the most common in the province and therefore the most feasible to investigate (Provincie Gelderland, 2020). As a representation of the location of all the farmers, there is a map which can be seen below. This is to give a good overview of the spread of the farms in the province. Every dot that can be seen on the map stands for a farm where an interview was conducted.

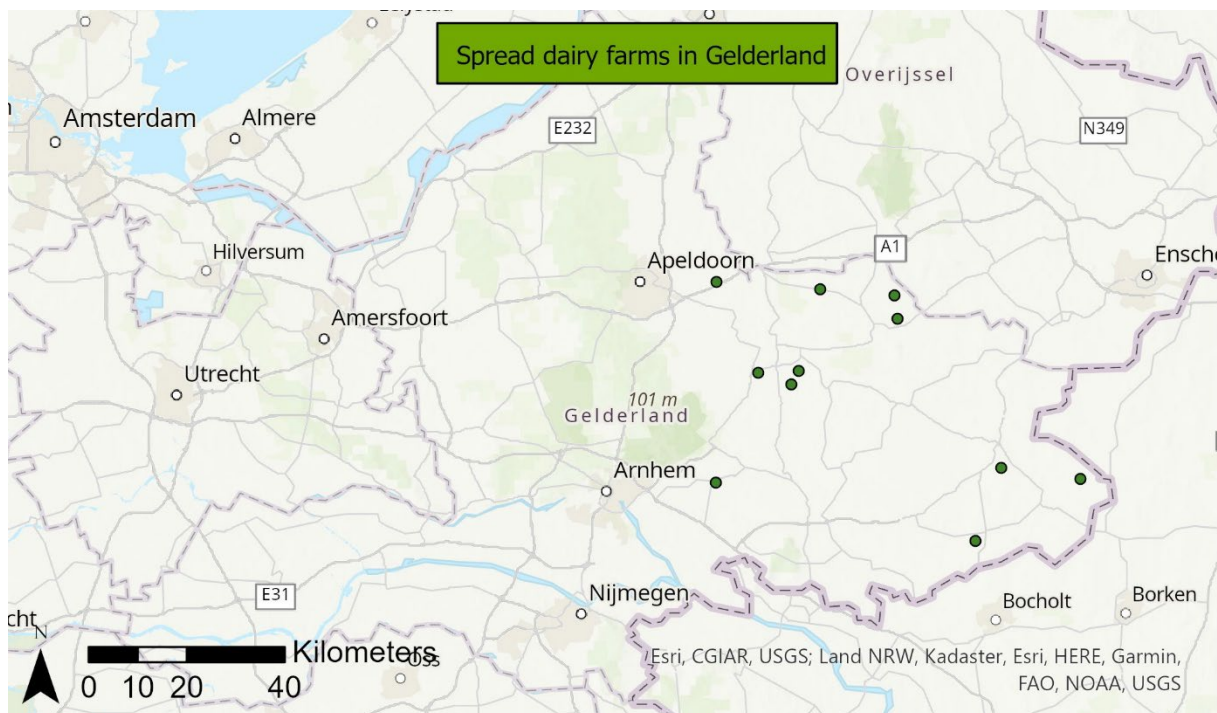


Figure 4 - Map of spread dairy farms interviewed in Gelderland

Below a description can be found of all the people interviewed. In total 11 farmers were interviewed and 2 people from the working field. In the rest of the thesis, the farmers will be named as stated in the table, so farmer 1, farmer 2, etc. In this table also the date of the interview, the kind of farm, the number of cattle, and the gender has been added. While looking for farmers to interview, it was carefully considered what degree of sustainability they already had and differences in gender and age (which was not included due to privacy reasons). This is to ensure to get the best and broadest view of the obstacles involved.

	Date of interview	Kind of farm/ work	Amount of cattle	Gender
Farmer 1	April 24 at 10:00, Vierakker	Conventional, photon farmer (fotonenboer) self-sufficient in energy	115 dairy cows, 60 young cattle	Man
Farmer 2	April 24 at 13:30 Harfsen	Conventional, though Planet proof, Friesland Campina	/	/
Farmer 3	April 25 at 13:30, Aalten (online)	Conventional farm with nature-inclusive elements	150 dairy cows + accompanying young cattle	Man
Farmer 4	April 26 at 20:00 Lochem	Conventional farm	150 dairy cows 80 young cattle	Man
Farmer 5	April 28 at 13:30, Angerlo	Biological and engaged in nature inclusion and recycling	70 dairy cows and associated young stock	Man
An employee at Boerenverstand	May 1 at 10:00, Utrecht	Consulting firm that stands for farmer sustainability	/	Man
Farmer 6	May 2 at 10:00, Lielvelde	Biodynamic	50 dairy cows 120 young cattle (herd of 170) + few chickens/pigs	Man
Farmer 7	May 2 at 13:30, Winterswijk	Conventional, but concerned with sustainability	80 dairy cows and 50 young cattle	Female
Farmer 8	May 3 at 10:00, Brummen (online)	Conventional, but concerned with sustainability	180 dairy cows No young cattle	Female
Farmer 9	May 4 at 15:00, Wilp	Conventional, though Planet proof, Friesland Campina	175 dairy cows, 80 young cattle	Female
An employee at LTO Noord	May 10 at 10:30, Zwolle	An employee at LTO Noord	/	Female
Farmer 10	May 12 at 13:00, Laren	Conventional, but concerned with sustainability	108 dairy cows, with belonging young cattle	Man

Farmer 11	May 15 at 11:00, Zutphen	Conventional, though Planet proof, Friesland Campina	120 dairy cows (young cattle not known)	Man
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Table 1 - Overview interviews

As an extra to this thesis, two people from the working field were interviewed, namely an employee from Boerenverstand and an employee working at LTO Noord. The employee from Boerenverstand is a business and project manager at the consultancy agency, which gave provided insight into the business side of farming. At LTO Noord the employee is a Market and Society Policy Advisor. LTO Noord is the interest group of farmers and gardeners in the north of the Netherlands, as explained during the interview. The employee has a great passion for dairy farmers and told a lot about her view on the current status of these farmers in the Netherlands and how she is trying to improve this problem in combination with working at LTO Noord.

6.2. Methods

Before the start of the investigation, literature research was performed to get a better understanding of the subject. In this literature research (chapter 5), there was looked at the kinds of sustainable farming. There are a lot of different kinds (Provincie Gelderland, 2020), but for this thesis, there is chosen to focus on organic farming, nature-inclusive farming and circular farming for reasons mentioned before (paragraph 5.1).

The main part of the thesis consists of interviews that have been conducted. These were held with dairy farmers in Gelderland which can be seen in the table above (paragraph 6.1.). Within the research participants, there was a preference for farmers who are considering becoming more sustainable. Besides farmers who are already sustainable or have not thought about becoming more sustainable, it was also valuable to interview those farmers. In this way, there will be opinions from all the different points of view. The methods used to find the farmers are listed below:

- Via friends and family;
- E-mailing and calling farmers found on the internet,
- Contacting umbrella organisations who have close connections with the farmers.

The interviews are conducted in a semi-structured way, which means that some questions were prepared beforehand but with the option of asking follow-up questions when needed. This was the best method of interviewing for this thesis because the same information was needed from the different farmers and with a not-structured interview it was more likely to forget important parts

needed for the thesis and for a structured interview there could not be asked follow-up questions, which for this research, were valuable.

The interview guide was developed according to quality standards, to get the best results (requirements see: Boezeman & Donkers, 2017; p 3-4). It was created with the help of the conceptual model. In the appendix (paragraph 12.1.) an overview of the questions and their correlation to the conceptual model can be found. The interviews were conducted in Dutch, for the reason that this (in most cases) was the mother tongue of the interviewees. The interview guide was also made in Dutch, but an English version will be added to the appendix of the thesis (paragraphs 12.2; 12.3). The transcripts are also in Dutch, and a translation of the quotes in English is used in the thesis. As a result, some quotes may be worded slightly differently, for the reason that there was not always a good translation for them in English.

After conducting the interviews, these were transcribed and analysed in Atlas.Ti, this is a specialised program for analysing and processing qualitative data. The analysis was done by coding the transcripts, comparing the codes and finding a correlation to the conceptual model. According to Williams & Moser (2019), the optimal coding process consists of three steps. Open coding is the first step, where distinct themes and concepts are identified. Second, axial coding narrows the amount of broad(er) codes back to a lower number with more specific codes. The last step is selective coding, where the axial codes are grouped into bigger themes. After analysing Atlas.ti, these were incorporated into the results and the interrelationships between the components of the conceptual model were also examined. These were included and further explained in the next chapter, the results.

7. Results

This chapter will explain the results of the study. First, the initial observations, done by the interviewer will be discussed and then the results of the interviews will be further elaborated for each part of the conceptual model. As an extra, a section about the meaning of sustainability and policy has been added. For the reasons that these terms have been mentioned often during the interviews and therefore needed to be explained in the results. The variable, intention, has been left out of the results, for the reason that the intention itself is influenced by every other factor. So, all that could be said about the intention is already mentioned in the other sections. In the analysis where all the factors are compared, the intentions are mentioned and the importance is explained. In this analysis, a new conceptual model has been added where the discovered relationships between the factors have been added, also shown here whether they could be negative, positive or both.

7.1. Observations

What was immediately noticed, which was not expected beforehand, is that many farmers were eager to engage in the conversation. After explaining what the research entailed, many farmers were willing to be interviewed. After the interview, the opportunity was given to look around at two farms as can be seen in figure 5. What was remarkable was not only how much knowledge they have about their profession, but especially how proud they are of what they have built themselves (often with their families). The farms have often been in the family for a long time and they want to keep it that way as well. The research is about sustainability and while looking around, there was often extra attention paid to this. For example, there were several brushes on display for the cows to use, which they did.

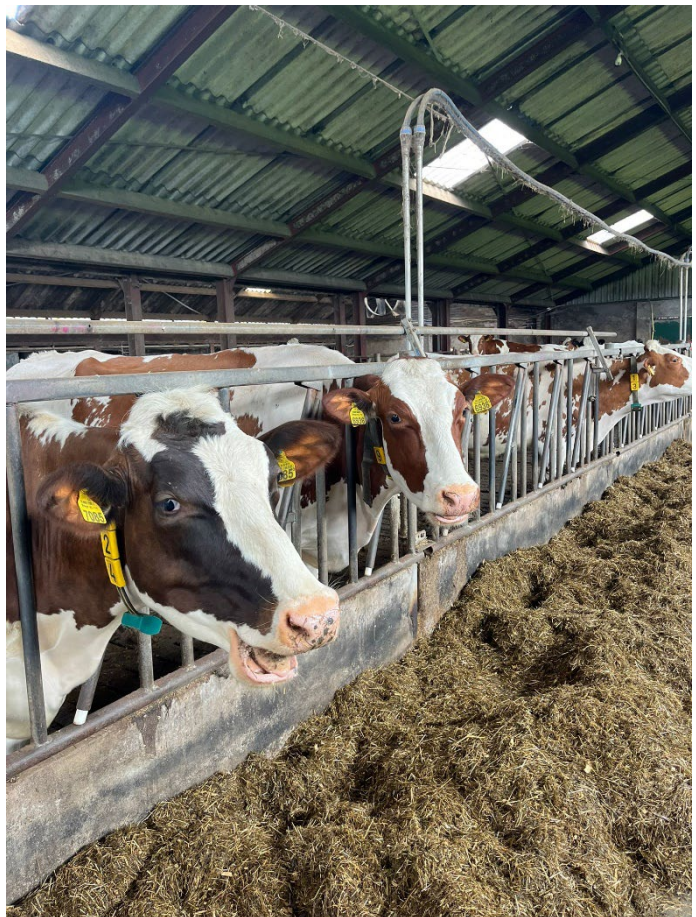


Figure 5 - Observation on the farm (own work)

Several farmers also had an additional source of income from home sales. This ranged from a milk tap at several farms to a proper farm store at the farm in Lievelde. Another example is the cheese from the farm in Brummen, which is sold on the farm and sometimes at a farm store nearby. That way people

know exactly how it is made and where it comes from, which the farmer says is a good thing. Also, the visits they organise show their farm and make citizens more aware of what happens on a farm. According to most of the farmers this can contribute a lot to the awareness of the citizen, because sometimes there is still a gap between the citizen and the farmer.

Most of the farmers that were interviewed live in the Achterhoek region. What stood out when driving around this region is that there are many farms (as mentioned earlier), especially dairy farms. When the weather is nice, there were cows in almost every grass field. It is noticeable that there is a tight farming community with flags hanging everywhere. As an act of protest, these flags were hanging upside down to indicate that farmers do not agree with the current policy. Besides the flags, many handkerchiefs are tied to car mirrors and farm vehicles. The BBB election posters could still be seen from the provincial election last March (2023) and influenced the landscape.

7.2. Meaning of sustainability for farmers

The Dutch government aims to steer the agri-food system towards more sustainability (Ministry of Agriculture, Nature and Food Quality, 2022). Although there are some established conceptualisations of the term „sustainability“, however, different farmers might subscribe to different understandings of the concept. To investigate these potentially different understandings, which may also impact the way farmers conceptualise different alternative farming methods, farmers were asked what for them sustainable agriculture entails. Most farmers indicated that they found this a difficult question, specifically because it is so broad and unclear. Nevertheless, it was often indicated by the farmers, that for them it means making the farm more ready for the future, making use of objects, like machines, longer and thinking more about nature and the next generation. These are still pretty broad concepts, these are clarified in the quotes section (Farmer 3, 5, 9, 7).

In their opinion the terms are often not well defined. On one side they experience this as beneficial because farmers are free to interpret, for example, what nature-inclusive means for them and their farm. On the other side, this makes it not always clear what is expected and whether the measures taken will then be accepted by the government as sustainable. In addition, to all the uncertainty farmers already feel, this is not the desired effect. As mentioned above, it is not always clear what is meant by nature-inclusive, for example: nowadays certain frameworks can be seen in chapter 4 (literature review), but it still varies per person and field of expertise (Employee LTO Noord).

It is also indicated by the farmers that the direction the government wishes to take is not necessarily always sustainable (Farmer 6, 11). For example, it is indicated that an organic farmer does not always score the best in some areas of sustainability. Carbon dioxide (CO₂) emissions and how the soil and animals are cared for are not always good. On the other hand, an advantage to organic farming is that

there are clear guidelines for becoming organic, which is different from the other kinds of sustainable agriculture like circular agriculture.

What all farmers agree on, in fact, is that making the farm more sustainable is something personal. Every farmer is an individual and chooses the method that best suits them and the farm. This is the way it should stay, according to the farmers. One should not focus on a certain type of sustainability but rather look at the motivation of the farmer and leave them free in what they want. Most of the farmers do agree that they then have to comply with certain frameworks, but how they fill them in should be left more free.

To conclude, it is still difficult to give a good definition of sustainability for farmers and the way they should become more sustainable needs to be less strict and give more freedom to the farmers. Below in table 2, some illustrative quotes can be seen on what the farmers said in the interviews, regarding this topic.

PARTICIPANT	QUOTATIONS
FARMER 3	<i>Yes, persistence, that you can continue your profession and agriculture can continue. But there are different opinions about that and also I have too little knowledge about that to say exactly. For the sustainability of agriculture and the environment and the impact of agriculture on it and nature.</i>
FARMER 5	<i>Well, I think sustainability starts with not wasting anything anymore, so we will just basically have to accept almost no losses to groundwater or not in the air in terms of nitrogen and phosphate and potash as well.</i>
FARMER 9	<i>Well, sustainable is simply making use as long as possible of, for example, your animals and your belonging. Using as little energy as possible, putting as little burden on nature as possible and still trying to get optimal results.</i>
FARMER 7	<i>Yes, that is a very difficult term indeed. Yes, I immediately think of future-proofing. That you organise it in such a way that you take everything into account on all fronts. The most important thing is that it is possible financially.</i>
EMPLOYEE AT LTO NOORD	<i>Everyone also understands it differently, look, my boyfriend is an ecologist, so he understands it very differently than my family who farms, for example.</i>
FARMER 6	<i>Yes, yes also a good question, because no, I think also organic has a lot of steps to take to get to organic or sustainable food production ... So chemicals and fertilizers that are already safeguarded with organic. But we also have a climate problem. And organic imports a lot of feed concentrates from Ukraine and so on. Indeed,</i>

that feed is organically grown, but a lot of feed concentrates are imported. And we have to get rid of that as an organic sector, I think.

FARMER 11

Some still have steps to take in terms of sustainability and organic. I know a farm in the neighbourhood that has been organic for 30 years. Well, when I see the ground there now, the way it looks now, it is a shock. It is just completely run-down.

Table 2- Meaning Sustainability (illustrative quotes)

7.3. Attitudes

During the interviews, the farmers were looked at first with a neutral point of view to capture the farmers' real view on the situation. What was not expected beforehand is that the farmers are aware of the problem. The farmers all recognise that something needs to be done (Farmer 1, 5).

The way farmers would like to become more sustainable varies greatly from farmer to farmer. While one feels more for innovations, such as the Lely Sphere or a low-emission floor, the other farmer would prefer to look and live with nature. A farmer's attitude towards a certain form of sustainability must be right if they want to apply it and be able to sustain it (employee at Boerenverstand (A)).

Why the government and society often do not see how many farmers are already concerned with the environment is explained by the farmers. Farmers say that there often somewhat isolated from the rest of society and do not feel the need to share everything with the outside world. This can make it appear that a farmer is not concerned with the environment, while this is the case. Also, because sustainability is measured using certain models, which only look at nitrogen emissions, the farmers indicate that in this way it is not always clear either whether a farm may already be more sustainable compared to, say, its neighbour (Farmer 10, employee at Boerenverstand (B), employee at LTO Noord).

What is also still important is the attitude of consumers and society toward sustainability and sustainable food. The farmers indicate that if consumers are not willing to pay more for sustainably produced products, this will not improve farmers' attitudes toward sustainability. Even if it seems that society wants more sustainability, it often remains just words and no action, according to the farmers. The Dutch consumers are perhaps quite 'stingy' in this respect and are quick to choose the cheapest product, which is often not the most sustainable option. Examples mentioned by the farmers can be seen below under the subjective norm (7.4).

Summing up, it can be said that the attitude of most farmers is positive concerning the environment, although how they want to become more sustainable varies. It is also not always shown how much a farmer is already practising on the farmers with more sustainable forms. To substantiate this, some quotes can be read below in table 3.

PARTICIPANT	QUOTATIONS
FARMER 1	<i>Yes, I think that is underestimated in Dutch agriculture. I think 80% of my colleagues are very active in that regard. There will always be a part that will not be interested in sustainability</i>
FARMER 5	<i>Well, there are quite a lot of farmers who do want to, including conventional farmers who do realise that perhaps things can be done differently. I feel that there are a lot of them</i>
EMPLOYEE AT BOERENVERSTAND	<i>It is also true, of course, that I think a person has to be intrinsically motivated to become organic because if they are forced to become organic, they will never do as well as they would if they chose for themselves</i>
FARMER 10	<i>I think a lot of farmers already do it, but it is rarely shown. It is not like I take a picture of flowers and then I post it on Facebook. I am not like that, and it should be more like that maybe</i>
EMPLOYEE AT BOERENVERSTAND (C)	<i>Maybe someone who never talks about sustainability at all is much more sustainable than someone who talks about it a lot, but of course, you don't know that</i>
EMPLOYEE AT LTO NOORD	<i>For example, we now have an area process in which agricultural exploration has been carried out. And it turned out that all farmers in the area already scored very high on the nature-inclusive scale, already much higher than the national average. So then I think, well, start looking there first, what do they do?</i>

Table 3- Attitudes (illustrative quotes)

7.4. Subjective norm

There are many parties involved in agriculture, much more than just the farmer himself. To mention a few examples: the supermarket, the feed manufacturer, the dairy processor and, the consumer. All of these have different interests. For example, the farmers indicated that it is in the interest of the feed manufacturer and the supermarket to make as much profit as possible, and thus actually prefer that the farmers produce as much milk as possible. This gives the farmer mixed signals, on the one hand they want to produce a lot because these companies want to make as much profit as possible. On the other hand, the government wants farmers to become more sustainable and often produce less. Because of this, the government also exerts a certain pressure on farmers. New rules are constantly being added, also by the European Union, but it rarely happens that these rules are revoked. As a result,

the rules keep piling up and according to the farmers the pressure on a farmer keeps growing (Employee at Boerenverstand (A), farmer 5).

Yet society wants more sustainable products in the supermarket to be available. However, this often remains with just words and actions lacking, as already mentioned in the section about attitudes (7.3.). The consumer in the supermarket often chooses the cheapest product and this is (hardly) never a sustainably produced product. So before the farmers can become more sustainable, a lot of work has to be done within society to get them willing to pay more for sustainable products in the supermarket (Farmer 1, 3).

It is also indicated that farmers experience pressure from society. The media does not always accurately reflect how many farmers are already working on the sustainability of the farm (farmer 4, 9, employee at Boerenverstand (B)). The farmers often say, ‘come and see the farm’ before they should give their opinion. This might make the media think differently about the agricultural sector. The same applies to policymakers, who put pressure on farmers to become more sustainable, but they often fail to visit farms and see how things work in practice. The knowledge of government employees is discussed further in the chapter 'knowledge'.

So it can be said that farmers experience pressure and indicate that they often feel misunderstood by society and the government. Society also needs to start adapting, if they want more sustainable products in the supermarket, they need to buy them. The quotes to support this conclusion can be read below in table 4.

PARTICIPANT	QUOTATIONS
EMPLOYEE AT BOERENVERSTAND (A)	<i>And the problem is also that it is just piled up, so there is a new measure that comes in every time, so that date comes in, but very few things go off.</i>
FARMER 5	<i>And I think that is also a bit of a problem with current politics, we all have to change, and that is fine, but the rest has to change as well. But there has to be a market for that, and if not, it will just come. Yes, but then the supermarkets have to be obliged to put Dutch products in the market and that is not going to happen.</i>
FARMER 1	<i>Another obstacle in my view is that we can get higher prices for sustainable food. And that goes to some extent as long as it is in the niche market in my view, but the moment that becomes the standard then the market is no longer willing to pay more for that either. As an example, in the Netherlands, 3% of</i>

	<i>the people are willing to pay seriously for organic options. So why does the government think that tomorrow that will be 50%?</i>
FARMER 3	<i>I think it is mainly because of the additional price and the fact that people have not had very much to spend last year. I mean inflation and the high gas prices. Then you can see that as soon as things get a bit stressful people very quickly move away from buying organic sustainable expensive products and immediately jump back in.</i>
FARMER 4	<i>The media that is left-wing, they run after all these left-wing crazies. You do not see a decent person explaining it differently.</i>
FARMER 9	<i>And then all those talk shows, people are very quick to say all sorts of things about farmers. Yes, and that is what I find most difficult: I think, yes, we are doing our best and we have to because otherwise, you will not even get into the milk stream anymore if you do not do your best to adjust every day, every year. I think a lot of people have very quick opinions when they do not know what they are talking about and I find that difficult.</i>
EMPLOYEE AT BOERENVERSTAND (B)	<i>Yes, I think it creates negative energy mainly in that sense, that a lot of farmers just have the idea that well I can never do it right anyway. Some media just frame every farmer as some kind of environmental polluter.</i>

Table 4 - Subjective norm (illustrative quotes)

7.5. PBC

Maintaining interest has indeed proved to be difficult stated by the farmers, especially with the ever-changing policy which gives little certainty. The farmers were asked in the interviews what might help in maintaining interest, and it was often indicated that it would help if there was a reward in return (Farmer 5 (A), 8). Many farmers were enthusiastic about the idea of a reward if someone farms more sustainably. Subsidies for the sustainability process were also a good addition to the policy. Three of the farmers are also part of Friesland Campina's PlanetProof programme, whereby by taking sustainability measures the farmers get an extra payment for the milk.

However, it was also made clear that subsidies cannot last forever either. It can give a push in the right direction but is not the solution that will solve the whole problem, as uttered by the farmers. There must be the certainty that there is a good revenue model behind it in the long run, so that even when the subsidies end, the farmer still earns enough money for his more sustainable products (Farmer 5 (B), employee at Boerenverstand (A)). The same applies to PlanetProof, it is a good way to earn some extra money, but to stay in the programme takes a lot of effort and also money to keep investing in the farm.

What would also help to maintain interest is the mutual contact that farmers have with each other. By exchanging stories with each other, on their initiative, for example with the neighbour, but also in various study groups or local initiatives. If a farmer joins this, he is more likely to retain his interest through a kind of social control (Employee at Boerenverstand (B)).

On the whole, maintaining interest is indicated by the farmers as difficult, but they also suggested solutions that would help the farmers. To see what the farmers exactly said in this regard, the quotes can be read below in table 5.

PARTICIPANT	QUOTATIONS
FARMER 5 (A)	<i>Well, they should first impose a not punish everywhere, but reward something.</i>
FARMER 8	<i>I think that is much more important than just making each other pay way too much. So I do believe very much in the power of positivity and rewarding and encouraging. And mischief is always good and enterprising, but not at the expense of the world.</i>
FARMER 5 (B)	<i>Yes, definitely, it should not be just for two years. Because before you get there, yes, then the other government always says, we do not do that anymore</i>
EMPLOYEE AT BOERENVERSTAND (A)	<i>Well, I see it more as a kind of intermediate step or something, perhaps just to get it going and to reimburse certain investments, say that companies have to make to become more sustainable. But in the long term that is of course very difficult to maintain, because at some point the pot is empty.</i>
EMPLOYEE AT BOERENVERSTAND (B)	<i>Yes, I think there are quite a few good initiatives and also that can motivate farmers very much. Because yes, they work together and look for solutions together. Perhaps that is why farmers are also participating, who otherwise would not participate. Maybe they are more likely to participate if the neighbour or fellow villager says hey, join us.</i>

Table 5 – PBC (illustrative quotes)

7.6. Past behaviour

During the interviews, people were also asked about a bit of the history of the farm. Almost always it turned out that it has been in the family for a long time, going back generations. Not always in the same locations, due to different reasons, but the profession has often been passed down from generation to generation. What was noticeable is that most dairy farms were first mixed farms and later focused on dairy cattle only. This was mainly because they liked working with cows more than the other forms of farming. Also, farms were actually more sustainable back then, fertiliser was not yet used and machinery (which emits CO2) was also hardly used, if at all. So to improve the environment, one solution could be to look at how they used to do it before all the machines were invented, according

to some farmers. They indicate that not everything needs to change back to how it used to be, but a combination of today's technology and knowledge of the past would be a nice solution (Farmer 6, 7 (A), 8). What is said by the farmers as a side note, is that if a farmer owns a farm, there always will be a need to innovate, despite government policy in this regard.

After this, mainly encouraged by the government, there was a push for economies of scale. To keep up with the current market, it was often necessary to increase the number of cows a lot to still be able to make a living (Farmer 2). Now, within a few years, the government wants to phase out this increase in scale, which took decades, in a short time (Farmer 7 (B)). This is incomprehensible to many farmers. Also, as mentioned earlier, they do react to sustainability with sympathy; they do realise that they cannot always continue in the same way. However, the way this is being handled now is not the right way (employee LTO Noord). They now have to change the farm, whereas, from the government's point of view, it was encouraged that a farm should look like this.

In other words, the working of the farms should be looked at more what is possible to connect this to the current problems and the growth of the farms in the past can be blamed on the ambitions of the government that wanted the agricultural sector to grow. This subject discussed in the interview can be seen below in table 6.

PARTICIPANT	QUOTATIONS
FARMER 6	<i>And there again, you can look at old systems. How did they do it before that fossil era? How did they have good agriculture then that worked well? Well, those examples are there, but of course, they are not easy to replicate now.</i>
FARMER 7 (A)	<i>It doesn't have to go back because I mean. If you look at all the technical things and so on, at other companies they don't say, we're going back either because that's better. I mean, it's allowed with today's knowledge and technology, but certain ideas, especially about how you deal with nature and so on. That's just. Yes, a lot of knowledge has been lost there. Which is and was there, but it's all tucked away of course.</i>
FARMER 8	<i>We did not get or create an agricultural system the way it is today for nothing. So almost all mixed farms have been disbanded. We have specialised, put the focus entirely on that cow or that potato or onions. Well, think of yourself if you have to give your attention to a sport or 4 sports. Yes, you can't be equally good in all 4. And of course, that's what you want, so you should also get some combined companies.</i>

FARMER 2	<i>Yes, and then you choose the safe option. And so that's when economies of scale come around every time because that's the easiest way to reduce your costs.</i>
FARMER 7 (B)	<i>So yes, because if you just look, that, yes, you will also hear that everywhere, of yes, how long it's been that this scaling up from history has taken so long, it can't change completely now in one go, in a few years. Sometimes it does feel like it all has to happen in a year, it can not, so no.</i>
EMPLOYEE LTO NOORD	<i>That does not mean that you can always carry on as before, that is just not possible, what I said earlier, you have a world around you and it changes, you will have to go along with that.</i>

Table 6 - Past behaviour (illustrative quotes)

7.7. Knowledge

Besides the fact that farmers naturally gain a lot of knowledge in practice, most farmers indicated that they had also been educated at agricultural school, both primary and higher agricultural education. Still, not all farmers have a background in agriculture, for instance, the farmer in Winterswijk studied pedagogy and the LTO Noord employee studied history. Their passion for farming life made their return to the sector.

Besides the knowledge the farmers gain in practice, many farmers said they occasionally attend a study club to learn more about certain topics. Study clubs are becoming increasingly popular and can also contribute when it comes to making a farm more sustainable. What is also pointed out, there are now so many study clubs that farmers sometimes do not know where to join. Many of the farmers are affiliated with the VKA (In Dutch: Vruchtbare Kringloop Achterhoek; in English: Fertile Cycle Achterhoek), within this association, there are several projects that farmers can join. The farmers also experience this as stimulating for sustainability (Farmer 2, 9).

Also, a study club is not for everyone. The farmer from Lievelde, for instance, says that the way of sustainability they promote there is not the best in his eyes (Farmer 6). Also, the farmer from Aalten is not involved in official study clubs, he is meeting people only at his initiative and not any specific club (Farmer 3). Knowledge exchange between farmers outside the study clubs is also felt to be stimulating. To talk about innovation, such as herb-rich grassland, for example, it is nice to be able to get advice on how best to farm it with someone who has experience with this type of innovation (Farmer 10 (A)).

Not only the knowledge of the farmer plays a role, but also the knowledge of the government and the people working there. It is often stated that the people working in government have little or no knowledge of what is going on on a farm and how it all works (Farmer 10 (B), 11, employee at Boerenverstand). These people do have to make policy so if they have no idea what the state of affairs is and how things are working on the farm, the farmers see this as a reason why policy is often 'skewed'.

As farmers describe this phenomenon as calendar farming, this is further described in the section on policy (7.9).

On the other hand, also the knowledge of consumers is sometimes still lacking. Even though society appears to be well informed about the environment, they still often look at the economic aspect and choose the cheapest product, which is generally not the most sustainable option. So a market also needs to be created for more sustainable products before all farmers can go massively sustainable. They have to earn their money from something and if there is no market it is not going to work. This is also discussed in the subjective norm section (7.4).

Therefore it can be said that the farmers already have some knowledge and there are a lot of opportunities to gain more knowledge if that is what the farmer wishes. Not only the knowledge of the farmers is important, but it is also important to look at the knowledge of the consumer and the government, which is often lacking. The quotes supporting these statements can be found below in table 7.

PARTICIPANT	QUOTATIONS
FARMER 2	<i>Well, that's a lot of talking with farmers and then I'm also in an economic study group of our accounting firm and that's how you keep each other on your toes.</i>
FARMER 9	<i>Around here, we do have those too, also about nature-inclusive farming there are study groups, and. We could learn a lot more, let me put it this way.</i>
FARMER 6	<i>Honestly, I know some of those clubs and that theory, which they then try to implement, but I don't have that much faith in that either, because mostly the goal is to still maintain the intensity so the number of cattle per hectare and then also tackling the problem with partly technical solutions anyway.</i>
FARMER 3	<i>Well not, not at official things, but just. The group of farmers who very often went together at the time of the demonstration. They still have contact with such things sometimes.</i>
FARMER 10 (A)	<i>We also started a piece of herb-rich grassland two years ago. Well, you do not really know anything about it, because you have never used it before and then you do it yes through where you bought seed. They then give advice, but also just, you then look for contact with other farmers who have been growing this for longer or are also doing it and what their practical experiences are.</i>
FARMER 10 (B)	<i>No, it is all of a sudden now, though. Or they did for a while. All visiting and showing up, but yes, only when the point is made and then rules come up</i>

	<i>again. And then you think, that is also just thought up again by someone who does not just does not have the understanding of the practice.</i>
FARMER 11	<i>With subject matter expertise, that is really a problem, because you see there is a whole agriculture that is currently just policy made, which just cannot practically be done.</i>
EMPLOYEE AT BOERENVERSTAND	<i>Well, for example, in the Ministry of Agriculture, dozens of people, 100 perhaps, have been hired in recent years, but that's really a handful who actually really know, who have a bit of practical experience and also a bit of a feel for the practice.</i>

Table 7 – Knowledge (illustrative quotes)

7.8. Emotions

As indicated in the description of the conceptual model (paragraph 4.2), describing emotion in an interview is not easy. Yet it was quite noticeable among the farmers at times, especially the frustration the farmers showed. The frustration that they feel misunderstood by the government and often do want to become more sustainable, but because of the current situation, it is experienced as difficult. They still have to earn money and as long as the revenue model for more sustainable agriculture is not there, the farmers indicated that they are less likely to become sustainable. This uncertainty does sometimes bring stress. Constantly not knowing where the farmers stand and policies that can change at any moment or additional rules that are added (Farmer 1, employee at Boerenverstand).

There is also anger at times over the concept of buying out (Farmer 2, 4, 9 (A)). This is sensitive topic among farmers. For instance, the farmers do not understand why the government puts so much emphasis on this when there are so many other options for policy making. What would already help is looking at the natural progression of farms. By this is meant the certainty that there is a successor for the farm, is far from always present. The sector is an ageing population, many of the farmers are 50+. Looking at this might already solve part of the problem, as mentioned in the interviews.

It also indicates that farmers sometimes experience pressure and stress from society. Society says they would like to have more sustainable agriculture, but as indicated earlier, the market for sustainable products is hardly present in the Netherlands. So until this demand starts to grow, farmers are in a difficult situation (Farmer 5, 9 (B)).

As shown, there are also emotions involved in being sustainable, the main ones being stress and frustration. Moreover, the idea of buyout brings out a lot of anger among farmers. The quotes below in table 8 provide further explanation.

PARTICIPANT	QUOTATIONS
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FARMER 1	<i>Of course, the first thing it has to come down to is clarity. Yes, no one actually knows where they stand, so that also causes a lot of frustration of course.</i>
EMPLOYEE AT BOERENVERSTAND	<i>That is just the frustration of a lot of farmers. A web of measures or obligations has been built around them. Then it is very difficult to take your freedom in that to run your farm well.</i>
FARMER 2	<i>So the Netherlands also has it yes, we should all buy out and expropriate farmers as soon as possible and all throw such things in via the media. But that only generates resistance. There are plenty of farmers who want to stop. But then there has to be clarity.</i>
FARMER 4	<i>Well, I think it is a very stupid arrangement. I just think it is a waste of money. I think they need money for everything and then spend 24 million for something so ridiculous.</i>
FARMER 9 (A)	<i>No, the government just wants a reduction and I get that. But then just look when you will be someone in 10 years with that current legislation, it is not going to be any more fun for those guys. So many guys are thinking yes, bye here I am not going to farm. Putting in hours and just bullshitting so to speak. Yes, so many still quit within now and so many years.</i>
FARMER 5	<i>Yes, but that does come from pressure from society, does it not? At the moment. They still think, oh, are we above this and we do not want to drop it, but we have to move a bit with the citizens.</i>
FARMER 9 (B)	<i>Oh well, you experience the pressure. I struggle most with, not so much with sustainability. We do that ourselves anyway and, because you do PlanetProof, we are already a bit ahead. But I find that people shout all kinds of things on TV that don't correspond to reality. Yes, what do I think of what we are talking about? Guys first go and see how it works, go and talk to the people who do that work and who know about it.</i>

Table 8 – Emotions (illustrative quotes)

7.9. Policy

The policy was not part of the conceptual model, however during the interviews, it turned out that this is one of the main obstacles for the farmers. It has already been mentioned several times in the documents above, but not all subjects could be classified under these documents.

To start with how the policy documents are written. As already mentioned in the paragraph on the meaning of sustainability (7.2), this was not clear to the farmers themselves. The terms they use are

also often (unnecessarily) difficult, creating a gap between the farmer and the government. A gap that would not be necessary if it was more clearly defined (Employee LTO Noord (A)).

There is no clear answer to how the policy should be set up. There are many levels of scale at which policy could be aimed. One farmer would like this to be done more centrally from Europe (Farmer 5, 6, 10 (A)). After all, the agricultural market is global, so limiting it to only a local level is not feasible, as said by one of the farmers. What is also being said in the interviews is that all countries in Europe are not the same. Each country has its own climate, which makes it difficult to tell Brussels what a particular country should produce according to the farmers. There is also a dissenting voice, that the government should tackle it more locally and nationally. Here is also a side note, of what is local, this is a concept that everyone interprets differently (Farmer 11). For some is local at province level or national level, but for others this means Europe, because of the size of this country and the open borders between the countries of the European Union (employee LTO Noord (B)).

In terms of policy, there is often a gap between the national government and the provinces (employee at Boerenverstand). This can cause confusion and dissatisfaction among farmers, but also ordinary citizens. For example, there are local problems that are not directly in the interest of the national government and are therefore not given priority. Examples mentioned by the farmers include the earthquakes in Groningen, the childcare benefits scandal and the floods in Limburg. Because of this, people today, perhaps more often than before, are revolting. For the farmers, this is seen as the start of the BBB, a political party that stands for the interests of the citizen. The farmers indicated that they have sometimes gone on strike and think that this has had a positive effect on the government, but also on society (Farmer 2 (A), 10 (B), 11). It is indicated that it should not go too far, as soon as the point has been made it is enough and should not go further.

What was also mentioned a lot is the dissatisfaction about the derogation being lifted, which means farmers that are not allowed to spread their farms' manure as much (Farmer 3). Most farmers find this incomprehensible. Now they have to buy fertiliser, which the government actually wants them not to do, and they also have to have the manure removed from the property (which means double extra costs). The farmers say that this is another clear example that the people who make the policy have little expertise and know little about how things work on the farm. A nice term they use for this is calendar agriculture. By this, they mean that circumstances such as the weather, for example, are not considered, but that a date is selected on which a certain regulation takes effect. An example of this is the new regulation that the potatoes must be harvested before October 1st, which is not something that the dairy farmers have to deal with, but which was discussed a lot (Farmer 2 (B), 4). When to get

the potatoes out of the ground depends on many more things and it cannot be said that it has to be done by a certain date.

All in all, it can be said that there are a lot of problems with the policy regarding the agricultural sector. The policies are often hard to understand, are made without real expertise and the local level is frequently not considered in the policy-making at a national level. To further clarify this, below are the quotes from the interviews in table 9.

PARTICIPANTS	QUOTATIONS
EMPLOYEE LTO NOORD (A)	<i>And what you often see, at least what strikes me very much, is that the policy language and the language of a farmer are often very different. Yes, kind of miscommunication at the beginning. It starts, of course, with speaking the same language.</i>
FARMER 5	<i>We really need to tackle this in a European way and not in a Dutch way. That does not help.</i>
FARMER 6	<i>I think we should tackle it Europe-wide in particular. The Netherlands cannot take measures for agriculture alone.</i>
FARMER 10 (A)	<i>Well, I think it is quite feasible to just make agreements with Europe about how all this should go, including emissions and everything.</i>
FARMER 11	<i>No, unfeasible, not at all realistic, not at all feasible and I therefore also think that it is totally unwise if we are going to do that with Europe.</i>
EMPLOYEE LTO NOORD (B)	<i>On the other hand, we cannot make it without a world market. Yes, then what is the world market? By the way, I still think Europe is local.</i>
EMPLOYEE AT BOERENVERSTAND	<i>Yes, this is a problem that is more common in the Netherlands. That there is quite a gap between just national and provincial policy. It is easy to say that the provinces will solve the problem, but that they do not actually provide the right preconditions for this.</i>
FARMER 2 (A)	<i>Well, basically I was for it. At a certain point, you also think with such strikes you shouldn't go too far. That you are the citizen, yes. You should not leave them in traffic every time because you are on strike there.</i>
FARMER 10 (B)	<i>It is just, look, I see, sometimes it is just necessary that you strike, but in the normal way. So not with arson on the highway and blocking highways, but it is good that you make a noise, say also get together with a lot of people to show that you just can not go on.</i>

FARMER 11	<i>I think strikes too, I was involved in the first two, but to say. I think it certainly helped, because it did attract the attention, so to speak.</i>
FARMER 3	<i>I think it is a pity that the derogation in the Netherlands is coming to an end. I also think that this is a missed opportunity for sustainability because you can use your manure less and have to spread more fertiliser again.</i>
FARMER 2 (B)	<i>Yes, that is now also being said in the media about all kinds of things from the potato farmers and the beet farmers, who are completely angry because in principle the crop must be off the land from 1 October. But yes, now we have a bit of a cold spring, wet spring, so the products get into the ground very late. So we already know that October 1 probably will not work.</i>
FARMER 4	<i>Well, you cannot harvest potatoes before October 1, because the potato harvesting season starts in September. Yes, they just need 2 or 3 months to get all the potatoes out of the ground. Then I think: what kind of nonsense is that?</i>

Table 9 – Policy (illustrative quotes)

7.10. Behaviour

Even though the farmers experience some obstacles, many farmers have taken good steps to make their businesses more sustainable. Despite the different ways they do this, most of them are consciously doing it.

As mentioned earlier, three farmers are part of Friesland Campina's PlanetProof project. Every year the requirements to be allowed to participate are tightened, which makes it more difficult to stay in it every year. The money the farmer gets gives the extra push to stay in the program. Examples of the more sustainable requirements are, for example, that at least 50% of the feed comes from the own farm, there is complete freedom of movement for the cow and at least 1 berth per animal in the barn and the construction of herb-rich grassland (*Melk - on the Way to PlanetProof, 2023*).

Herb-rich grassland is something that many more farmers, also outside PlanetProof, are actively involved in. Nine out of eleven farmers that were interviewed have indicated that part of their land is herb-rich grassland. This is a landscape type with grassland with more than fifteen to as many as 40 different plant species spread over the entire plot. An advantage of this is that it increases biodiversity, but a disadvantage of this is that slightly less yield can be collected and the seed mixture is more expensive, which means that it is an investment again. This is also part of nature-inclusive agriculture. What a farmer can do in terms of nature-inclusiveness on the farm is sometimes more than they would expect, such as leaving field margins. Yet not everyone is equally positive about nature-inclusive agriculture. They often find the term too unclear and do not see it as a good solution. The same applies

to circular agriculture, the term is too vague and is seen more as a nice marketing term (employee at Boerenverstand, employee LTO Noord (A)).

There is an upcoming trend of home sales of farm produce. There are different opinions on this. On the one hand, this is a good development because everyone knows where the products are produced and there are fewer emissions from transport (farmer 9, 5). On the other hand, these products are a bit more expensive than in the regular supermarket, so they are not affordable for everyone (Farmer 11 (A)). A term they use for this in the government is multifunctional agriculture, which also includes things such as farm camping and child daycare on the farm (employee LTO Noord (B)). The same applies to this as with the farm shop, to start this it must suit the farmer. There will be all kinds of people on the property, which is not always desirable. Also, starting a subsidiary branch of the company is a considerable investment, which is not possible for every farmer.

The behaviour of the Dutch farmer can also be influenced by other countries (Farmer 5, 11 (B)). The Netherlands always wants to lead the way and therefore often looks to neighbouring countries. When it comes to sustainability, this is still a tricky point. Producing more sustainable products is more expensive, the countries around the Netherlands are not so concerned with this, so sellers such as supermarkets will sooner get the cheaper products from there if the demand for more sustainable products in the Netherlands does not grow. The farmers are also concerned about this, especially because the will is there, but as long as the market does not grow and the pressure from the government continues to grow, there will be no solutions to this problem.

As shown, the farmers experience some obstacles when trying to convert to a more sustainable way of farming. Most of them have herb-rich grassland, and some are part of the PlanetProof project or started home sales. Nevertheless, they feel that the behaviour of other countries influences the behaviour of the Dutch farmers. In table 10 the quotes regarding behaviour can be read. Some examples of the sustainable behaviour of the farmers are summed up here:

- The farmer from Brummen feeds her cows products from human waste streams, such as potato peels, beetroot, carrots and orange peels. Because they use this as concentrated feed and grow the rest themselves, they are moving towards more circular agriculture. They have also established an orchard and make cheese for sale. The farmer herself thinks it is important to eat organic, even though the farm is currently conventional (due to economic reasons). They would therefore also like to become even more sustainable in the future, if given the chance.
- The farmer from Lochem, as said himself is not much concerned with the environment, and is involved in a biogas project with his neighbours. A nice initiative, according to the farmer,

however, it is not getting off the ground because regulations and the government is not cooperating.

- At the farm in Winterswijk, they are also already consciously working on making the farm more sustainable. For instance, they have already planted herb-rich grassland and an orchard, left field margins and hung nesting boxes. They would like to do more but current policies and the lack of space in surrounding areas do not make it any easier for them.
- Network Practice Farms is an initiative of dairy farmers in the Netherlands to look together at how they are going to become more sustainable. The farm in Laren has also joined this for several years already. They are connected and look together at how they can reduce methane and ammonia emissions to move towards a more circular agriculture.
- On the farm in Aalten, they are consciously working with nature; they have planted flower borders around the fields. They don't do this because the government requires it, but because they say, "it gives them a hobby and nature is beautiful too". What they find unfortunate is that they were already doing this in places where there was not so much yield anyway, only the government now dictates where they should be. This is yet another example of a policy that is hardly looked at in practice and is implemented without actually looking at what the farmer himself says or already does.
- One farmer is biodynamic (Lievelede) and one is organic (Angerlo). These are not necessarily more sustainable initiatives, but as a result, these farmers are strongly engaged in making the farm more sustainable. For instance, they both work together with Natuurmonumenten (the Society for the Conservation of Nature Monuments in the Netherlands), the farmer from Lievelede has a farm shop and Biotel (organic build guesthouse) and the farmer from Angerlo grows his own feed for the animals (which the farmer from Lievelede also does).
- The farmers have not yet purchased it but saw a lot of future in the Lely Sphere. This is a device that filters the air in the barn. Many indicated that they do see a future in this and are willing to invest in it. However, they are afraid that if they invest a lot of money in it, the government might declare this device invalid again at any moment, or else say that the functioning of the device cannot be guaranteed and the investment was actually for nothing.

PARTICIPATIONS

QUOTATIONS

**EMPLOYEE AT
BOERENVERSTAND**

So what is circular agriculture? Are you closing loops around the world or are you closing them at a local, company level? So in themselves, they are all fine terms to use, but then the question is what it actually means.

EMPLOYEE LTO NOORD (A)	<i>That's yes, that is really kind of a term, like yes, it is kind of put together. The term of all kinds of things that they actually want, but no one really knows what it means, because it is just very yes nature inclusive, so more with nature. But yes, they all say yes, we live with nature. So yes, we are actually already nature inclusive, but yes, that still has to change and yes.</i>
FARMER 9	<i>We have a shop and I have a farm education, host schools, host groups, I do birthday parties. We do a lot of social education and have a lot of people on this property.</i>
FARMER 6	<i>And now that farm shop is. That actually became the largest turnover of the entire company. In the past, a dairy farm was of course the core business, but that is no longer the case. Now that farm shop has really taken off.</i>
FARMER 11 (A)	<i>So I do not believe in those local door-to-door sales, as it were, on the farm. Or just in fresh local or you name it. That is quite a certain group of consumers who are interested in it. That is by no means affordable for everyone and you also see how much poverty there is in the Netherlands, so that is just not realistic at all, that is simply not possible.</i>
EMPLOYEE LTO NOORD (B)	<i>I do not want to say anything that is an extension of the company, so multifunctional, side branches, because you sometimes see that even, for example, the daycare centre is just as big a part of the company as the company itself. But you also often see that in policy documents or in governments that are seen as oh yes, but then the farmer will do something next to it, then he will get extra income from it. But yes, it is not that easy',</i>
FARMER 5	<i>And that is what happens if that government could have continued everything now, yes, and so many farmers had left and the rest should all become nature-inclusive, then they would just pretend the problem is not there in other countries, but you cannot do that, right?</i>
FARMER 11 (B)	<i>You can't just turn off agriculture and put a fence around it, that is not possible. We are dealing with trade agreements.</i>

Table 10 – Behaviour (illustrative quotes)

7.11. Analysis

The different factors of the conceptual model are related to the farmer's intention and thus to the actual behaviour they exhibit. As mentioned above, farmers are already showing good behaviour in terms of sustainability and there are all great initiatives they are working on. Below, all parts of the conceptual model will be discussed and with this the connection to the behaviour.

It has been shown that attitudes towards sustainability are often positive. It can therefore also be said that this has a positive influence on intention and behaviour. However, if this attitude is negative towards sustainability, farmers are more likely to have a negative intention and, as a result, do not show environmentally conscious behaviour. Among the farmers interviewed for this thesis, most were positive about changing, despite the obstacles they face.

During the interviews, it also became apparent that the subjective norm also influences the farmer's sustainable behaviour. If the farmer experiences pressure both from society, the government and manufacturers/supermarkets, this can negatively influence the intention to become more sustainable. Therefore, this will lead to a lack of farmers' sustainable behaviour. It is also said that no matter how much pressure farmers experience from society to become more sustainable, there has to be a market for these products first, because until there is one, farmers simply cannot become more sustainable.

PBC, or maintaining interest in becoming more sustainable, was also found to be important. Various solutions were also mentioned during the interviews to maintain this interest and thus reduce the obstacle. These are the implementation of subsidies, yet it is also indicated that this solution cannot be maintained long-term. Another solution must therefore be found to maintain farmers' interest in sustainable agriculture in the long term.

The farmers' past behaviour did not emerge as a strong factor from the study as an important factor in the farmers' current behaviour. However, it did reveal how the farmers' current behaviour has been shaped, which provided valuable information. This current behaviour has mainly been shaped by the government, which has focused a lot on scaling up in the past. As a result, farmers have grown a lot in the past and now have to reduce. In other words, the past behaviour of the farmer has provided important background knowledge, however, this has little impact on the farmer's current behaviour.

Farmers' knowledge proved to be an important factor and thus a good addition to the conceptual model. The more knowledge the farmer has about the possibilities of sustainability, the more likely the farmer is to consider different possibilities. There are also increasing opportunities for farmers to gain knowledge, however, this is related to the farmer's attitude and intention to become more sustainable. These are addressed further in the section below where all correlations will be discussed.

As indicated earlier, emotion is a difficult factor to investigate, yet it has been shown that there is a link between emotion and the actual behaviour of the farmer. A farmer cares a lot about his farm and his animals and is, therefore, more likely to adapt his business in this way if there is then a guarantee that he can continue farming. However, this does not alter the fact that a farmer may disagree with the government's measures and still see obstacles to achieving the behaviour the government would like.

The factor policy has not been added to the conceptual model but still has a great influence on the farmers' intentions and behaviour. However, the influence of the current policy on the farmers' intention is often negative, because there is little clarity, farmers indicate that this is a major obstacle and has a negative influence on becoming more sustainable. As the farmers themselves indicate, if there is more clarity in the policy, this can become a positive influence on the farmer's intentions and behaviour.

Although the intention is not mentioned above, there is an influence on the behaviour. The parts of the conceptual model have an influence on the intention and therefore on the behaviour of the farmers. If the attitude, knowledge and PBC are good on the subject of sustainability, this will only strengthen the intention to adopt more sustainable behaviour. The same applies if these are more negative, then the intention to exhibit more sustainable behaviour will be lower. For emotion, subjective norm and past behaviour, this is harder to say. The pressure they experience may have a negative impact on becoming more sustainable but this was not clearly stated by farmers. Also, past behaviour was not distinctly indicated by the farmers to influence their intention and thus their current behaviour. Farmers did indicate that the government's previous policy (the scaling-up) influenced past behaviour, but whether this is still the case was not expressed. Farmers have indicated that they feel frustrated with the policy, but on the behaviour and obstacles, it is difficult to say whether this affects intention.

All in all, it can be said that attitude and knowledge have the most influence on farmers' behaviour. The other factors also have an influence on behaviour but a lot less than the aforementioned two. It was discovered, as mentioned earlier, that policy has the greatest influence on farmer behaviour.

Similarly, links can be seen between them. If the attitude towards sustainability is good, the farmer is more likely to attend a study club and will therefore have more knowledge about sustainability than a farmer who does not attend such a study club. It can also be said that if the farmer has the intention to become more sustainable, he is more likely to learn more about the topic and have therefore more knowledge. Past behaviour can also influence the retention of interest. If applying an innovation in the past has proven to go well and therefore there is a positive attitude towards it, the farmer is more likely to retain an interest in applying more innovations on his farm. It is mentioned in chapter 4 on theory, that past behaviour is part of PBC, and could also be scaled below it in this study and seen as part of it.

A link can also be seen between subjective norms and attitude. When great pressure is experienced by farmers, the attitude is also not always good. As has been shown, they then feel unheard and go on strike, which has attracted the attention of society and hopefully the government, but for many farmers has meant that the attitude towards sustainability has not become more positive.

The policy is a kind of overarching factor that affects every factor. For instance, because of the lack of clarity, it has a negative impact on attitudes and emotions. The policy has caused farmers to focus on scaling up in the past which they are now being paid for. Farmers do also feel pressure for the policy (subjective norm) and the ever-changing policy makes it difficult to maintain interest (PBC). And if farmers do not get certainty from the government on which direction they want to go in terms of sustainability, it is also difficult to gain certain knowledge in the right area. The policy also has a direct negative effect on the intention of the farmer.

In figure 6, the above-mentioned connections between all the factors are presented. As shown, the factor policy has been added to the model, because of the importance of this factor that became clear in the interviews. Each arrow also indicates whether the relationship between the factors is positive or negative.

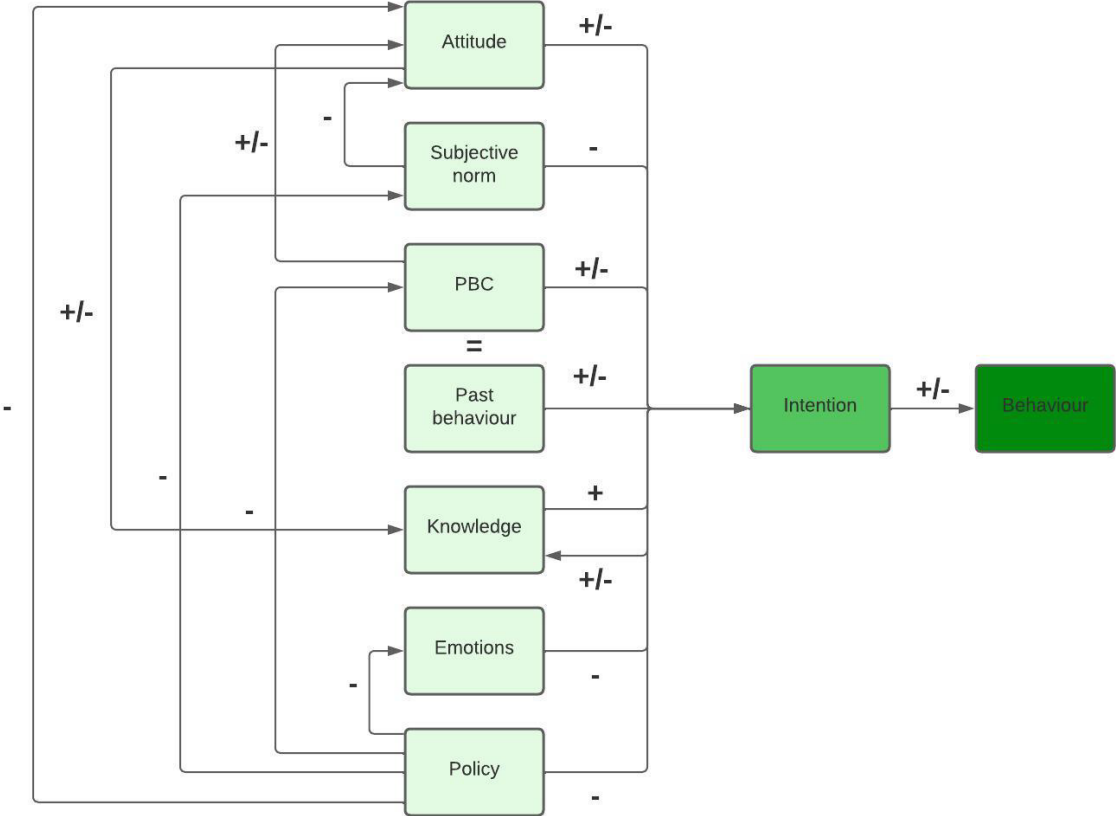


Figure 6 - A renewed conceptual model

Concludingly, it can be said that the factors, except for past behaviour, have a significant influence on the intention and the behaviour of the farmers. Policy only for now only has a negative influence on every factor. For most factors, whether the influence is positive or negative depends on the interviewee. For example, if the attitude towards sustainability is positive, it would have a positive

influence on the intention and therefore on the behaviour. When this would be negative, the influence on the intention and behaviour would also be negative.

8. Conclusion

In this thesis the following research question has been examined: *What are the obstacles for dairy farmers in Gelderland when trying to convert to a more sustainable way of farming?* With the help of interviews and literature research, an answer to this question can be formulated.

It is important to say, still after conducting the interview, one clear obstacle is hard to acknowledge. The interviewed farmers perceived policies to be the most important obstacle. In several interviews, policies were described as 'unclear' and not easily understandable. Farmers claimed that policies lack a long-term orientation. Moreover, some bemoaned that policies were drafted by people who themselves have 'little understanding of how things work on the farm'.

Another obstacle is that the market in the Netherlands is not ready for more sustainable products. The Dutch consumers simply do not want to start paying more for sustainable products, however, if the products in the supermarket are starting to become more sustainable, they need to accept the additional cost of these products.

In the interviews, several solutions to these obstacles also emerged, but it was not possible to draw a clear conclusion from these because the farmers' opinions were still much divided. While some want to solve it more Europe-wide, others see more future in solving the obstacles more locally, even though the term local is often interpreted differently by the farmers.

In conclusion, the biggest obstacles farmers face are policy and the market that is not ready for it. If these obstacles are addressed then farmers will start becoming more sustainable much faster and we can all enjoy agriculture and a better climate in the future!

9. Discussion

9.1. Limitations of research

To begin with, it is important to be clear whether what was measured was the right thing to do. In this study, obstacles certainly emerged in the interviews. Even though the main question was what are the obstacles of the farmers, it was valuable to also interview two people from the field because they still sometimes knew what the farmers were not always aware of.

In this thesis, thirteen interviews were conducted, so a generalisations cannot be made. Due to the large number of farmers in Gelderland, only a small part of these were interviewed. Also, this study may involve specific local problems in sustainability that may not apply to other people in the province. As a result, external validity is also not high; the results of the study cannot be used for another group of people, outside the agricultural sector. To increase external validity, different actors could be interviewed and several farmers in different parts of Gelderland to get an even better picture of the obstacles, however, for this bachelor thesis it was not feasible to do more interviews in the time available for the thesis. Nevertheless, the obstacles discovered in this thesis are valuable, even though they cannot be generalised and the external validity is not high.

For the main part, scientific sources were used to support the context of the thesis, however, some news articles and other websites were used where the scientificity cannot always be proven. Nevertheless, it was chosen to use these because they contained valuable information for the context of the thesis. A semi-structured interview guide was used for the interviews, allowing flexibility between questions but providing a clear framework of what to ask, to raise the same issues with all farmers. This increased the reliability of the survey, especially because the obstacles raised by the farmers were along the same lines, even if they were sometimes specific to the region. For instance, farmers around the river IJssel had more problems with the river and farmers near the German border with a difference in regulations with the neighbouring area.

A limitation during the research was contacting the farmers. During the research, it was initially difficult to find enough farmers to the interviews, partly for the GDPR (General Data Protection Regulation; in Dutch: Algemene verordening gegevensbescherming (AVG)) that people are not allowed to share personal details. Also, the experience was that the farmers who are already working on sustainability are more willing to be interviewed than the farmer who is not involved much in this area, this can create a skewed picture of farmers in the province. There was also a large non-response to the emails and attempted calls that were made. A total of more than 50 emails were sent and calls were made, half of which only responded/answered and 13 interviews followed from this.

9.2. Interpretation results

Little literature could be found for the specific problem of this thesis, so there were not many expectations at the beginning of the research. It did become clear from the literature that there is a lot of discontents among farmers, which also emerged in the research. What was said a lot in the Dutch media was that farmers are not or hardly concerned with sustainability. However, this research showed that farmers are indeed working on it and a lot is already being done to increase sustainability. The topic of sustainability is current, which means that many farmers do deal with it and have a clear opinion about it, so a lot of useful information could be extracted from the interviews.

In using this theory, it was valuable that it had been expanded to include several more factors, especially the farmer's knowledge proved important here. It was also a good addition for the study not to have interconnections between the different factors at first but to see where connections could be discovered between them based on the results. This allowed this to be let go more during the interviews and even better include the farmers' opinions because no connections were established beforehand. With the results, it can be shown that there are obstacles for farmers if they want to become more sustainable, and thus the main question could be answered.

9.3. Implications

What has emerged from the study is that there are obstacles. The government has clear targets they want to meet, however, it is not clear how the government wants to meet these targets. So there needs to be more clarity for farmers if the government wants to meet these targets and then farmers will also be more likely to become more sustainable. It is also important to look at what farmers are already doing on sustainability, rather than setting clear frameworks for a particular area as to what should happen there. Because the concept of sustainability is broad, farmers should also be more free to decide how they want to make their farms more sustainable. If this is not looked at more closely, farmers' cooperation on sustainability will be a lot more difficult.

9.4. Further research

As a follow-up study, more farmers could be interviewed to get an even better picture of the obstacles, however, this was not feasible in this bachelor thesis. It could also be interesting to compare countries or regions to see if the obstacles differ per country/region.

It would also be possible to investigate other forms of agriculture, widening the scope beyond dairy farms. These farmers may have other insights which could also be interesting to get an even better picture of the obstacles. As a result, other forms of sustainable agriculture can also be explored beyond the ones named in this thesis. It could also be interesting to look at the possibility of sustainable forms

of agriculture without a specific label, as explored in the article by Koch et al. (2023). Here it is applied to a case in Germany, this could also be applied to a case in the Netherlands

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12. Appendix

12.1. Questions connection to the conceptual model

Subject	Questions	Part of the conceptual model
General question	Who is it?	
	Did they follow any form of education?	Knowledge
History of the farm	How long has the farm been in existence? What kind of farm is it?	Emotions/knowledge
	Has it been in the family all along?	Emotions
	Have you had many innovations/investments in the future of the farm? If so, which ones? How did this go? If not, why not?	Past behaviour
Knowledge about the environment	What is sustainability in your opinion?	Knowledge
	Are you concerned with the environment yourself? or not at all?	Knowledge
	If yes, where did you acquire this knowledge?	Knowledge
	Are you concerned with the environment in everyday life (including off the farm)? If yes, when did this interest arise? If not, what is the reason for this?	Attitude PCB PCB
	Do you experience pressure from society to be more concerned with the environment? Does this pressure affect the choices you make on the farm?	Subjective norm/ emotions
	Are you aware of the types of sustainable farming methods available? If so, which ones are you aware of? If they do not know of one explain what it is and whether they would consider it	Knowledge/ attitude

	Why have you not yet taken steps within your farm to become more environmentally friendly? -> Have they done so ask what these are and how it went to do this (obstacles) -> If not what are obstacles you expect to encounter	
Knowledge about policies	Are you aware of the policy on becoming more sustainable?	Knowledge
	Do you think this policy is good? What would you like to see changed? What would you like to change? -> Strike?	Attitude
	Do you ever experience stress from the policy around farmers and the environment?	Emotions
	Does the ever-changing policy affect the choices you make within the farm?	PBC
Other	Do you have contact with other farmers? Do you share knowledge? Do other farmers' stories influence your farm choices?	PBC PBC Subjective norm
	Are you familiar with local initiatives to help farmers become more sustainable? Could this help you become more sustainable?	Knowledge Attitude

12.2. Interview guide farmers

Main research question: What are the obstacles for dairy farmers in Gelderland when trying to convert to a more sustainable way of farming?

English interview guide

Name of interviewee:

Name of farm:

Gender:

Introduction

Already in email, possibly also short live confirmation of anonymity, recording and mentioning they can take a break at any time.

Questions:

Part A: Background information/information about the farm

- Could you tell me something about yourself? How long have you been a farmer?

- Do you have followed any form of education about dairy farming or agriculture?
- How long has the farm been in existence?
- What kind of farm is it?
- Has it been in the family all along?
- Have you had many innovations/investments in the future of the farm?
- If so, which ones? How did this go?
- If not, why not?

Part B: Knowledge about the environment

- What is sustainability in your opinion?
- Are you concerned with the environment yourself? or not at all?
 - o If yes, where did you acquire this knowledge?
- Are you concerned with the environment in everyday life (including off the farm)?
 - o If yes, when did this interest arise?
 - o If not, what is the reason for this?
- Do you experience pressure from society to be more concerned with the environment?
- Does this pressure affect the choices you make on the farm?
- Are you aware of the types of sustainable farming methods available?
 - o If so, which ones are you aware of?
 - o If they do not know of one explain what it is and whether they would consider it
- Why have you not yet taken steps within your farm to become more environmentally friendly? -> Have they done so ask what these are and how it went to do this (obstacles)
 - o if not what are the obstacles you expect to encounter

Part C: Knowledge about policies

- Are you aware of the policy on becoming more sustainable?
- Do you think this policy is good? What would you like to see changed? What would you like to change?
 - o Strike?
- Do you ever experience stress from the policy around farmers and the environment? (Because the policy is so uncertain)
- Does the ever-changing policy affect the choices you make within the farm?

Part D: Other

- Do you have contact with other farmers?
- Do you share knowledge?

- Do other farmers' stories influence your farm choices?
- Are you familiar with local initiatives to help farmers become more sustainable?
- Could this help you become more sustainable?

Part E: Outro

Well, that was the interview, thank you very much! I found it very interesting and it can certainly make a valuable contribution to the research. If you have any questions or would like to give feedback on the interview now or later, please feel free to contact me. If you're interested, I can also send you the research when it's finished. Once again, thank you and have a great day. Who knows, maybe until next time!

12.3. Interview guide others

Main research question: What are the obstacles for dairy farmers in Gelderland when trying to convert to a more sustainable way of farming?

English interview guide

Name of interviewee:

Gender:

Introduction

Already in email, possibly also short live confirmation of anonymity, recording and mentioning they can take a break at any time.

Part A: General

- Could you tell me something about yourself and the company?
- What kind of training have you received?
- What exactly does your job entail?

Part B: Business/ projects

- What are the problems farmers face when they turn to you for help?
- What are examples of projects you are involved in that focus on sustainability?
- Are there any specific examples in Gelderland?

Part C: Environment

- What is sustainability according to you?
- Are you working a lot on sustainability yourself?
- Is this reflected in the company?
- If so, where did you acquire this knowledge?

- Do you notice that farmers experience pressure from society to be more concerned with the environment?
- What forms of sustainable dairy farms do you think are most feasible?

Part D: Policy

- What do you think about the current policies on sustainable farming?
- Do you ever experience stress among farmers when it comes to sustainability and policy?
(Because the policy is so uncertain)
- Does being on strike affect policy changes?

Part E: Other

- Do you think mutual knowledge sharing among farmers could help them to become more sustainable?
- Are you familiar with local initiatives to help farmers become more sustainable?
- Could this help them become more sustainable?

Part F: Outro

Well, that was the interview, thank you very much! I found it very interesting and it can certainly make a valuable contribution to the research. If you have any questions or would like to give feedback on the interview now or later, please feel free to contact me. If you're interested, I can also send you the research when it's finished. Once again, thank you and have a great day. Who knows, maybe until next time!