Design for Interaction

MASTER THESIS MARIA GEUZE

March 2022

TOT IN DE BODEM

Investigating the current system of the Frisian dairy cow, to find a new perspective on the current complexity and inspire towards a sustainable future.

TU Delft

De wortels maken de bodem waarin ze leven
en we zien de wortels in onszelf groeien
sneller dan gedacht.
Maanwormen op zonnekracht
die zijdezacht haartjes ontwikkelen
als het allerfijnste begin.
Elke wortelhaar blijkt een microkosmos
een heelal van levensvormen
lichte wortels in donkere grond
als een licht vezelnet.
De boer staat
tussen het onbegrijpelijke en het ongebruikelijke.
Brengt het licht van zijn aandacht de grond in
en schept iets van waarde.
Gaat een relatie aan met de grond.
Boer zoekt vrouw
en ze heet Moeder Aarde.

- Alexis de Roode, fragment uit 'Wortels' (ongepubliceerd)
(Seidell & Halberstadt, 2021)

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PREFACE

In this report, the results of my graduation project will be presented. With successful finishing this project, I will graduate my master program “Design for Interaction” at the Delft University of Technology.

As my family has a vacation home in Friesland, I have been coming to the Frisian countryside since I was born. The dairy cows in the meadow are a beautiful sight, and I have always been greatly interested in the processes around dairy cows. That is why the subject of this project is the complex system around the Frisian dairy cow, whereby I zoom in on this aspect of the Dutch agriculture.

I have worked on this project for more than a year with great pleasure. In this report, I lay out my journey with all my experiences, findings, and results. I sincerely hope you will have as much fun reading it, even though it is a lot of text, as I had to make, experience, and write it.

While conducting the project, it was touching to see and experience how many people reacted on the topic. It was easy to talk to various types of people when they had a genuine interest. These conversations or (heavy) discussions made it special to work on this project. The vast amount of people sharing

newspaper articles or information on related topics, showed me how much this subject deserves attention and an open conversation.

I hope in the future more designers, creatives, and students will work in the field of Dutch agriculture, and act on the opportunities which I experienced.

During this project, I had the great pleasure to work with a wide range of interesting people. I want to thank them all for their contribution, inspiring stories, effort, and time.

I would especially like to thank my supervisory team, Bregje and Erik. The trajectory of this project was different compared to my peer-students, due to a concussion which had me out of the running for several months and which proceeded with long-term effects. Bregje and Erik were very understanding. Without them, the project would never have been the same. Thank you for giving me the space to define this project and to work on it in my own way and always trusting me while doing so. But most of all, thank you for your time and attention during this long period of time, and your great respect and patience during the insecure times. In addition, I would like to thank Bregje for her inspiring new perspectives and challenging questions during all our meetings. And Erik, thank you for your enthusiasm, sharing inspiring articles along the year and always thinking along in a creative way and coaching me towards the best result.

Genietsje fan it lêzen.

Maria

SUMMARY

In 2021, a group of angry farmers drove their tractors to the 'Malieveld' ('Main square') in The Hague, to protest the new nitrogen regulations. They felt angry because the politicians were not listening. When reading this news and following the politics around the farmers, a present call for sustainable change within agriculture could be heard. However, the changes which are currently spoken about, such as reduction of nitrogen or the number of dairy cattle, seems to be a black-and-white approach to frame the problem and does not represent a real or focused long-term plan.

Therefore, the aim of this project is to investigate the current system surrounding the dairy cow to find a new perspective on the complexity of the problem, and to create a fitting intervention which should bring about change towards a sustainable agriculture. This project will zoom in on specifically the Frisian dairy agriculture, exploring this context on a systemic level, and investigate using the 'Transition Design' method.

To gain insights in the complex system around the Frisian dairy cow, various stakeholders were identified. Some of these stakeholders, such as farmers or experts

on nature or soil, were interviewed, while other stakeholders' perspectives were investigated through in-depth research.

During the project, a new perspective arised. It can be concluded that the whole system surrounding the Frisian dairy cow is one large interwoven network. With at the centre not the dairy cow, but the one stakeholder which is directly connected to the entire system as every stakeholder depends on this: the soil. Without a healthy soil, which supplies raw materials, the entire identified system will not exist. Within our currently built agricultural system the discovered problem is that the soil will be depleted over the coming years and biodiversity will be expelled. Within this current system profits are not fairly distributed. The present system is mainly focused on yielding high profits by the banks, the food industry, and supermarkets.

Based on the research, a desired future vision was created which helped to map out the pathway of transition. To accelerate the transition of the current system of the dairy cow towards the desired future, an intervention was designed. This intervention was focused on helping young professionals to develop a level of self-reflection with which they can link their behaviour towards buying certain dairy products to the invisible exiting consequences of the Dutch soil degradation.

Through a diverse set of testing rounds with different iterated prototypes, the intervention was tested among the target group. This showed that through the designed intervention, a new awareness was created regarding the present state of our food or dairy system. In conclusion, it showed that the intervention increased the level of self-reflection in the habits of consumers towards buying and consuming food with all the connected consequences.

This project however has some limitations, the research had some time constraints and was conducted by only one individual. Therefore, when analysing, concluding and interpreting the data, the outcome, the new vision surrounding the Dutch dairy cow and the designed intervention could be received as subjective. Additionally due to the short time period of the research, not every stakeholder could represent themself.

If the research was to be reproduced, all the stakeholders of the system should represent themselves, to create an equal and complete view on the current system.
Moreover, if the project was to be reproduced it should be continued by a larger team of diverse (design) researchers to create a more objective data analysis outcome.

TABLE OF CONTENTS

01

INTRODUCTION

This chapter introduces the topic, the challenge and the purpose of the project. The first section introduces the context and scope of the project. In the first part the two conflicting sides of the Dutch dairy cow will be revealed and showed how this dairy cow is in reality part of an immense kapitalist system. The second part will discuss the design challenge and the goal of this project, in which the current approach towards the topic is being critically questioned.

The average Dutch child grew up with the mantra “Melk is goed voor elk”, which translates to “Milk is good for all”. That is why the Dutch refer to themselves as ‘White Cheese Heads’, a kind of loving nickname to those who are of agricultural descent.

As the mantra suggests, the Netherlands has a rich history of farmers and their dairy cows. In the 1950s, the Frisian “Stamboekvee” was a world-famous breed of dairy cows (Blokzijl et al., 2012). These types of dairy

cows have defined, and are yet defining the famous image of the Netherlands. These black-and-white spotted dairy cows stand in a perfectly green meadow with the Dutch clouds and blue sky, as painters like Vincent van Gogh and Rembrandt have shown the world in their paintings. It is hard to imagine the Netherlands without its black-and-white cows (Veltman et al., 2007).

However, this sight might not last as there is a possible end for this historic dairy cow. The dairy cow is currently the subject of much national political discussion. The number of dairy cattle should decrease according to several politicians, experts and activists in order to achieve sustainability and a decrease in nitrogen (van de Berg, 2019) (Ariëns, 2020). This makes the Dutch cows a multi-faceted topic of discussion.

The claims about these dairy cows are mostly concerned about the emission of too much nitrogen and CO2 by the dairy cattle. As a result, farmers are identified as the number one culprit (Kuiper & Verlaan, 2021).
For me however, these statements raised the following questions :

- Can these complex problems be viewed as such a black and white problem?
- Is the question of more or less nitrogen a bit too simplistic?
- Are the cows or is the farmer the real cause of this problem?

The solutions already proposed for these problems only deal with smaller parts of a much larger problem. The proposed solutions might change the problem but will not solve it completely (van de Berg, 2019) (Slump, 2019). These kinds of complex issues need a much more thorough approach. Therefore, the focus should be on the core of the problem, which is deeply rooted in the human-build capitalist system. These problems reflect the society we have created. A society in which everything revolves around efficiency, returns, and costs and benefits. Though this system was working in the past, it now seems to turn against us. However, since humans built the system as it is now, we are also capable of creating a new system (Rotmans & Verheijden, 2021).
According to researchers, humans currently live in the Anthropocene, the geological age of man. An era in which humans have a fundamental influence on the earth, leaving deep traces which cannot be easily erased. Therefore, humans should realise that we are in control of Mothership Earth and

Figure 1.1 -
The cows in the landscape of Southwest Friesland

considerable adjustments must be made in order not to crash it (Tielbeke, 2016) (VPRO, 2019).

"There is a world which is sensitive to what we do."

- Bruno Latour

To be able to get to the core of the system around the dairy cow, a holistic approach is needed in which more than human elements are included, such as ecological or natural elements. By doing so a multi disciplinary view on the system can be created.

All living organisms should be seen as equal players, meaning that plants, animals and even micro organisms should be included when looking at the system surrounding the dairy cow. This is of great importance since complex living systems cannot be understood in terms of a single part, they can only be understood within the context of the greater whole they are all part of (Irwin, 2012).

System changes, or transitions, are slow processes developing a better version of something which can take several years. Since system changes demand personal change, a deeper change in our thinking, acting, and organising is needed. In order to accelerate the transition to a new system, a new, clear and big story needs to be realised and told. However, this story must be made into small and reachable pieces to be able to be fully embraced and accepted by us humans. This is where the work of designers comes in (Rotmans & Verheijden, 2021), and creates the starting point for this project.

This project will underline the importance of understanding that the dairy cow is part of a larger, whole, and immense system and how a dairy cow is entangled with all the other players functioning in this system.

SCOPE OF THE PROJECT

The study field of this project is the southwest of Friesland or, as the Frisians would say Súdwest-Fryslân.
Súdwest-Fryslân is a municipality in the Dutch province of Friesland.
Due to the specific geomorphologic soil profile, this area is home to many dairy farmers, and thus makes it an interesting and demarcated area of research for this project (Ruyter, 2020).

The system around the southwest Frisian dairy cow is explored with an holistic point of view including all multidisciplinary elements, and will therefore be centralised within this project.

There are various main stakeholders within this holistic dairy-producing system, who play an important key role. As relevant information about these stakeholders and their roles is needed to provide deeper analysis later in this research, the involved stakeholders will be presented below. All these stakeholders together form the starting point and the scope for this project research.

1. The first important stakeholder of the system is the home of the dairy cow: the Southwest Friesian meadow. This landscape has a unique geomorphological profile. The soil has specific characteristics, which influence the functioning of the system (Ruyter, 2020) (Geuze, 2021) .

2. Secondly, Southwest Friesland has specific biodiversity. Next to the black and white cow in the meadow, the black-tailed Godwit (in Dutch, the 'Grutto') and other animals can be found. These are also part of the system as their presence is directly related to how the land is cultivated, which in turn has certain consequences for parts of the system around the dairy cow (Fryslân, 2021).
3. The same cow is maintained by a farmer. The farmer owns the land and the dairy farm (in Dutch, the 'Melkveehouderij'). In addition, the farmer is also the manager of all the work and activities happening on or around the farm (De Platte Stad, 2021).
4. The farmer and the product of the dairy cow are both linked to the dairy industry. The dairy industry consists of various smaller stakeholders, for instance, medium or big supermarket chains (e.g., Albert Heijn and Jumbo), and various dairy factories. In general, the dairy industry turns the milk into various dairy products, which reach the Dutch consumer or are exported. This makes the dairy industry a major stakeholder in the network of a dairy cow (Wetzels, 2015).
5. Lastly, the consumer is also an important member of this system. Since the consumer is the one who buys the dairy in the supermarket (or online).

Figure 1.2 - Sketch of Southwest Friesland within Friesland on the map of the Netherlands

Figure 1.3 - Southwest Frisian meadow

Figure 1.4 - Meadow bird eggs in the Frisian meadow

Figure 1.5 - Dairy farming in Southwest Friesland

1.2 Project challenge & goal

CHALLENGE

The whole system is a great interplay of different parties with different interests. However, the customer market and politics seem to be in control of the system and are thus making choices which are often not for the benefit of the farmer, their dairy cows and their land. The present call for change is apparent when reading the news, following politics around farmers, and listening to the angry farmers during the 'Malieveld' demonstration in 2021 (Kuiper & Verlaan, 2021).

Nevertheless, the change, which is currently spoken about, concentrates solely around the reduction of nitrogen or the number of dairy cattle, in order to achieve sustainability.

The focus on only these two interventions seems to be a black and white approach to the problem and does not represent reality or focus on a long-term plan. Those kinds of interventions are resulting more in changing the current problems rather than improving the system towards a more sustainable future. These kinds of systemic problems are much more complex. The Friesian (dairy) agriculture can be considered more as a 'wicked problem' (Irwin, 2012). How the whole system functions is yet quite unclear and needs to be better mapped, in order to come up with a desirable future vision and a well-considered transition plan.

Wicked problems are "systems problems" which exist within large, socio-technical systems, and therefore, require new problem-solving approaches (Irwin, 2018).

What makes those systems complex is that they often consist of multiple layers, such as economic, political, social, and ecological. Therefore, changing or solving existing problems is more difficult since all the layers are interconnected. All those layers also involve multiple stakeholders with conflicting agendas. Complex living systems cannot be understood in terms of a single part, they can only be understood within the context of the greater whole they are part of (Irwin, 2012).

All these layers are touched upon within this project, in order to find a new perspective on the complexity of the problem. By investigating the system with the conflict layers, the current working mechanism can be mapped out. The research will reveal if and how all the different elements relate to each other, where possible tensions between them lie, and discover where and what possible action could be taken within this system. Only then can be identified where within the system an intervention can be designed and what it should bring about.

The aim of this project is to investigate the current system of the Frisian dairy cow, in order to find a new perspective on the complexity of the problem, and create a fitting intervention which should bring change towards a sustainable future for agriculture.

Figure 1.6
Cow at the farm in Southwest Friesland

02

PROJECT APPROACH

This chapter will introduce the design-led approach of this project and provide an overview of the process, including all the steps taken to achieve the goal of the project.

Complex systems require a holistic approach which includes the existing complexity and all layers or elements. To achieve a complex system, the holistic approach called 'Transition Design approach', is used for this project.

"Transition Design: An approach for addressing complex "wicked" problems and catalysing societal transitions toward a more sustainable and durable future"

- Terry Irwin

Transition Design is a relatively new design-led approach. It uses methods which are focused on training designers to work with a greater degree of complex challenges, thus aims to bring about larger system change. Areas of design focus such as 'social design' or 'interaction design', take a more systematic approach in addressing complex problems. However, these areas of design tend to frame problems often in a limited time and context. Due to these limitations, these types of areas of design often do not offer a comprehensive approach to help identify all involved stakeholders (both human and non-human) and to embrace their internal conflicts (Irwin, 2018).

As a design-led approach which is focused on training designers, Transition Design is a more practical approach which takes more functional steps towards a future transition within society. Thus, it requires strategic design steps, in which, for example, different designed interventions bring about the desired change. This change is looked at in a longer period of time, such as a 10 year or 15 year period, because facilitating transition within a society usually extends over a long-term period (Irwin, 2018).

Rather than a fixed process, the design-led approach suggests that certain phases must be executed within a process. In other words, different types of actions are needed to be executed when designing a change of system.

To provide structure to the different types of design steps, the Systemic Design Toolkit is used during the project. This toolkit helps designers to trigger a process of systemic change, and therefore, is divided into seven sub-phases. These sub-phases form the guideline of this project. The seven sub-phases are the following: (van Ael et al., n.d.)

1. Framing the system
2. Listening to the system
3. Understanding the system
4. Defining the desired future
5. Exploring the possibility spaces
6. Designing the intervention model
7. Fostering the transition

An in-depth explanation of each phase will be explained in the chapters regarding those steps of the toolkit.

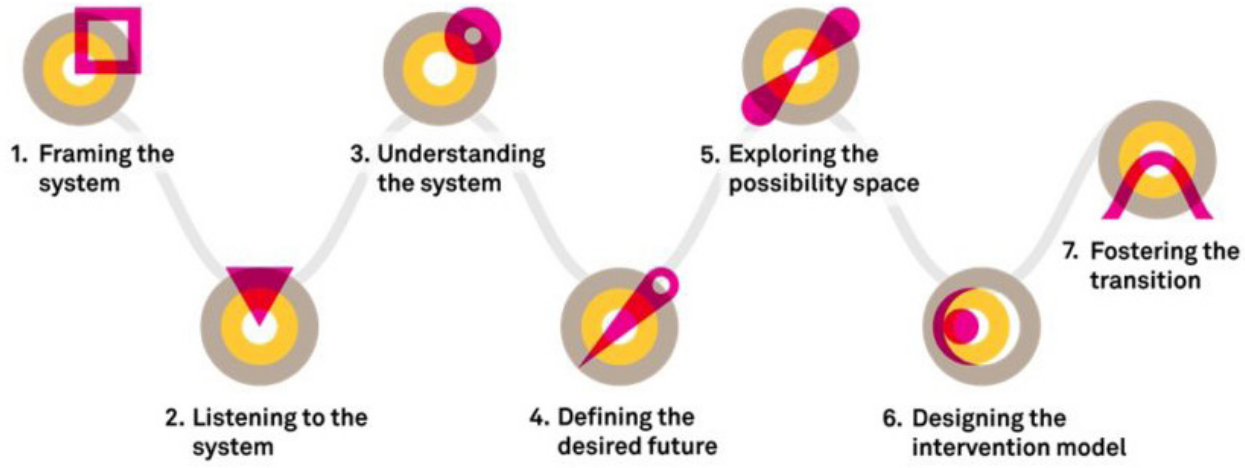


Figure 2.1 -
The Systemic Design Toolkit methodology 7 steps (van Ael et al., n.d.)

Bewlow in figure 2.2, is a drawn overview of the Transition Design process is presented, with all sub-phases and the activities which were conducted for each of these phases.

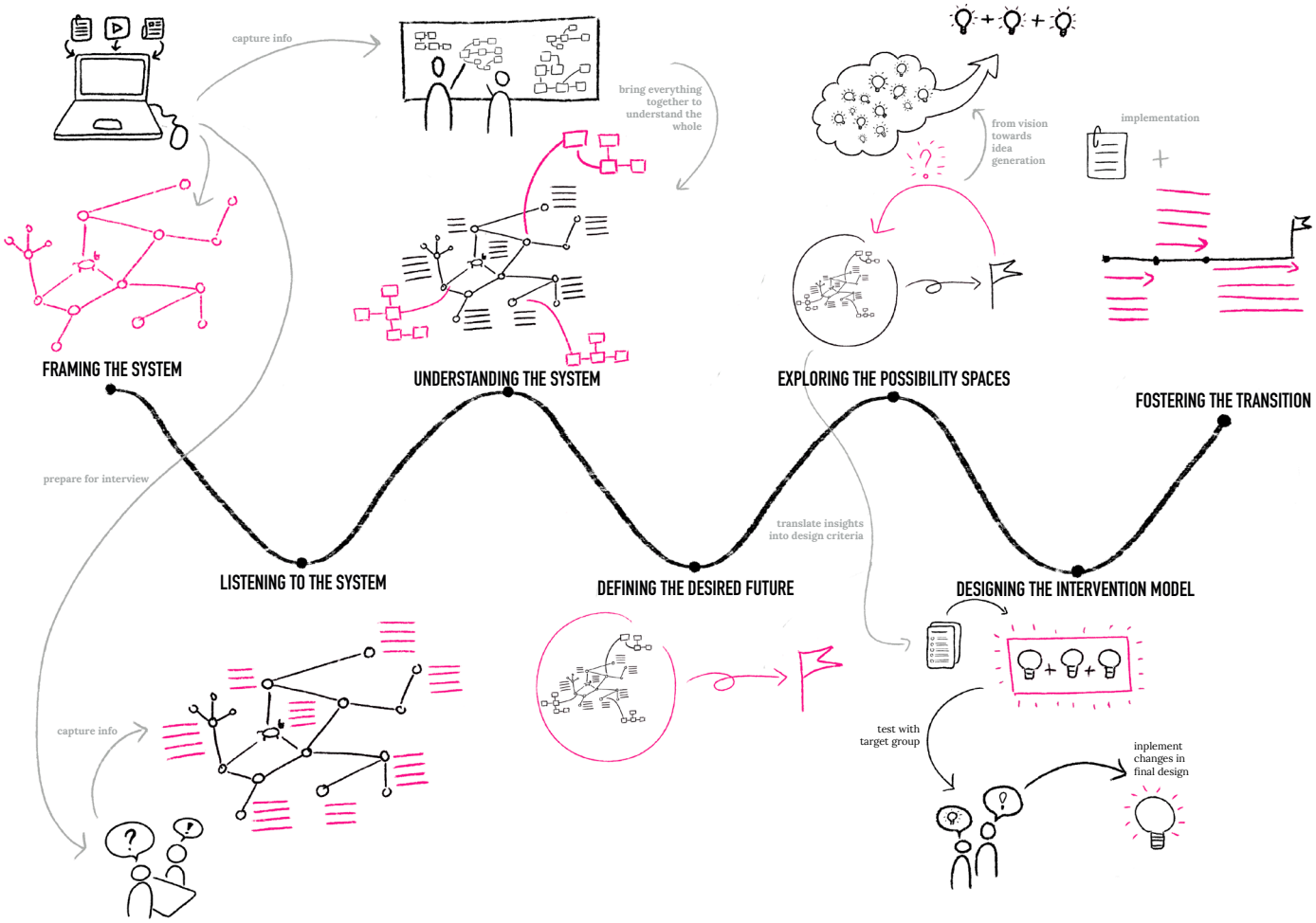


Figure 2.2 -
Overview of the Transition Design process, with all phases and the activities that are performed

03

RESEARCH

This chapter provides an overview of the research which was conducted during this project. Within the first part of this chapter, all research activities and the corresponding results will be explained. Research activities contain, but are not limited to, interviews with farmers and other stakeholders, and an in-depth literature study. In the second part of the chapter, the analysis of the research and the results will be presented.

As stated in Chapter 2, the research will be presented on the Systemic Design Toolkit and their corresponding sub-phases. The first step of the Systemic Design Toolkit includes the setting of boundaries of the system in space and time and the identification of the hypothetical parts and relationships (van Ael et al., n.d.).

To get a better understanding of the current organisation surrounding the Frisian dairy cow, in-depth research was

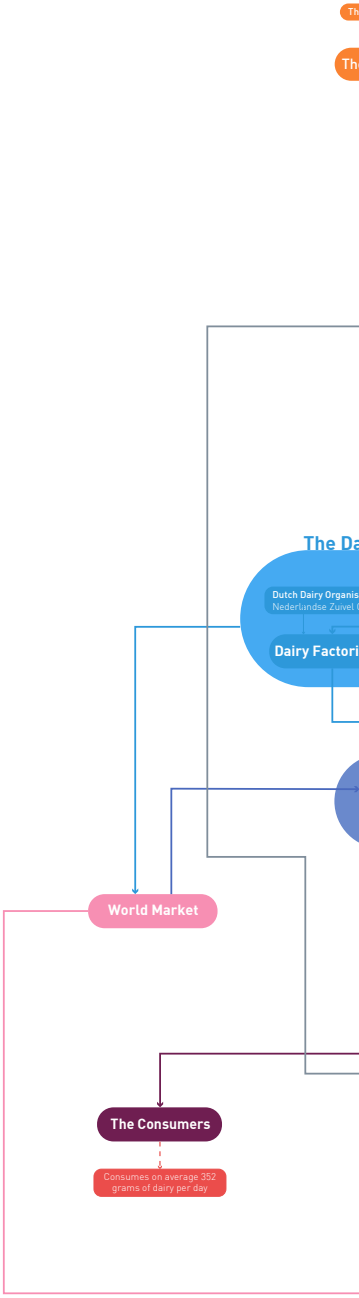
conducted to frame the system. The in-depth research included desktop research, based on newspapers, documentaries, television episodes, podcasts, and other informative and related media sources. Where available, existing academic research and publications have been used.

After performing the necessary research, the first layer of the Design-led system, and thus the basis of the frame, was identified: the stakeholders and their internal relations. The stakeholders are a group of people or processes, which can be seen as a team. The team must function together to be beneficial to each other, while all having their own task, agenda or function within that team. Together the stakeholders define the playing field of the current system.

Multiple stakeholders were identified within the network of the Friesian dairy cow. Even though not all players are directly linked to the dairy cow, they can still function as an important factor within the whole process. These stakeholders cannot be seen as individual units since they are interconnected within their network and need other stakeholders to function. The identified stakeholders and the relations with each other are presented in figure 3.1 A big version of the stakeholder map can be found in appendix 4.1.

The stakeholder map identifies both human players as well as non-human players, for example, the players within the nature area, these elements need to be represented within the system to create the most realistic view of the bigger picture.

To get a better understanding of the presented stakeholder map, all the stakeholders are shortly introduced as well as their internal relations. However, the context of the relations is not yet explained. This extra layer of information will be discussed in chapter 3.2.



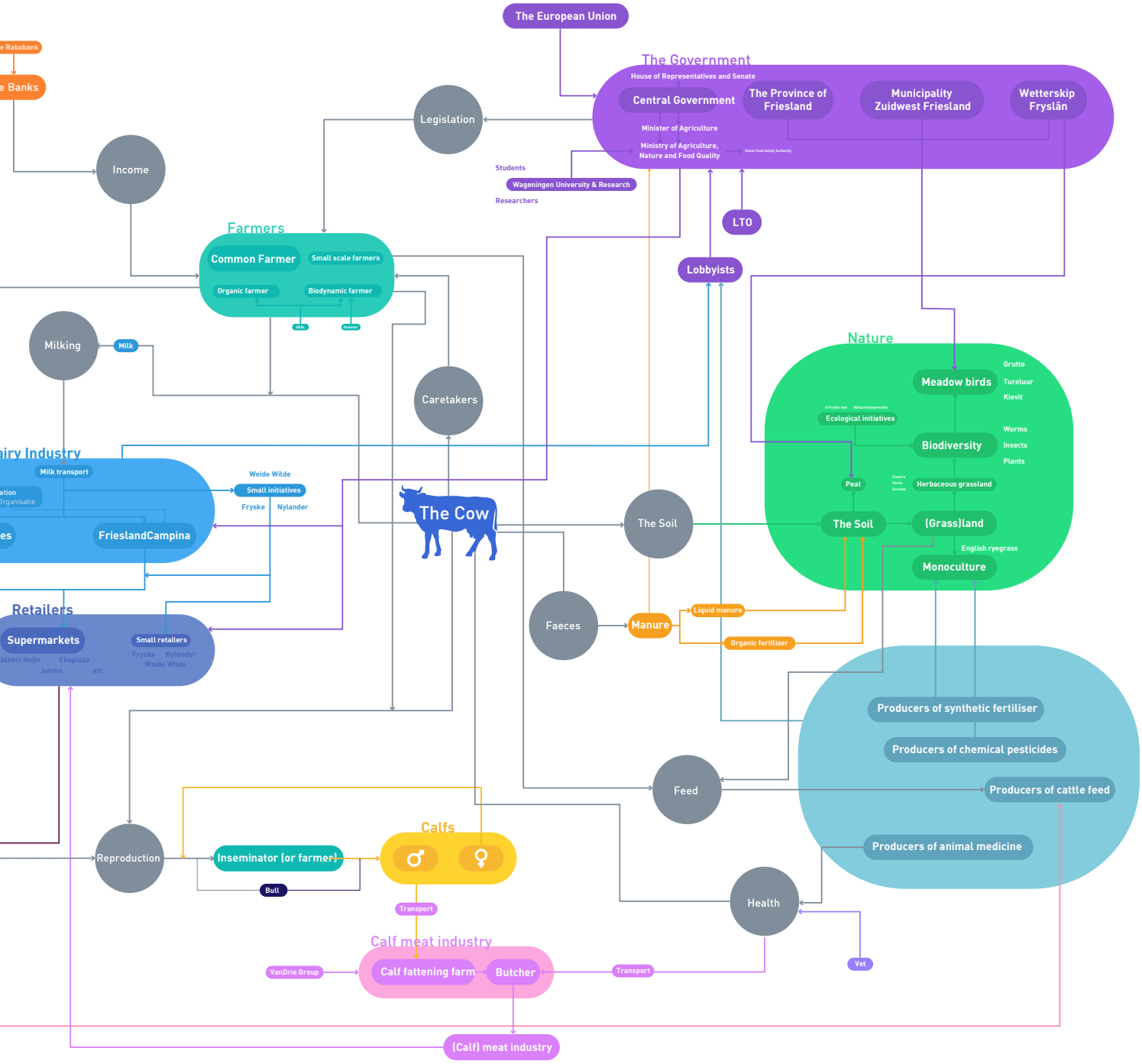


Figure 3.1 -
Stakeholder map of the Friesian dairy cow system and their internal relations

Nature

As figure 3.1 shows, the Southwest Friesian dairy cow forms the middle of the whole dairy system. The Southwest of Friesland has a specific type of soil, which is specific to that area. The specific soil type is called peat (in Dutch 'veen') (Ruyter, 2020) (Provincie Fryslân & Wetterskip Fryslân, 2021).

Figure 3.2 - Grass monoculture

Due to this peat soil, there are a lot of grasslands in Southwest Friesland. These can either be a monoculture or herb-rich grassland. A monoculture grassland consists of perennial ryegrass (in Dutch, Engels Raaigras). The fertiliser and pesticide manufacturers are linked to the monoculture grasslands (van der Ham, 2021). A herb-rich grassland includes clovers, herbs and other grasses. These herbs are part of the biodiversity connected to this type of grassland.

Figure 3.3 - Herb-rich grassland

The above-mentioned herbs are not the only biodiversity found in grasslands. Other related biodiversity includes worms and other soil life, insects, various types of plants, meadow birds, such as the black-tailed godwit, the lapwing and the redshank (in Dutch, 'de Grutto, de Kievit en de Tureluur') (Vroege Vogels, 2020) (van der Ham, 2021) (De Ingenieur, 2018) (Omrop Fryslan, 2020).

Because of the large biodiversity present in this area, there are several various region-specific nature initiatives, such as 'It Fryske Gea' and 'Natuurmonumenten', to protect the biodiversity (It Fryske Gea, 2022).

Figure 3.4 - Herb-rich grassland

There are different types of government departments involved with multi-faceted nature and biodiversity (Nasr, 2021) (van der Ham, 2021) (Baars, 2020). For example,

Figure 3.5 - It Fryske Gea, protected nature reserve

Figure 3.6 –
from the Wetterskip Fryslan


Figure 3.7
Farmer and intern in the stab


Figure 3.8
Farmer checks his cows in the stabl

the municipality 'Sudwest Fryslan' is particularly linked to the meadow birds. The 'Waterschappen, a province-wide organisation,' is linked to the peat (Provincie Fryslân & Wetterskip Fryslân, 2021) (Wetterskip Fryslân, n.d.).

The Farmers

The farmer is directly linked to the dairy cow. However, the farmer is also linked to the government and the banks, most commonly the Rabobank (van der Ham, 2021). There are multiple types of farmers. The biggest group are the common farmers (in Dutch 'gangbare boeren').

Other types of farmers are biological and biodynamic farmers, who are both related to SKAL (the organic quality mark). Only the biodynamic farmers are also related to DEMETER (the biodynamic quality mark) (SKAL, n.d.) (Stichting Demeter, n.d.) (De Platte Stad, 2021).

Lastly, one small group of 'other' farmers are identified. Essentially, this group of farmers falls under one of the three previously mentioned types of farmers. However, they are a different category, as they farm on a significant small scale. For this reason, this group calls itself 'small scale farmers' (Van Hattem, 2020).

The dairy industry

As the dairy cow's milk is what the whole current system revolves around, the dairy industry is therefore directly connected with the dairy cow, and with the farmer, who manages the dairy cows. The usual logistical process is that the milk gets transported from the cow on the farm to the dairy factory, called dairies. One well-known Dutch factory is 'FrieslandCampina'.

Within this area, there is also the Dutch Dairy Organisation, who is linked to the dairies (Omrop Fryslan, 2020) (Fryslân, 2021).
In addition to these large dairy companies, there are also smaller initiatives that process dairy locally and by themselves. Within the Southwest Frisian region, these include 'Fryske', 'Nylander or 'Weide Wilde' (Baak, 2021).


Figuur 3.9 -
Raw milk straight from the farm

Retailers

Both the larger dairy companies and the smaller initiatives are linked to the retailers. The retailers can be broken down from large organisations or supermarkets such as Albert Heijn, Jumbo, and Ekoplaza, and smaller organisations such as 'Fryske', 'Nylander' and 'Weide Wilde' (Fryslân, 2021).


Figuur 3.10 -
Dairy factory Frieslandcampina in Workum, Southwest Friesland

Consumer

From the retailers, the system extends to the consumer, who buys any of the dairy products at any retailer.


Figuur 3.11 -
Milk transport from the farm to the dairy

The government

The government is a player who has common ground in many places in the system. Since the government determines the regulations for the entire playing field. The government is a body made up of different parties. Such as the State (national government), the Province, the Municipality and the 'Waterschappen' (Waterboards). These different parties are jointly connected with the farmer, nature, the cow, but also with the entire market, the banks and the whole (dairy) industry (Provincie Fryslân, n.d.)(Wetterskip Fryslân, n.d.)(Provincie Fryslân & Wetterskip Fryslân, 2021).

Figuur xx -
The consumer buys the dairy in the supermarket

Figuur 3.12 - Fresh manure in the meadow

Figuur 3.13 - Storage tank for livestock feed on the farm

Figuur 3.14 - Sperm tank with bulls sperm for artificial insemination on farm

Figuur 3.15 - Female calf on the farm

The Global Market

Due to the international demand for Dutch dairy, the dairy industry and the retailers are linked to the global market. Consequently, the global market is linked again to the animal feed factories (Fryslân DOK, 2021).

Manure

The dairy cow produces faeces, which is called manure. Manure is distinguished into slurry (in Dutch 'drijfmest') or organic manure. These are directly linked towards the soil, however, also the government has a link with the manure (van der Ham, 2021).

Feed

Every dairy cow must eat. is Thus, the dairy cow is not only linked to the feed factories but also to the grassland (Fryslân DOK, 2021).

Health

Since the dairy cow is a living animal, she has a certain health. This links the cow mainly to the veterinary drug manufacturers and a vet. In certain situations, regarding the cow's health, she is also linked to transport towards the slaughterhouse and the meat industry (Eicher, 2001).

Reproduction

Lastly, a dairy cow reproduces. This means that the dairy cow is connected to an inseminator or the farmer, and in some cases with a male cow, also called a bull.

Whenever the dairy cow gives birth to calves, she is linked to the male, who are called steers, and female calves. As the steers do not produce any milk, the steers

will usually not reside at the farm and are used within the meat industry. Accordingly, the steers relate to transport and with the calf fattening facilities. The calf fattening facilities are linked to the slaughterhouse. This area of stakeholders together can also be called the meat calving industry. 'Van DrieGroup' is a major stakeholder within the field of meat calving. The slaughterhouse is at the end connected to the meat industry (De Correspondent, 2021).

As mentioned above, all these Southwest Friesian dairy cow stakeholders are related, either directly or indirectly. Together, they form the playing field, the system. This playing field is relatively wide, given the diverse functions of all stakeholders and their area of functioning.

The individual stakeholders and their relations do not reflect what exactly happens inside the system. The exact context of all relationships within the system is missing. The next chapter will elaborate on that content and elaborate on the mechanism of the identified intertwined relations.

Figure 3.16 –
Exploring the South West Frisian landscape

3.2 Listening to the system

After defining the playing field of the system, the next step of the Systemic Design Toolkit is to listen to the system. In practice, this means to 'listen' to the experiences of the people, and to discover how the identified interactions lead to the system's current behaviour.

To be able to listen to the system, interviews were conducted to give all stakeholders in the system a voice. Participants of various backgrounds were recruited. However, given the timeframe of this project and the number of researchers involved in the research, it was impossible to speak to all stakeholders across the entire system. In order to still be able to represent all the areas of the system and provide a complete vision of the current situation, additional in-depth research was carried out on behalf of the absent stakeholders. This additional in-depth research included, but was not limited to, books written by experts in those fields, existing interviews with the absent stakeholders in documentaries and podcasts, academic publications, or (online) webinars where stakeholders talked about various topics. These used sources will be explained in more detail in the following sub-chapters of chapter 3.

To ensure that the in-depth discussions with the participants were as structured as possible, diverse interview guides were created (appendix 3.2-3.6). The interview guides served as a sort of manual to the conversations and allowed the interviews to take place in a logical structure, such as building up towards more in-depth questions. Consent forms were created handed out to the participants to protect their privacy (appendix 3.1).

The perspectives of all the stakeholders of the system of the dairy cow are presented in the next subsections. The stakeholder perspectives will be presented in the chronological order of the research.

Figure 3.17 - Dairy cow in the stable

3.2.1 FARMERS

A big focus point of this research is the perspective of the farmers. In all existing media, the real perspective of the farmer is missing. The reality behind the farmer remains a grey area. Hence, framing and reality need to be distinguished from each other. The farmer is an important stakeholder as this person is connected to many parts of the system. The farmer is the person who experiences what happens to the land and to the dairy cows. The farmers know better than anyone how the regulations work in practice.

Figure 3.18 - Dairy farm in Southwest Friesland

Figure 3.19 - Dairy farm in Southwest Friesland

Introducing the farmers

Almost all farmers farm within their family's business. The farm has been in the family for generations, and they grew up on the farm as well. This makes the farm a valuable, emotional, and sentimental place for them with a rich family history.

"I was born here in 1972, got married and we have three children. In 2003, we took over the company from my parents. They were here before; we are now the 4th generation of this farm."

-Farmer Almar

Figure 3.20 - Dairy farm in Southwest Friesland

The farm and the (dairy) cows are the farmer's life, and being a farmer is a lifestyle. The farmers are busy with their or the family's business, day and night. Anything can happen to a cow at any moment, and they must be present and prepared immediately. Holidays and weekends, therefore, make no distinction from weekdays.

"Basically, I am a manager on the farm for 24 hours a day. Because something can always happen."

-Farmer Sicco

Figure 3.21 - Stable on dairy farm in Southwest Friesland

Creation of perspective of The Farmer

For this research, a diverse selection of farmers has been included to create a fair and realistic picture of the current situation within Southwest Friesland. In-depth interviews were conducted with different types of farmers.

Farmer	Way of farming	Farming for...
Ygram (dairy cow farmer)	Quit Milking, a former common farmer	Nestle
Almar (dairy cow farmer)	Common farmer	Albert Heijn
Sicco (dairy cow farmer)	Biological farmer	FrieslandCampina
Klaas (dairy cow farmer)	Biological farmer (pioneer for regenerative and innovative agriculture)	FrieslandCampina
Henk-Jan (dairy cow farmer)	Common farmer	FrieslandCampina
Frank (dairy cow farmer)	Common farmer	Fryske
Otto-Jan (dairy cow farmer)	Biological farmer, cheesemaker & owner cheese factory	Nylander (own company)
Leslie (dairy cow farmer)	Former common and biological farmer, expert natural medicine for animals and former vet assistant	In England, Denmark, Australia, Wales and England for multiple companies
Doettie (goat farmer)	Small-scale farmer (pioneer for regenerative and innovative agriculture), cheesemaker, clinical chemistry engineer & inspirator	Own company
Jan (dairy cow farmer & soil expert)	Biodynamic farmer, & cheese maker	Zuiver Zuivel & small-scale own cheese production
Durk (dairy cow farmer)	Biodynamic farmer & soil expert	Zuiver Zuivel

Figure 3.22 -
Participant list of farmers for in-depth interviews

All the interviewed farmers are very passionate about their job, they work hard and love their cows very much. They give all the cows names, and they recognize most of them immediately.

The organisation of the farm

The farmers had an average farm of 80 cows. This is a relatively small farm within the total dairy farming industry. The conventional farms (in Dutch 'gangbare boerderijen') are usually somewhat larger compared to the organic farms. In terms of the number of cows, biodynamic farms are often even smaller than biological farms.

The farmers ensure that the cows are well taken care of and have the opportunity to go outside. All of them let their dairy cows graze in the meadow but emphasise that this is not the case everywhere. In addition, the farmers ensure that the cows are milked every day. The milking is done either by the farmers themselves, usually in the milking parlour. On some farms, the dairy cows can milk themselves with the milking robot. The dairy cows can walk into the robot whenever they want and then the milking is done automatically.

The raw milk is kept in large tanks on the farm. Approximately every three days, the raw milk is collected by the milk truck. The milk truck takes the milk to the dairy factory, where the milk is processed into various dairy products. This flow of collecting, transporting, and processing of milk results in the milk flow. A milk flow means that the milk is produced for a certain brand, with associated requirements for the farm itself and for the processing of the milk. These are requirements, for example, which can concern how the land or the cows must be treated.

Figure 3.23 - Stable on dairy farm in Southwest Friesland

Figure 3.24 - Milking parlor where the cows are milked by the farmer

Figure 3.25 - Milking robot that automatically milks the cow

Figure 3.26 - Milking robot that automatically milks the cow

Depending on the type of milk flow which the farmers are part of, the milk must go to the different associated dairy factories. This is a great logistical puzzle as there are many different milk flows. The milk truck coming from one farm is often a different one than at the neighbours. This results in a lot of driving every day to get all the milk to the right factory.

In the case of organic farms, the farmers must meet the SKAL requirements. SKAL requirements state that fertilisers and pesticides may not be used on the land. In addition, fewer cows are allowed per hectare of land. Also, the cows may only be fed organic feed and hay.

In addition to the organic farmers, the biodynamic farms have specific rules on top of the SKAL rules, which mainly relate to ecology, animal welfare, closed cycles, and no homogenisation of milk (homogenisation is the process of getting a more homogeneous mixture of substances) (Zuiver Zuivel, n.d.).

Most farmers have usually been within the same milk flow for years. Depending on which milk flow they are part of, the farmers may have a fixed milk price. This price has hardly changed over the past 30 years. In other words, the milk price has stagnated. (See figure 3.27) Switching to a milk flow with possibly different requirements and a higher milk price is not so simple. All milk flows which are more favourable to farmers are full and have large waiting lists. The farmers do not have any influence on the milk price. The factory determines the price per litre of milk. In turn, the dairy factories trade the dairy with supermarkets and other retailers. The price charged for milk and other dairy products available in the supermarkets or other stores is barely visible on the farmyard. According to the farmers, their average milk price of 0.35 euro cents per litre of milk (for conventional milk) is too low. Over the years, the farmers claim that everything has become more expensive due to inflation. The prices for their land are rising increasingly and the developed farming technology also requires major investments in for example tractors, stables, and milking robots. In order to pay for this, farmers have received loans in recent years from the banks. Most of these loans were acquired from the Rabobank, which is known as the bank of the Dutch farmers and agrarians.

In addition to acquiring tools and land, farmers also need to buy the necessary rights, which allows them to milk their cows and emit nitrogen. In conclusion, the money earned from the milk is barely or not enough to make ends meet.

"You do not have much choice as a farmer about the milk flow you are in. You can leave where you are, but you do not come back so easily. Then you end up on a waiting list."

- Farmer Sicco

"If the milk price stays the way it is, I do not think we will survive to farm for the next generation."

-Farmer Henk Jan

"But really, agriculture is just a hobby. Because economic activity is just not possible. If you calculate the economic cost for the company to produce a litre of milk, it is not economically feasible. This means that it is a hobby. You can only sustain that hobby if you do not count your own labour hours and your own capital does not count on a return."

-Farmer Durk

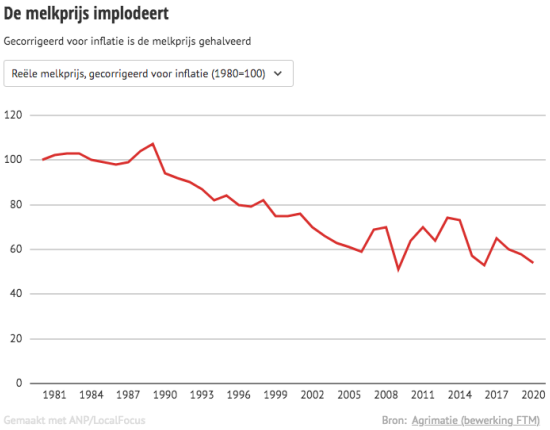


Figure 3.27 -
Verifying source, milk price stagnation (Joosten, 2021)

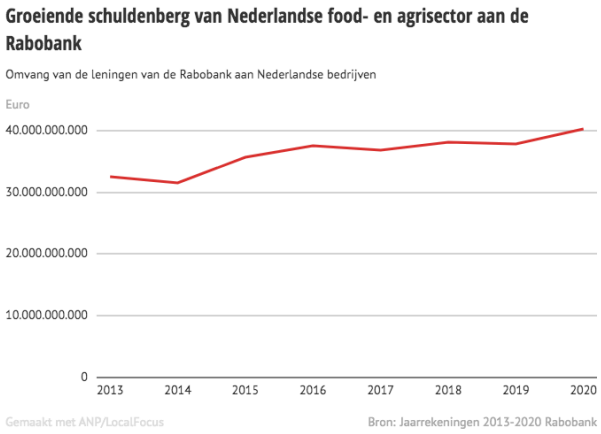


Figure 3.28 -
Verifying source, Growing debts of the Dutch food and agri sector to Rabobank (Joosten, 2021)

Figure 3.29 -
Milk from the supermarket from different milk flows

Figure 3.30 - Peat meadow Southwest Friesland

The tillage (physical manipulation of the soil) of the land

When it comes to land cultivation, it is very important to distinguish between conventional farmers and organic or biodynamic farmers. For conventional farmers, it is still permitted within the conventional segment to use fertilisers and pesticides. Yet, this is not allowed within organic and biodynamic companies.

The use of fertiliser makes it possible to produce a lot of grass quickly and efficiently. Fertiliser is extremely nourishing for the grass. However, the use of fertiliser is not nourishing for the soil. Yet, most of the common farmers continue to use them, as they do not have a lot of choice. Farmers are under extreme pressure from the market, resulting in them having to produce as much as possible. As the farmers stated, farmland is expensive, as the costs of maintaining the land are high and the loans must be paid off. The only way to rectify this is to start producing more and more. Hence, this high production demand is only possible through the frequent use of fertiliser.

Almost all farmers farm within the Frisian peat meadow area. Peat soil is wet by itself. To ride with heavy tractors on the land, the water level must be regulated and set as low as possible.

All farmers are aware of the consequences of their way of dealing with the land. They indicate that they would like to do things differently, but no longer know how to do this. They feel stuck. They have invested so much in the current business form over the years that they cannot easily change direction.

"There are a lot of farmers who are indeed stuck because of choices they have made in the past. By growing in scale, doing big investments, and taking on debt. And then you end up in a certain system from which it is very difficult to come back"

- Farmer Durk

"The milk prices have always remained the same, actually since the late 1970s. So, what do you do when the cost price goes up? Then you must produce more. What I learned in school to tackle this is if you produce a little more every year, you can keep your cost price the same, that has been rammed into my generation."

- Farmer Klaas

Farmers who would like to make the switch from conventional to organic farming have a lot of trouble finding a bank who is able to financially support them. Even farmers who want to farm on a small scale in an extensive way, do not receive a loan from the bank. In addition, the current regulations make it extremely difficult for these farmers. The regulations for agriculture are aimed at large-scale intensive farms. Currently, there is no distinction between farmers and the way they work.

For organic and biodynamic farmers, tilling the soil is a completely different story. Given the fact that they are not allowed to use fertilisers, they automatically have much healthier soil. In addition, many of these farmers are more active in promoting biodiversity. For example, sowing herb-rich mixtures in the grass. A result of less intensive fertilisation is that various grasses and herbs are already appearing in the meadow.

Figure 3.31 - Newspaper headline in the Volkskrant at the second of August 2021 (Smit, 2021)

Christian Klein Koerkamp haalt met zijn dochters de koeien binnen. De Rabobank wilde zijn overstap naar biologisch boeren niet financieren.

Bioboeren zitten zonder bankier

Een nieuwe generatie boeren droomt van een duurzaam bedrijf. Maar banken weigeren financiering, vooral die bekende boerenbank. Vaak passen de nieuwe plannen niet in de oude regels. 'De Rabobank heeft

Johannes Regelink (33) heeft een plan. Een prachtig plan, al zegt hij het zelf. Samen met zijn partner Joanne wil hij de oude melkveehouderij van zijn ooms in het Gelderse Vorden overnemen en die omvormen tot 'boerburgerboerderij' De Patrijs. Het moet een gemengd bedrijf worden: minder koeien, wat varkens en kippen erbij, stroken groenteteelt in de volle grond. Van de melk van zijn

Johannes heeft een businessplan uitgewerkt, inclusief het uitkopen van zijn twee ooms. Een paar miljoen euro, dat moest uit kunnen, had hij berekend. Maar toen hij daarmee aanklopte bij de bank, kreeg hij het deksel op zijn neus: 'Mooi plan zeiden ze. Maar dat gaan we niet financieren.'

Wat Johannes wil, wringt met de regels. Om een voorbeeld te nemen: in zijn businessplan gaat

Figure 3.32 - Herb-rich grass on a biodynamic farm

Most of these farmers inject the cow's manure into the soil as slurry, which is good for soil life. On organic farms, manure is more often spread over the entire land. This way of fertilising the soil is exceptional for farmers, as this releases more nitrogen into the air. Some farmers, especially the biodynamic ones, even make solid manure or organic manure which is spread on the land. This last option is the best in terms of soil fertility.

Biodiversity is a topic which many farmers are concerned with. According to them, it is something they should also think about because they feel that they must. They feel a certain expectation from their environment which they must meet. This pressure is mainly regarding the meadow birds, given that these were well-known birds for the region and have become less present over the past years.

In addition to this pressure, biodiversity is also a subject which many farmers are passionate about. Biodiversity and thus nature, are a big part of what once attracted them to become a farmer. However, the farmers cannot act the way they would want to regarding biodiversity. The market has shaped the farms in certain ways over the years, leaving no space for biodiversity. Within the shaped business model, farmers must produce more and more each year to keep costs down. To be able to do so, their land is turned into perfectly green grass mats full of perennial ryegrass. This grass is efficient as feed for the cows, as it contains a great amount of protein content. However, as a grass species, it is so dominant that it leaves little room for other species, and therefore, not beneficial for biodiversity.

On top of that, the frequent use of fertiliser is catastrophic for biodiversity, which has led to a decrease in the biodiversity on the average conventional farm over the past years.

"We use bokashi and compost, then you feed the soil, and with fertiliser, you only feed the grass. That is how nature conceived it, the soil has to feed the grass. So, fertiliser does not fit in that chain, and now I talk as an organic farmer. I have also spread fertiliser for years. That is how I grew up, that is how my father used to do it for years."

- Farmer Sicco

The farmers explain that they would like to do more to stimulate biodiversity. Yet, it becomes a difficult dilemma for them. If farmers leave more room for biodiversity, they work their land less intensively. They will have less yield and thus a loss of capital. Thus, even if a conventional farmer would still like to take these steps to stimulate biodiversity, this will not be reflected within the price they receive for their milk. Since most conventional farmers already have trouble making ends meet, it is simply not an option for them to pay much attention to biodiversity, even if they want to. It does not fit into the current revenue model. The farmers themselves think this is a waste because it also hurts them to experience the decline of biodiversity, especially the decrease of the wealth of meadow birds. They state that when they were children, there were many more flying around.

Some farmers do pay extra attention to the return of the meadow birds. Many of these farmers feel that doing nothing is not an option as they feel a certain pressure from their environment. These farmers create a 'plas-dras' (temporary flooding of grassland) on their land, raise the local water level there and dig small trenches. This creates an attractive place for the meadow birds to breed.

Alternative business models

Despite the high production which many farmers try to achieve, the income they receive from their milk alone is not enough. This forces many farmers to look for additional business opportunities which provide an additional alternative cash flow. Among others, farmers might commence into other businesses in the following ways:

1. By selling CO2 certificates which are related to their land. The selling of these certificates is linked to a healthier peat soil, as explained in chapter 3.2.2, a healthy peat soil can store more CO2. As soon as a farmer meets these requirements, the farmer can 'sell' square metres of land to other parties in exchange for CO2 certificates for compensating CO2 for companies. (See figure 3.33)
2. Green energy, in the form of solar panels or windmills on their land. (See figure 3.34)
3. Secondary activities on the farm, such as camping, education, a care farm or other similar activities. (See figure 3.35)
4. Processing their own dairy, to completely separate themselves from the big market. (See figure 3.36)

However, these last two scenarios are only possible if farmers have extra help on the farm, since it takes a lot of extra organisation of setting up and running these extra businesses.

"I am not going to do anything else on the farm, like a camping site. I have my hands full with the farm as it is already. If I would want that, it would mean that someone from the family should stand up to help. That is not the case yet."

- Farmer Klaas

"I am also working on plans for recreation like a campsite, that is my dream for the future. Then you have an extra pillar under the company, an extra income flow. At the moment, a revenue model within agriculture alone is very difficult to find."

- Farmer Almar

"In our own store where we sell our own cheese, we get much more than the price you get from the factory. In that case, you are completely dependent on the market. We really have a lot more leftover. Of course, there will be some costs for making it, but it is much better."

- Farmer Otto Jan, Cheesemaker

Figure 3.33 - Currency for peat, initiative in Friesland (Valuta voor Veen, 2021)


Figure 3.34 - Windmill on dairy farm

Figure 3.35 - Dairy farm and camping


Figure 3.36 - Own cheese factory on the farm

Animal welfare

Animal welfare is a slightly more difficult topic for farmers to discuss. All the interviewed farmers emphasise that they all have a lot of love for their dairy cows. The cows are their life, work, and income. Within the circumstances in which they farm, they do everything they can to take good care of their dairy cows.

Nevertheless, there are aspects of the business for the dairy farmer which are emotionally difficult in terms of animal welfare. This part is a bit of a grey area for farmers. Farmers may feel strong emotions towards their dairy cows, but must put these emotions aside when conducting their business. If they are not capable of doing so, it would not be likely to be a dairy farmer.

Most farmers stated that the emotional difficulty lies with the death of the animals. If a dairy cow becomes too old or too weak and therefore is no longer able to give enough milk, this dairy cow must be slaughtered. This can be a confronting moment for the farmers. Whenever this situation occurs, the dairy cow is collected by an external party, and from that moment on the farmers are not in charge of what will happen to the animals or how they are being treated. The slaughter of dairy cows is a standalone and separate system over which the farmers have no control. For farmers, it always hurts to see a cow they took care of for years leaving the farm.

Another animal welfare aspect is that if a dairy cow must be able to give milk, she must have a calf every year. The female calves stay with the farmer and become dairy cows themselves within a year. However, the male bull calves do not stay with the farmer, as they cannot produce milk and therefore have no function on the farm. It is not financially feasible for the farmers to keep the bulls. By law (Overheid, 2015), these bulls must stay on the farm for a minimum of two weeks and after that, they are allowed to be collected for transport. The farmers state that this is also a more sensitive subject, and something which they are not proud of or enjoy about their job. The same principle as stated above applies here as well. When the bull calves are collected, the farmers are no longer in charge of what will happen to the bull calves. The farmers know that the calves will probably be transported to a calf rearing and slaughtered once they are big enough. Nonetheless, this makes the job as a farmer more emotionally difficult.

Politics

Politics is a heavy subject for farmers on which they all have strong opinions. When it comes to politics, the farmers feel abandoned. For years they have done what they thought was expected of politics, and now the farmer is designated as the 'wrongdoer' and stands alone in times of change.

As mentioned in chapter 3.2.1, farmers would like to respond to social themes such as biodiversity, sustainability, and nature. However, within the current political climate and within the borders of policy, they do not have room for more attention or gaining expertise on these social themes. According to the farmers, Dutch politics lack 'farmers-knowledge'.

"Policymakers need to clamp down on farming policies. Then you will get a policy with consistency which we can work with, and which has been tested in practice."

- Farmer Almar

Although, there is now one policy which occurs for all farmers, no farmer is the same and therefore, farmers are not comparable to each other. The impact of an average farmer is very different from that of an organic, biodynamic, or small-scale farmer. However, all farmers must buy the same rights, such as nitrogen rights, which are based on the average numbers of the common farmer and do not take these differences into account.

Subsequently, this makes it almost impossible for pioneers who would like to do things differently, for example, farming with far fewer dairy cows and having more attention for nature and biodiversity.

Currently, there are many rules which are constantly changing. The effect of these changes is that farmers must focus more on administration and rights (such as nitrogen rights) instead of focussing on farming. This does not make the work of a farmer attractive or fun.

"The government, that is the most unreliable partner we have. If they keep changing the rules all the time, it gets frustrating. Not only for young farmers but also for older farmers, like me."

- Farmer Sicco

In order to transition to farm with nature, diversity and a healthy soil, farmers should be more encouraged and supported by the federal and local government through clarity about regulations and a system of rewarding a farmer instead of letting the farmers down. A great example of rewarding the 'good behaviour' of a farmer could be regulations about higher milk prices.

However, the most crucial and beneficial for farmers would be a well-structured and realistic long-term policy. Farmers themselves know very well what they would do differently and how to get there, but such a transition could take years and is expensive. Without the certainty about a consistent long-term policy, a transition would pose too much risk for them. It is not feasible for farmers when they are in the middle of a transition process that regulations change whenever a new government is voted in, meaning that their transition would become inadequate or ineffective.

This current situation has resulted that the farmers themselves no longer see a positive or sustainable future in the survival of the farmer. Some even tell their own children "Please do not become a farmer". Farmers like to keep up with the times and are willing to go through with changes, as there is a will for the better, but lack the federal or local government support.

"I would like the farm to remain in the family. But we struggle with all those rules. I consciously keep my children away from it. It takes away the fun for me. Everything is lumped together. That makes me sad. Then I hear all the beautiful stories of the politicians, but they do not understand anything."

- Farmer Klaas

"I say to my children, do not become a farmer. That is a terrible conclusion. That really touches me. I say to myself: farming is something that I fully support myself, as it is something that I do and love. But then I need to tell my children to not do it."

- Farmer Almar

3.2.2 NATURE

The current situation: a green desert

As mentioned in chapter 1, a peat meadow is an area where many dairy farms can be found, due to the soil properties of the land.

However, due to the increasing scale and intensification of dairy farms, the southwestern Frisian countryside has come under surging pressure. The soil suffers from acidification, eutrophication, desiccation, and compaction. This has led to an enormous increase in the vulnerability of the soil.

For the Frisian farmers, the highest possible yield per cow appears to be the only indicator of success. To achieve a higher success rate, the soil is an important means of production. The result is the uniformity of perennial ryegrass in the Southwest Frisian peat meadow landscape. These monocultures form a green desert around all farms.

Why has agriculture become so entwined with fertilisers?

Fertiliser was invented in the post-World War II period by inventor Justus von Liebig. With his invention, his aim was to prevent another famine. Fertiliser ensured that a lot of agricultural products could be produced in a more efficient manner and in a shorter time. Immediately, fertiliser became very popular (Mesters, 2021) (Seidell & Halberstadt, 2021)(Schiffman, 2017). Over the years, Liebig disregarded his conclusion of his invention after realising the negative long-term effects of its use. He realised how excessive use of fertiliser was a danger to healthy soil life and a responsible agricultural system (Visser, 2020) .
The industry did not listen to Liebig's warning. Fertiliser provided a lot of economic capital and a lot of yield in the short term. Until today, this has always outweighed the long-term consequences within large parts of agriculture (Visser, 2020).

Figuur 3.37 -
The Green Desert in Southwest Friesland, uniformity of Perennial ryegrass

Creation of perspective of Nature

Another large area in the system is nature. Unlike many other stakeholders, nature does not have a voice to represent itself. In order to give nature an honest voice in the whole, extra research had been conducted. This has been done by talking to experts of nature. Interview guides for the interviews with the experts can be found in appendix 3.4-3.6.

Figure 3.38 shows a list of the experts who were interviewed, which could represent a part of nature's voice.

Participant	Expertise
Catharinus Wierda	Soil Expert, founder 'De Fryske' Cheese, International Dairy expert at 'Solidaridad', former Policy Officer at LTO
Bert van Ruitenbeek	Director Stichting Demeter, Retail expert, expert speaker
Durk Oosterhof	Biodynamic farmer, Soil Expert, teacher soil fertility and environment, City councillor and former chair of the Department of Organic Agriculture LTO Post

Figure 3.38 -
Participant list of experts for perspective nature, for in-depth interview

Catharinus is a soil expert with a background in Soil Sciences at the Wageningen University and Research. He is an International Dairy expert at 'Solidaridad', and he is the founder of a relatively new cheese brand, 'De Fryske'. This cheese brand focuses on biodiversity.

Bert van Ruitenbeek is currently the director of Demeter, the quality mark for biodynamic products. He works on the future of Dutch agriculture. He is aware of the consequences of our current behaviour and how this must change if we want to continue producing on Dutch soil.

Durk Oosterhof has a broad profile. He owns a biodynamic farm and has an educational background at the Wageningen University and Research. Currently, he teaches a new generation of farmers about soil fertility and environment. He is a participant in the local city councillor. He used to work for the Department of Organic Agriculture LTO Post as chair.

In addition to the experts above, several farmers, especially pioneers who farm more extensively, also were able to speak for nature.
The content of the perspectives as described below, is a combination of information from conducted interviews and additional in-depth research. The additional research sources included are the following:

- Book: 'Vloeiend Landschap, over de toekomst van het Friese landschap' - Peter de Ruyter (Ruyter, 2020)
- Documentaries: The whole series of 'De uitgeputte bodem' - Zembla (van der Ham, 2021)
- Book: De Vogel Atlas van Nederland - SOVON Vogelonderzoek Nederland (SOVON Vogelonderzoek Nederland et al., 2018)
- Article: 'Why It's Time to Stop Punishing Our Soils with Fertilizers' - Yale Environment 360 (Schiffman, 2017)
- Report: Transformation of our food systems, the making of a paradigm shift - B. Haerlin, H.R.Herren & IAASTD+10 Advisory Group (Haerlin et al., 2020)

As the Frisian farmers aim for the maximal production and highest yield, the peat meadows are injected with fertiliser and slurry, the water level is kept as low as possible, the meadows are fully down with the high-protein perennial ryegrass, and large tractors are riding on the land. This way of operating characterises the current intensive conventional agriculture in the Netherlands. The term conventional agriculture differs from other forms of agriculture such as organic farming (and/or biodynamic farming). However, current intensive agriculture has drastic consequences for the soil and biotope in which the farming takes place.

Whenever a farmer uses fertilisers for a longer period, the soil becomes addicted to these external products and can therefore no longer grow or produce without it. In essence, the grass is constantly infused with 'their own form of drugs'. Fertiliser grows quick yields, yet is not suitable for maintaining a fertile soil. It provides a quick grass yield in the short term but does not provide fertile soil in the long term.

Due to the intensive use of fertiliser, the soil hardens and dries up. This process puts the soil life at risk or even makes it inoperable. An example of the consequences of a hardened or dried up soil is the decreased number of the red earthworm living in the soil. These types of worms play a key role in regulating the water during times of drought and heavy rainfall. Birds are also dependent on the soil life and the insects in this ground. When the ground becomes too hard for the birds to pick in and there is no longer an insect to find, it makes the meadows unsuitable breeding grounds for birds. These important, sometimes rare, and symbolic meadow birds are thereby driven away.

Figure 3.39 - Manure injector

About the Black-tailed Godwit

The Black-tailed Godwit is one of these traditional Dutch meadow birds and is lovingly called the king of the landscape. In the farming areas where production and nature are still in balance, the Black-tailed Godwit acts as an ambassador for the agricultural country. Southwest Friesland is an important breeding hotspot for the Black-tailed Godwit in Europe (Vogelbescherming, n.d.). As a result of scaling up and intensification of agriculture, there is increasingly less space for the Black-tailed Godwit to breed in its own well-known peat meadow landscape.

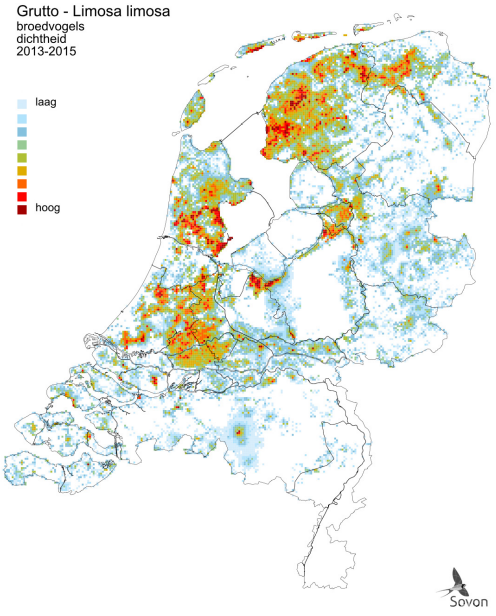


Figure 3.40 - Black-tailed godwit density in the Netherlands (SOVON Vogelonderzoek Nederland et al., 2018)

The current situation: a water land

The entire water management of Friesland is centrally regulated by 'Wetterskip Fryslân'. In determining the water level, all the different users of the waters of Friesland are considered. (Wetterskip Fryslân, nd) The agricultural sector has the largest voice in advocating the water levels. As farmers want to maximise their production, the farmers want the water level to be as low as possible below ground level, so that farmers can drive over the land with their large tractors. With a higher water level, the land would be too wet for them to drive on.

Peat oxidation

Unfortunately, peat soil is very fragile. When water is extracted from it, the peat oxidises with the air, also known as peat oxidation. When this occurs, the soil settles, resulting in subsidence (Ruyter, 2020) (De Ingenieur, 2018).

Simultaneously, peat oxidation is accompanied by the emission of greenhouse gases. On average, 7 megatons of CO2 are released each year because of peat oxidation within the Netherlands. That is 4% of the total CO2 emissions in the Netherlands (Province of Fryslân & Wetterskip Fryslân, 2021).

If agricultural processes continue in this manner, the Frisian peat will not persist long-term. The farm buildings will continue to sag with the decline of peat soil. As the decline of peat is irreversible, the eventful history of the Frisian peat will disappear over time, and with that also the typical image characteristic of the Frisian peat meadow landscape.

Another form: extensive farming

As discussed in chapter 3.2.1, there are different types of farmers with different styles of farming. Intensive farming is mainly maintained by the common farmers. However, there is a new movement of farmers who want to do things differently. On these farms, intensive farming makes room for more extensive farming, in which attention is focused on restoring the soil and attracting biodiversity.

As stated in chapter 3.2.1 increasing attention is paid to the return of meadow birds on the farm. Pioneer farmers make room on their land for various types of meadow birds.

To stimulate the return of these birds, the farmers fertilise less intensively on certain plots of their land, mowing it later in the year and creating, as mentioned before, a so-called 'plas-dras'. As a result of less intense fertilising, other types of herbs and flowers are able to grow back again, which attracts many more insects than the insects found in uniform monocultures. Some farmers even sow an extra herb-rich grass mixture to further increase the diversity of the grassland. The more variety, the more food supply for the birds and the greater the biodiversity.

The 'plas-dras' is the (temporary) flooding of grassland or ditches. This creates better living conditions for the meadow birds in their immediate surroundings. The meadow birds use these puddles to look for food and to sleep in. In addition, the watery 'plas-dras' also attracts extra plant species, which in turn provides extra insects and thus food for the birds.

"*People just do not know what they are doing anymore. If farmers think that the birds are not important, they are very wrong. Because they are the core. There must be room in the landscape for that and we should not trivialise that. Nature is our life.*"

- Catharinus Wierda, Soil expert & founder 'De Fryske' Cheese

In summary, intensive agricultural management dominates in the Netherlands and primarily aims at quantity rather than quality. The soil has become an 'addict',which is no longer able to produce without the addition of external products, such as fertilisers and pesticides. The soil is exhausted and there is no longer a healthy soil life. Within this form of agriculture, there is little room for biodiversity. This means that the real natural connection in agriculture with the soil has disappeared. The circle of life has been broken in today's intensive agriculture.

Figure 3.41 -Hatched nest of meadow birds, lapwing

Figure 3.42 - ‘plas-dras’ on organic dairy farm

Figure 3.43 -Pump to raise local water level for ‘plas-dras’

3.2.3 THE COW

The link between milk and a cow is clear to many people. Even if there are some people who believe milk is produced in a factory, most people know that dairy cows produce milk. However, this prevailing image is often quite idyllic, as many people still associate dairy cows with happy cows in the meadow.

For most people, the association ends there. In reality, the life of a cow is less romantic. Usually, the dairy cows do not spend the whole day outside, and certainly they are not outside the entire year.

As discussed in chapter 3.2.1, from the perspective of a farmer, it cannot easily be said that farmers do not take good care of their cows. However, the way the dairy farming model is currently performed, there are ethical aspects which can be questioned when looking from the cow's point of view. What consumers, politicians and other stakeholders often do not realise is that a dairy cow needs to give birth to a calf every year to be able to give milk in the first place. From a natural point of view, the dairy cow needs to give milk as this is necessary to feed her calf. In practice, this milk rarely gets fed to the calf. Feeding all the calves is not financially profitable for farmers, because they need as much as possible for human consumption of milk.

> *Regulations and policy oblige farmers to give the calves colostrum (mother's milk) for a minimum of two days (Rijksdienst voor Ondernemend Nederland, 2021).*

After these two days, the calves may also be fed with a milk replacer. Among farmers, there is a lot of variation in the decision and timeframe when to feed a calf dairy cow milk or milk replacer. Every farmer does this in his own way. Common practice with common farmers dictates that the calf usually only gets breast milk for two days.
Also, the calf is often taken away from the mother immediately after birth. The calf is isolated and is fed the milk by the farmer. Again, this varies per farmer. This means that the mother and her calf cannot build a personal or emotional relationship. Consequently, the calf lacks social skills which would otherwise be learnt from the mother.

Figure 3.44 - Dairy cow on an extensive biodynamic farm

Creation of perspective of The Cow

The content of the perspectives as described below, is a combination of information from conducted interviews and additional in-depth research. These included and additional research sources which contribute to the "cow" perspective, are the following:

- Interview: Leslie - Cow welfare Expert
- Book: 'Ooit aten we Dieren' - Roanne van Voorst (van Voorst, 2020)
- Report: 'De forse groei van de kalvenhouderij' - Stichting Dier & Recht (Dier & Recht, 2019)
- Podcast: 'De zuivelindustrie = ernstig dierenleed. Waarom mag je dat niet zeggen?' - De Correspondent (De Correspondent, 2021)
-

As the dairy cow produces the milk, the dairy cow is an important stakeholder. However, the cow cannot represent itself within the system, as it cannot converse in human language and notify farmers of their needs. Nowadays, anti-dairy activists and organisations such as 'Wakker Dier', represent the dairy cow and are increasingly speaking up in favour of the rights of the dairy cow.

To validly represent the dairy cow within the system and for the purpose of this project, research was conducted into what these activists say, state and represent as spokespersons for the dairy cow. The podcast "De zuivelindustrie = ernstig dierenleed. Waarom mag je dat niet zeggen?" produced by "De Correspondent" was a valuable resource, which clearly summed up the opinions of these activists. Additionally, an interview was conducted with Leslie, an expert in the field of animal welfare and the life of dairy cows.

Leslie used to be a farmer. She was a common farmer as well as a biologic farmer, and has international farming experience. Additionally, she has developed natural medicine for animals, and has worked as a vet assistant. Leslie was able to represent and advocate as the voice of a dairy cow.

As stated above, it is not financially feasible for a farmer to keep the calves with the mother cow. If a farmer would like to keep mother and calf together, it would require a different barn system with more space and would result in a big loss of milk production. This would be the most optimal form of a happy life for a dairy cow. However, this is not normally the case and is not how the current system is built.

"If you go to a farm where the cow has just calved and the little one is taken away, the mother will not be calm. She will be shouting `where is my child, where is my child'."

-Leslie, animal welfare expert

"If a cow does not get enough colostrum from birth, you have an unhealthy animal. And sometimes it is so bad that calves do not even make it long. The colostrum contains very large amounts of proteins, which ensure, among other things, that the wall of the intestines is closed."

-Leslie, animal welfare expert

The dairy industry also has a darker side, which is not often highlighted. As the dairy cow needs to give birth to a calf every year, the chance of a female calf is just as great as a male bull calf. However, as stated in chapter 3.2.1, there is no room on the farm for these bull calves. They cannot produce milk and are too expensive to feed. The bull calves can be seen as a by-product of the dairy.


Figure 3.45 - Cow portrait


Figure 3.46 - Cow portrait


Figure 3.47 - Cow portrait


Figure 3.48 - Cow portrait

After the colostrum period, the bull calves face a gloomy life. Being transported at such a young age is a traumatic experience for the animals. Furthermore, they usually end up in the calves rearing, where they live under animal expropriated conditions. They do not have fresh outdoor air, no mother care, no natural food, and no opportunity to graze outside. In short, there is no space for natural behaviour for the animals.

Once the bull calves are fat enough, they are taken to the slaughter. This is also a stressful final experience for these young animals. Naturally, dairy cows are animals which are easily distressed in unfamiliar circumstances. The bull calves, but also the slaughtered dairy cows, often die under stress.

This part of the dairy industry is usually overlooked, as it cannot be portrayed other than what it is: heart-breaking. The last phase of a cow's life cannot be experienced as positive. Furthermore, the life of the bull calf cannot be perceived as animal-friendly at all.

In summary, the life of the dairy cow is too romanticised. There are some aspects of the dairy industry, which could be ethically questioned. The aspects such as the end of life of the dairy cow and the transport and rearing of the bull calves in particular, create a dark side to the life of a dairy cow.

Figure 3.49 -
Female calf on dairy farm

3.2.4 THE GOVERNMENT

For a large part, the government dictates how the current system is built, as laws and regulations are proposed and voted upon by the government. The current system has been built upon over the past 50 years, where a new regulation or policy is added upon the current policies. Therefore, it is difficult to make quick changes in the system.

After the Second World War, the Dutch government wanted to turn the Netherlands into a welfare state. The Netherlands was good at producing dairy, but this was not yet widely consumed. During this post-war time, the government started heavily subsidising the Dutch dairy industry as a boost for the dairy industry would mean a boost for the Dutch economy. This financial incentive has contributed to the increased larger sale of dairy consumption within the Netherlands. Therefore, society demanded from the farmers, especially under the leadership of former Minister Sicco Mansholt, to deliver super production.

Furthermore, over time, the government has been cutting the regulation and policy into smaller pieces. Everything within policy making on agriculture is divided into different categories. Fragmentation takes place in both policymaking and policy implementation. Within the agricultural sector, this means that each part belongs to its own category, thus the sector is not considered as a whole.

"The problem is that it is governed in parts and not in business systems. There is an official for nitrogen, another official for the stables, and yet another official for phosphate. The total overview is missing."
- Pioneer farmer Klaas

As a thriving economy was given a higher priority, within the built-up system there was no room for or focus on nature, as the aim was to reach the highest possible production. Nature and animal welfare were therefore not part of the political discussion. Due to the lack of guidance and norms for both nature and animal welfare,

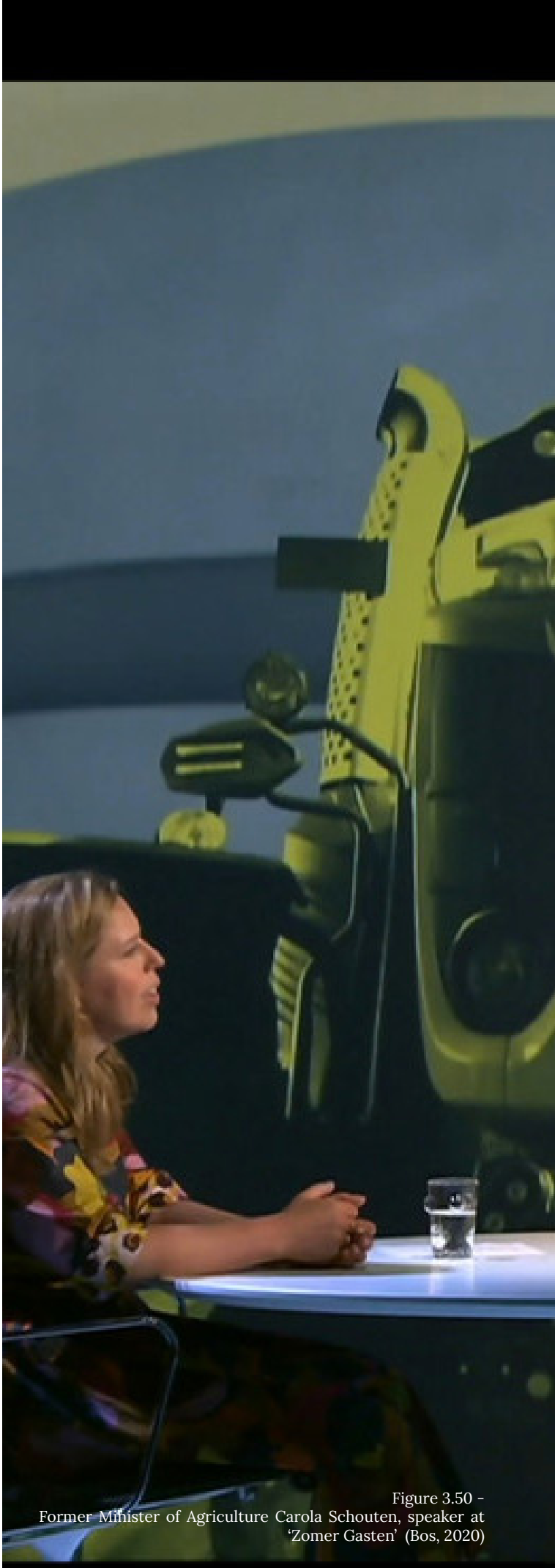


Figure 3.50 -
Former Minister of Agriculture Carola Schouten, speaker at 'Zomer Gasten' (Bos, 2020)

politicians transferred these ethical issues into the business world. An example of this lack of guidance in the 1940s and suffering the consequences nowadays, is from Carola Schouten, recently resigned Minister of Agriculture, Nature and Food Quality. She stated that when she was sworn into office in 2017 at the Department of Agriculture, Nature and Food Quality, this department was already battling against all the limitations of the environment, biodiversity, and climate. She indicated that our society really needs to make a big transition, and established that such changes would require political support, which is difficult.

According to Schouten, politicians find it difficult to propose new or necessary measures, which can deeply affect people's lives. Not every new measurement is popular for various groups of voters. As federal or regional politics heavily rely on their voters, it is not attractive to pose such new, drastic or necessary measures. This might lose politician voters in the next election.

Funds for nature or environmental causes has long been a complicated topic in every political discussion. However, awareness for these topics is increasing, and nowadays more money is being set aside to strengthen and improve natural causes. According to Schouten, there is still a long way to go as there is not enough awareness of the urgency of the topic, but the momentum is gaining.

In summary, since the Second World War, the focus of the Dutch government has been on high production of dairy products in order to build a wealthy state of the Netherlands. Within this policy, there was no room left for nature. Despite the fact that there is certain awareness within the current politicians that a transition towards a nature inclusive system is needed, the political support for the necessary change is not yet sufficient. Such big changes which are needed require political support. Altogether, there is still a long way to go.

Creation of perspective of The Government

The content of the perspectives as described below, is a combination of information from conducted interviews and additional in-depth research. These included and additional research sources which contribute to the "government" perspective, are the following:

- Book: 'De Fundamenten' - Ramsey Nasr (Nasr, 2021)
- TV Interview: with Carola Schouten at Zomergasten (Carola Schouten - Zomergasten, 2020)
- Documentary: 'Platteland Pioniers' - VPRO Tegenlicht (Brouwer, 2019)
- Documentary: 'Melk de witte motor' - Andere Tijden - NTR/BNNVARA (Veltman & van Run, 2007)
- Documentary: De Uitgeputte Bodem: Supermarktmacht - Zembla (van der Ham, 2021)
- Webinar: 'Samen voor grond #3: Aan tafel met de bodem- en voedselverbeteraars van nu' - Pakhuis de Zwijger (Samen Voor Grond #3: Aan Tafel Met de Bodem- En Voedselverbeteraars van Nu, 2021)

The government is represented by multiple sources. As mentioned in chapter 3.2.2, the experts have knowledge and experience with political policy due to their background at the Agricultural and Horticultural Organisation of the Netherlands (LTO). In addition, a lot of information can be found about politics through various sources of media. For this research project, to argue the perspective of a government entity, some of these media sources were explored, such as existing interviews with the current Minister of Agriculture, Nature and Food Quality or the book 'De Fundamenten'.

3.2.5 THE DAIRY INDUSTRY

Before the Second World War, little dairy was consumed in the Netherlands. For the benefit of a wealthy state, the dairy industry received more subsidies to brand dairy products. Around 1958, major 'drink-more dairy' campaigns were launched. The campaigns were aimed at giving dairy 'a more popular status', which resulted in a big boost for the dairy industry.

The advertisements were mainly aimed at children, who grew up with the slogan "melk is goed voor elk" (meaning 'milk is good for each'). A well-known example of these advertisements is from Joris Driepinter (see figure 3.51).

The dairy industry has become an immense business over the past decades, which is intertwined with multiple parties who all have their own interests as their highest priority.

The dairy industry is the first stakeholder making a profit from the milk, as dairy farmers do not profit from the milk of their farm as mentioned in chapter 3.1. Almost all farmers are affiliated with a dairy factory. Depending on the milk flow the farmers are part of, the milk goes to the associated factory. In the dairy factories, the raw milk is processed into various dairy products, such as all sorts of milk, yoghurt, cheese, cream, and butter.

When a dairy product is produced in the dairy factory, it is usually traded to various parties. Therefore, a dairy factory functions more as a middleman. Different supermarkets, brands or other stores buy the dairy in certain quantities from the factory. For example, it could be the case that one type of cheese is sold under two different brands, but it is produced in the same factory. The moment the dairy is sold to the next party, a profit is made by the dairy factory.

Figure 3.51 – Famous old campaign, 'Joris Driepinter' from Nederlands Zuivel Organisatie (KnutzEls, 2010)

Figure 3.52 - Old campaign 'Melk moet, melk doet je goe goed' from the Dutch Dairy Agency Nederlands Zuivel Organisatie (Giesendorf, 2018)

However, the dairy factories do not pull the strings within the playing field of the dairy industry. They mainly sell their dairy to supermarkets and other retailers, but these parties have free rein to determine the prices of their products. These retailers have the influence to put all factories against each other to get the best price for a certain quantity of dairy.

In addition, the world market is a big contributing factor to the determining of prices which makes the power of supermarkets and retailers even bigger. Apart from the Netherlands, Germany and Denmark are counties where a lot of dairy is produced. Since relatively less strict rules apply in these countries compared to the Netherlands, the cost price for a litre of milk is lower there. This has led to fierce competition within the Dutch dairy market. If Dutch factories do not partly go along with the prices of other countries, they will lose their sales. To still make a profit, the factories continue to pay low costs to the farmers for the milk they supply.

Within our built-up system, return is the primary goal in the business world. Almost all large organisations are out for profit and strive for the highest possible return. The system is also dominated by the triangular relationship of boards, commissioners, and shareholders. This also applies to dairy factories, supermarkets, and other retailers. This means that there is little room left for naturalness within current politics.

"There are still products being produced that we shouldn't be proud of as the Netherlands. But if you stop making it, someone else will pick it up. As long as it generates money, it will not go away. That's how it goes in our existing system, which is rotten actually."

- Catharinus Wierda, Soil expert & founder 'De Fryske' Cheese

Creation of perspective of The Dairy Industry
The content of the perspectives as described below, is a combination of information from conducted interviews and additional in-depth research. These included and additional research sources which contribute to the "dairy industry" perspective, are the following:

- Small informal interview: Expert Anne, Former process technologist in the cheese factory and now team lead in the filling and packaging department in the fresh dairy products factory
- Formal interviews: The farmers and experts who have experiences in the dairy industry
- Book: 'Ooit aten we Dieren' - Roanne van Voorst (van Voorst, 2020)
- Book: 'De Fundamenten' - Ramsey Nasr (Nasr, 2021)
- Documentary: 'Melk de witte sluier' – Fryslân DOK (Fryslân DOK, 2021)
- Article: 'De boer versus de supermarkt' - De Groene Amsterdammer (Wetzels, 2015)

3.2.6 THE SUPERMARKETS / RETAILERS

As mentioned in chapter 3.2.5, a profit-driven system applies for large supermarket chains. Supermarkets and retailers make the largest amount of money within the dairy industry. These parties have the opportunity to purchase dairy from the factories as cheaply as possible. Since there are no recriminations from the government, they can buy food from anywhere around the world. By doing so, these large corporations are forcing the Dutch dairy industry to participate in the big competition of the world market.

The larger supermarkets and other retailers recognise that sustainable change is necessary. However, operating within the current system puts them in a difficult dilemma. If without the urgency being abundantly clear to the consumers, they radically change, they will lose their customers to their competition. Since the need for large-scale change has not yet dawned on consumers, supermarkets and other retailers are residing to their current business model which results in the highest profits.
The current way of doing business is still the best structure for an optimal business model with the highest possible profit. This system will be continued by the supermarkets for as long as possible. As they do not have strict restrictions for nature or might lose too many customers by staying behind, they will not change their business model. Supermarkets and other retailers still have too many commercial interests; therefore, they will continue to avoid measurements for change.

"Supermarkets are inherently slow followers. Only when they see that they are losing customers by not going along with a certain "trend", will they change something."
-Bert, Director of the Demeter Foundation

To maintain the current profitable system, in the large supermarket chains little or no information is shared revealing

Creation of perspective of The Supermarkets / Retailers
The content of the perspectives as described below, is a combination of information from conducted interviews and additional in-depth research. These included and additional research sources which contribute to the "supermarkets/ retailers" perspective, are the following:

- Documentary: De Uitgeputte Bodem: Supermarktmacht - Zembla (van der Ham, 2021)
- Book: 'Andre kost, een pleidooi voor een gezonder en duurzamer voedselsysteem' - Jaap Seidell and Jutka Halberstadt (Seidell & Halberstadt, 2021)
- Formal interview: With retail expert Bert van Ruitenbeek, Director of the 'Stiching Demeter'
- Formal interview: With sales expert Catharinus Wierda, founder 'De Fryske' Cheese

price differences between products, the production or the associated consequences. An organic carton of milk is placed next to a conventional carton of milk. Apart from the difference in the price tag and the organic quality mark on a carton of milk, there is no in-depth information shared about the difference between the two types of milk.
Consequently, the supermarkets or other retailers make use of the lack of knowledge from the consumer. As the common (non-biologic) products are the most profitable, the supermarkets or other retailers consciously present their products as unambiguously as possible, seducing the user to buy their product of preference.

Where most supermarkets and other retailers now sell biological products, biodynamic products are not even sold in the large supermarket chains such as Albert Heijn, Jumbo or Aldi. To purchase a biodynamic product, the consumer must go to special organic supermarkets such as the Ekoplaza or Odin.
In addition to the big players, more small initiatives are introduced or arising within the playing field. These small initiatives try to sell their dairy products based on the story and background of their dairy products. In this way, they get the consumer on board with the importance of change. These kinds of initiatives and brands are getting more attention and emerging interest. In Southwest Friesland alone, these three small initiatives can be found: 'De Nylander', 'Fryske' and 'Weide Weelde' (Baak, 2021) (De Nylander, n.d.) (Weide Weelde, n.d.). As these products are not usually sold in the big stores, the products are sold on a smaller scale. The products are sold in farm shops, small local supermarkets, specialty shops or included in local fresh ordered food packages, such as 'Versmarkt de Drie Ambachten' where the products of Nylander are sold.

In summary are the big supermarket chains within the Netherlands profit-driven organisations. Without any new strict regulations for nature, they will continue their way of doing business. They are aware that the world is changing, but without the urgency being abundantly clear to the consumers, they radically change, they will lose their customers to their competitors. Therefore, this system will be continued by the supermarkets for as long as possible.

Figure 3.53 -
Small farm shop, on a biodynamic farm where their own products are sold

Figure 3.54 -
Specialty store, where 'De Nylander' sells their own and other locally produced cheese

3.2.7 THE CONSUMER

The behaviour of humans is partly the result of the environment humans find themselves in. The political, socio-cultural, physical, and economic world in which humans live, has a major influence on the way humans live. That environment therefore largely determines how sustainably we live and behave.

In our current information society, humans are constantly exposed and besieged with various opinions and claims about how we should and can live more sustainably.

The choices consumers make regarding their food choices are therefore strongly influenced by their environment. Food providers such as supermarkets and the catering industry play an important role in this.

It is very difficult to maintain an overview with all these diverse viewpoints. The result is often that people start to ignore the complexity instead of embracing it. In the supermarket, a consumer is constantly influenced by or exposed to the designed stimulus of the retailer. When shopping in the supermarket, the consumer does not see the difference between the production process of products or what that production means for the living environment. Also, other issues such as water use and the living conditions of farmers, are not visible.

The same holds for the production of food, its processing, packaging, and transport, as these are almost completely hidden processes for the consumer. Therefore, problems concerning these processes seem very far away from the consumer. Consumers might conclude that they cannot directly influence these processes. There seems to be a visible missing link between human behaviour regarding the products they buy and eat, in relation to the bigger problems humans see and hear about. This link seems dissolved from the food they buy.

For example, the decline in quality of our living environment due to soil gradation which is increased by the way food is produced, is connected. However, for consumers, it might be unclear how these problems could be the cause of our own human behaviour. This can lead to feelings of powerlessness or even despondency.

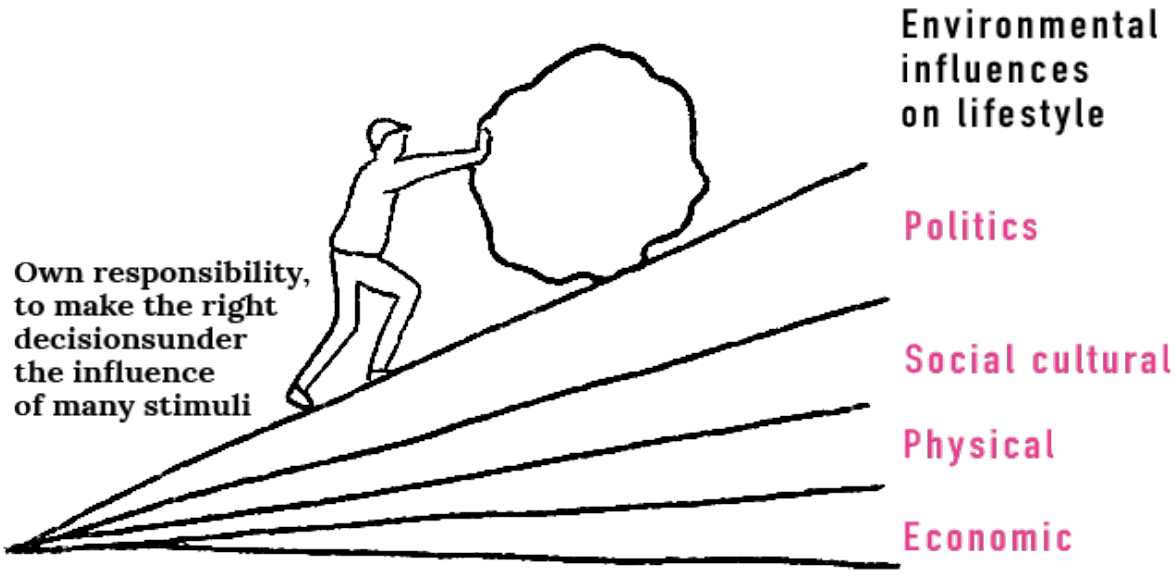


Figure 3.55 - Every individual is responsible for making the right choices, however the environment can be a strong influence (Seidell & Halberstadt, 2021).

However, in practice, the current system is built up in such a manner that for every product a consumer buys in the store, the consumer gives a vote for this product and the way it is produced. As a result, the consumer is subconsciously voting in favour of maintaining the current food system. As long as certain products are bought, the market usually continues to produce them as it is yielding profits.
For the average consumer, the main reason why a consumer buys a product, is the price of a product, followed by the appearance of the product. Only after these decisions, the conscience of the consumer plays a role.

The interviewed experts who have experience selling (their own) products, have identified a clear picture of the Dutch consumer. In their vision, the average Dutch person does not like to spend a lot of money on food. Within the Dutch culture, food is not a symbol of status, since the Netherlands does not hold a popular food and agricultural culture. That is different compared to other cultures and countries close to the Netherlands, such as Italy or France. A Dutch person prefers to go on holiday twice a year or wants to have a second car in front of the door rather than invest in a higher quality of food. The average Dutch person has lost connection regarding the food which they consume, and where it comes from. The result is that there is no reflection of the consumer in regard to what they buy and how it is made, or the consequences connected to their consumption.
On the other hand, the experts also concluded that a few years ago the consumers are experiencing an increasingly new mindset of themselves. This mindset has the consumers pay more attention towards better nature and living conditions. Therefore, the experts have identified three types of consumers.

1. The consumer who claims to want everything that is best for nature, but is not prepared to pay more.
2. The consumer who mainly uses the quality and sustainability of food as a form of status. A good example is the naturally produced raw milk cheeses which were made on a small scale by Doetie and Otto-Jan (farmers and cheesemakers), see chapter 3.2.1.
3. The consumer who is looking for a genuine connection with the origin of the food and is therefore consciously willing to pay more for these products.

Creation of perspective of The Consumer
The content of the perspectives as described below, is a combination of information from conducted interviews and additional in-depth research. These included and additional research sources which contribute to the "consumer" perspective, are the following:

- Documentary: De Uitgeputte Bodem: Supermarktmacht - Zembla (van der Ham, 2021)
- Book: 'Andere kost, een pleidooi voor een gezonder en duurzamer voedselsysteem' - Jaap Seidell and Jutka Halberstadt (Seidell & Halberstadt, 2021)
- Formal interviews: Experts, who have experience selling their own products (Doetie, Durk, Catharinus, Jan & Bert)
- Newspaper: 'Wat eten we in de toekomst?' - NRC (de Kroon, 2020)
- Podcast: 'We kunnen nooit gezond zijn in een giftig systeem' - OERsterk (OERsterk, 2021)

3.2.8 THE BANKS

The banks provide loans to multiple stakeholders within the system. Over the past decades, the banks have provided many loans to farmers, who mainly use these loans to scale up the farms. These larger loans gave farmers, including the Southwest Frisian dairy farmers, the opportunity to build larger stables, accommodate more dairy cows, lease or buy more land, and purchase large machines such as tractors and milking robots. (van der Ham, 2021)

The leading bank in the agricultural sector is the Rabobank. Rabobank was originally the bank of farmers and horticulturists. To this day, 85% of Dutch farmers are customers of Rabobank. Rabobank is even one of the largest financiers for agriculture worldwide. This makes the bank a powerful player in the system of the (entire) food chain.

"Banks and the agro-industry entangle farmers in increasingly risky loans and contracts. Who does not grow, goes."
- Niels Debonne (Debonne, 2021)

However, not only farmers are financially supported by the banks. Other stakeholders within the current system have also received loans, such as the necessary pesticide producers and fertiliser manufacturers. Therefore, the bank is financing various parties, whose agendas might not align or might even be complete opposites of each other. This makes the banks partly responsible for how the agricultural system now functions and the consequences of this malfunctioning system.

"As a bank, we share responsibility for how the system is now."
- Bas Rüter, Director Sustainability Rabobank (van der Ham, 2021)

Creation of perspective of The Bank
The content of the perspectives as described below, is a combination of information from conducted interviews and additional in-depth research. These included and additional research sources which contribute to the "banks" perspective, are the following:

- Report: Greenpeace - 'De Vleeskoorts van de Rabo' (Stichting Greenpeace Nederland, 2019)
- Documentary - Het excuus van de Boerenleenbank - Zembla – BNNVARA (van der Ham, 2021)
- Newspaper - 'Het platteland wordt sluipenderwijs door banken en perverse subsidies gekaapt' - Het Parool (Debonne, 2021)
- Newspaper - 'Boeren die willen verduurzamen zitten zonder bankier: 'Dit is geen landbouw, zegt de accountmanager' - De Volkskrant (Smit, 2021)

Foto Harry Cock / de Volkskrant

Bioboeren zonder bank

Een nieuwe generatie boeren droomt van een duurzaam bedrijf. Maar banken weigeren financiering, blijkt uit een rondgang. Vaak passen de nieuwe plannen niet in de oude regels. 'Kredietbeoordelaars kijken niet naar visie, alleen naar cijfers.'

PAGINA 13-15

Zes jaar lang werkte de Braziliaanse meesterfotograaf Sebastião Salgado in het grootste regenwoud ter wereld

PAGINA 16-17

Kroonprinsen genoeg na Usain Bolt, maar het is een olympisch debutant die het goud pakt op het koningsnummer van de Olympische Spelen

SPORT 3

Prince is al vijf jaar dood en toch verschijnt er een echt nieuw album van hem: *Welcome 2 America*

PAGINA V6

Annica Muller brengt op

Grote branden in mediterrane streken

■ Aanhoudende droogte en extreme temperaturen wakkeren natuurbranden aan in mediterrane kuststreken. Dit weekend bedreigde het vuur badplaatsen in Griekenland, Italië en Turkije. In dit laatste land werden duizenden toeristen uit bedreigde badplaatsen geëvacueerd. De hitte en het brandgevaar zullen naar verwachting nog een tijd aanhouden. Zeker acht mensen kwamen om, onder wie een Duitse vrouw.

PAGINA 8

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Figure 3.56 - Newspaper article in de Volkskrant at the second of August 2021 (Smit, 2021)

Waar we ons op richten

Grote transities geven vorm aan de wereld waarin we leven. Wij als coöperatieve bank, geworteld in de wereld van voedsel en in Nederland, richten ons op die transities waar we met onze proposities impact op kunnen hebben. Onze proposities geven we vorm door onze klanten, producten en diensten, kennis en ons netwerk aan te bieden. Om een betere wereld voor toekomstige generaties achter te laten, is een belangrijke verschuiving in de transities nodig.

Voedseltransitie

De beschikbaarheid van genoeg, gezond en betaalbaar voedsel om de wereldbevolking te voeden is na de klimaatuitdaging de meest urgente en complexe uitdaging waarmee de wereld wordt geconfronteerd. We vinden het belangrijk dat voeding met respect voor mens, dier, natuur én voor de boer economisch rendabel wordt geproduceerd. Als grootfinancier van de food & agri-sector zijn we ons ervan bewust dat er niet één oplossing is voor het vraagstuk en dat er nog veel dilemma's zijn. Daarom richten we ons op de hele keten, van boer tot bord. We werken samen met onze klanten, partners en andere partijen om verduurzaming te versnellen. We zetten in op het behoud van land, water en biodiversiteit, het voorkomen van voedselverspilling, het sluiten van kringlopen en het verminderen van de impact op het klimaat.

Klimaat & de energietransitie

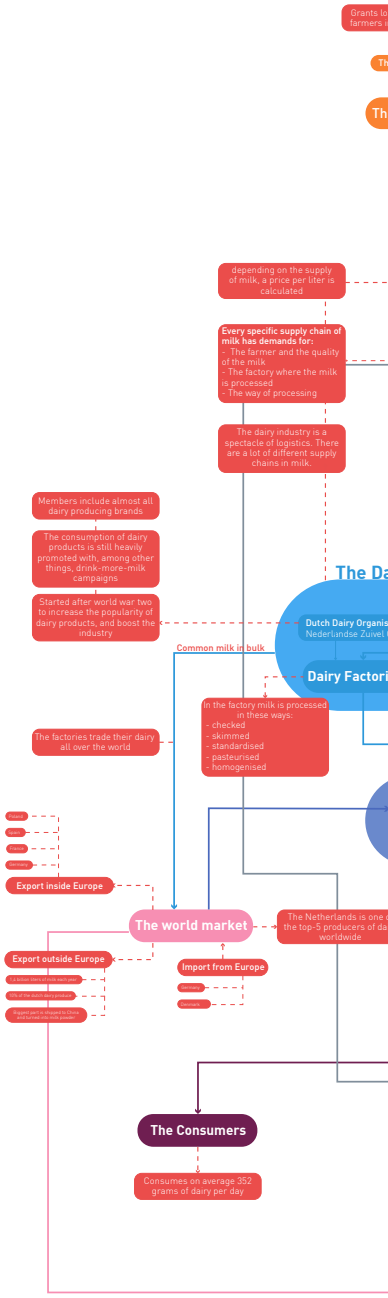
Klimaatverandering en de transitie naar een duurzamere energievoorziening en -verbruik is dringend nodig om de huidige klimaatverandering aan te pakken en de negatieve effecten, die deze al veroorzaakt, te onderdrukken. Zelfs als we voldoen aan het akkoord van Parijs is zowel klimaatmitigatie als klimaataanpassing nodig. Mitigatie vereist zowel een verschuiving naar een duurzamere productie van energie, als een lager energie verbruik in zowel het industriële deel van de economie als in het energie verbruik van huizen en woningen. Deze transitie geldt ook voor een duurzamer gebruik van de andere hulpbronnen en grondstoffen die de planeet heeft, op weg naar een meer circulaire economie.

Figure 3.57 - Rabobank website where they promote sustainability

Banks, especially the Rabobank, promote their sustainable investments and their desire for a transition within agriculture, see figure 3.57. However, the reality does not reflect the 'perfection' they show through their commercials or social media campaigns. These banks are trapped in their own system. Since they have so many loans running in the current system, it is not financially attractive for them to turn the organisation around into another (more sustainable) direction. If the banks can earn money from the loans they have agreed upon in the past, they will not change the current status quo, as mentioned in chapter 3.2.1.

In summary, the banks are partly responsible for how the current system is build. They still have a big interest within the current system, as they have invested a lot in multiple areas of this system. This means that banks do not yet invest much in organic or nature-inclusive farms, which does not stimulate the needed transition.

In the figure 3.58 on the right, the stakeholder presented in chapter 3.1 is included. However, a new layer is included within the map. With this new layer a systemic representation of the current system of the Frisian dairy cow is created. This system map captures an extra layer of information, which helps to understand how the system and the way it functions.



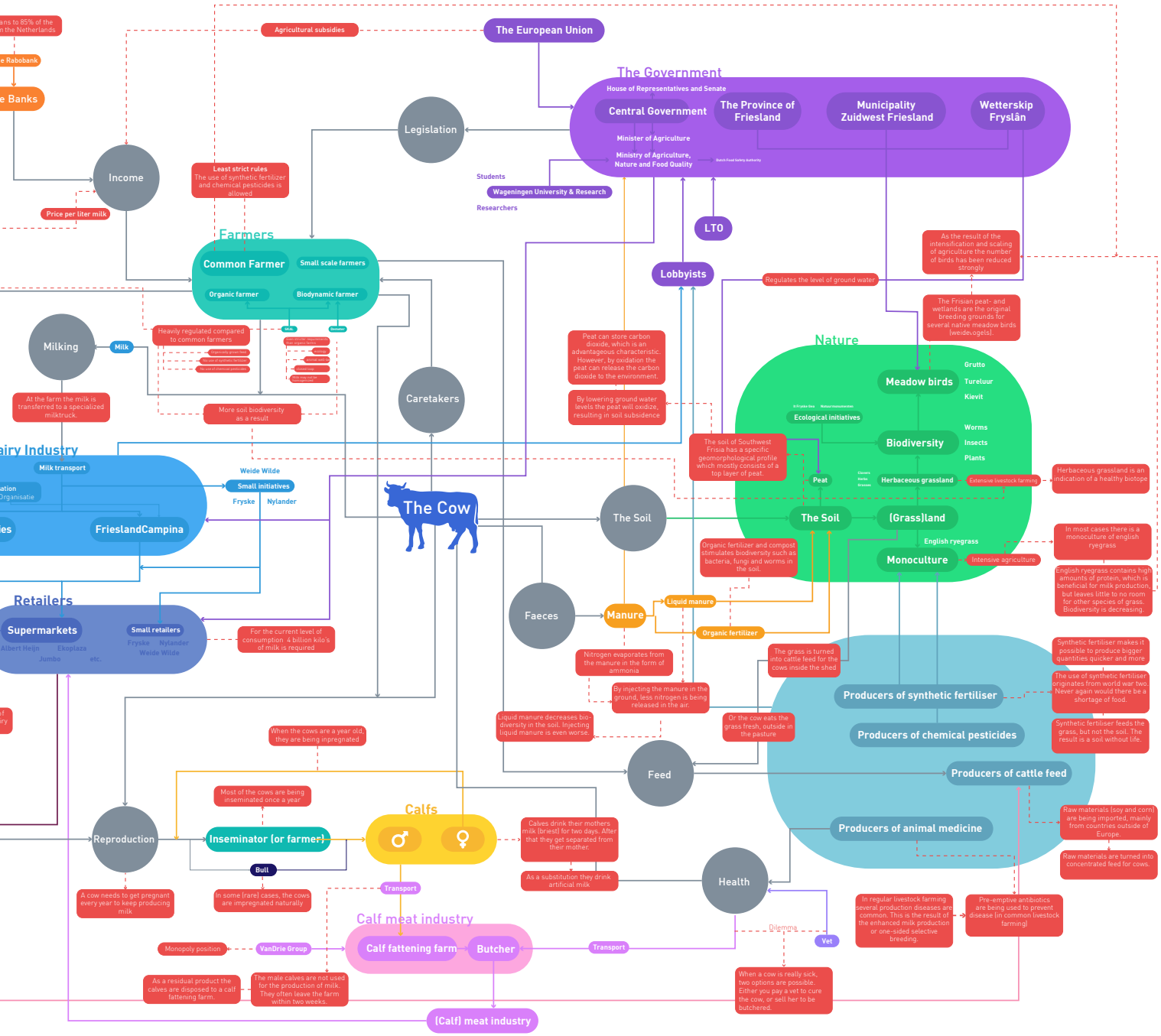


Figure 3.58 -
Systemic representation of the current system of the Frisian dairy cow

In the previous sub-phases discussed in chapter 3.2, it was presented how certain interactions between stakeholders could lead to the behaviour of the system. Thus, a foundation was created by the experiences of the people within the system. These findings have helped to create an understanding of how the variables and interactions influence the dynamics of the whole system and the emergent behaviours. In the phase 'Understanding the system', all obtained information from the previous steps is placed next to each other to analyse it. The separate perspectives of chapter 3.2 will create a dynamic form in which possible conclusions can be drawn. The in-depth research and obtained experience and knowledge from all interviewed participants, are bound together to form conclusions made by the researcher. These conclusions create a direction in the transition to work towards.

The analysis was performed by surveying the data for tensions, pain points, conflicts, dilemmas, and other visible relationships between the stakeholders. This resulted in different identified points of interest, each with a separate set of stakeholders. After analysis of these points of interest, proposals for the possible (nearby) future transition were established. These propositions were included at the end of each point of interest.

These points of interest are stationed in different areas of the system, which can be seen in figure 3.59.

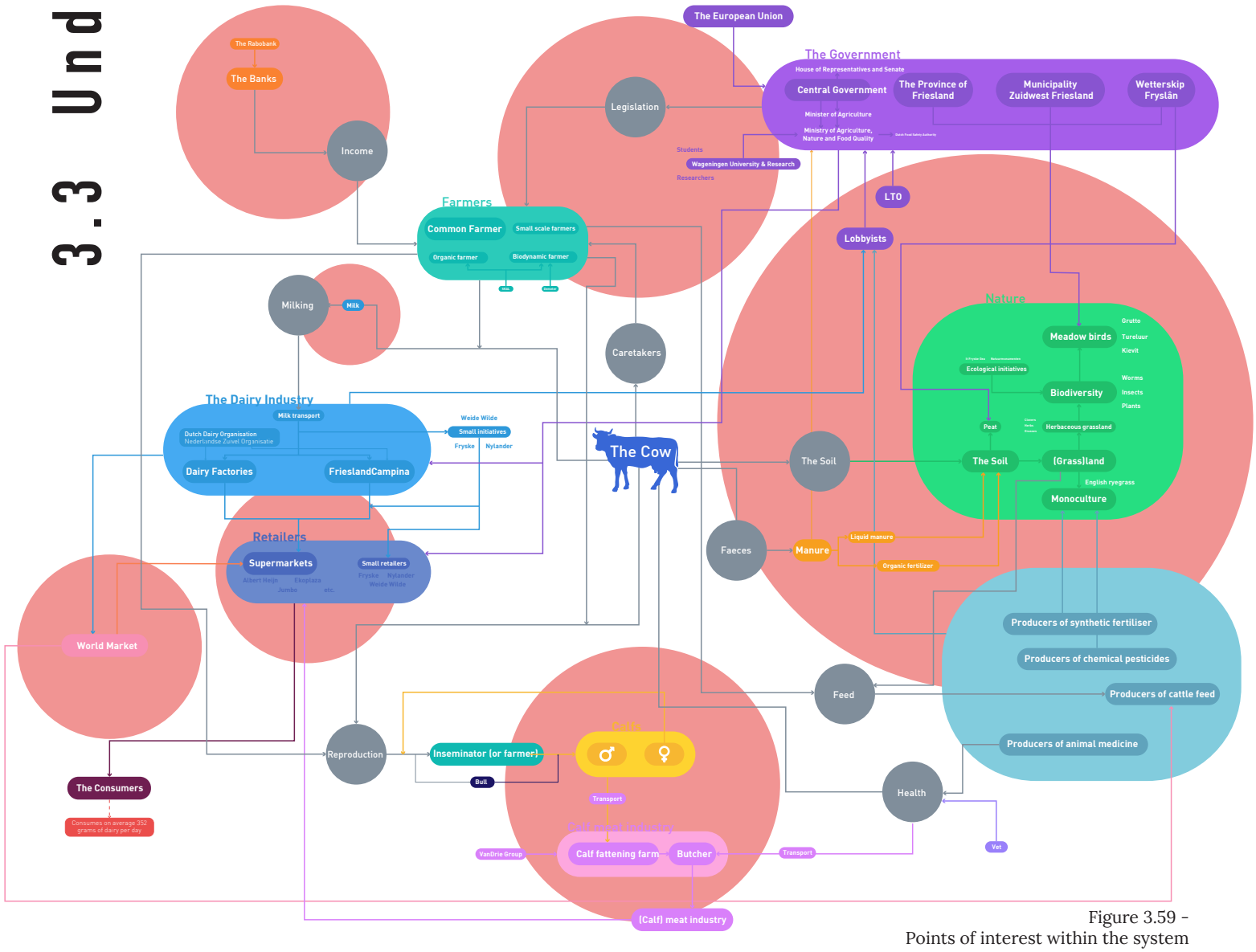


Figure 3.59 -
Points of interest within the system

3.3.1 NATURE VERSUS THE WHOLE SYSTEM

When looking at the identified system, it can be stated that the soil is the basis of the whole system instead of the dairy cow. However, within our current built-up system, nature has not been considered. The producers of our system have "plundered" the soil. In our current agricultural system, which includes dairy farming, there is an imbalance between nature and production. This stems from a simple fact: more space for nature means less production of the land.

Therefore, it might seem as if the system is working well, since there are a lot of various dairy products available for a low price. However, the reality is that the low amount the consumer is paying for a carton of milk in the store, is not a fair and reflective amount of what it actually costs. There are costs associated with the loss of biodiversity and deterioration of soil quality, which are currently not included in the price of a carton of milk. As a result, society has built up a high ecological debt.

> **Ecological debt**
> This debt can be converted into values expressed in money, which corresponds approximately to 35% of what the whole Dutch population now earns together within the Netherlands. Delaying intervention will only cause more ecological, social, and economic damage (Rotmans, 2021).

By depleting the soil, its natural strength disappears. When looking at Southwest Friesland, the peat package of the soil literally burns up. Due to peat oxidation, the peat package is lowering every year, which results in emitting CO2 from the soil. In the near future, there will be no peat left. This consequence is not desirable since healthy peat could fulfil an important function in storing CO2 in the soil, which was explained in chapter 3.2.2.

Thus, there is a tipping point for the peat soil in Friesland. However, this applies also for other agricultural soil types in the Netherlands. If the soil is not yet completely exhausted, this process could be reversible, since nature can slowly recover itself.

> **Soil exhaustion**
> If the soil is completely exhausted or the peat has completely disappeared, it can no longer recover itself nor grow anything (Arsenault, 2014) (RoyalHaskoningDHV et al., 2014).

In the interest of the Dutch soil, this current way of farming should not be continued. Society has been growing at the expense of the earth for hundreds of years. By depleting and drying out the soil to achieve the high production quantities, the agricultural system is reaching its own limits. Without a healthy soil or the presence of a great biodiversity there is no food security in the future.

"So many people are so cut off from reality. They really think that the food shelves will always stay filled. They have no idea how much we depend on nature. And if nature derails further, the misery is incalculable."

- Bert van Ruitenbeek, director of 'Stichting Demeter'

Possibilities for transition

To prevent the irreversible tipping point of an exhausted soil, within the agricultural sector and especially within the dairy sector, drastic change is needed. A new way of farming needs to be implemented throughout the Netherlands. The system of the dairy cow, or the agricultural system in general, must be based on the power of nature, for example with a fertile, healthy, and biodiverse soil. In the Netherlands, the soil is the basis for food production in the short and more importantly in the long term. Society needs to get rid of the mantra "more is better", and must move towards following the rhythms of nature. The new and adapted form of farming must take over the current conventional (in Dutch 'gangbare') dairy production. The discussion should not be focused on the type of farming, such as conventional or biological, but should be on a new farming standard. There must be a new standard in which nature and production of food are in balance, a way in which there is food for everyone without exhausting the soil.

Within the current system, there is a tense

3.3.2 THE FARMER AND THE POLITICS

relationship between the farmers and politicians. In the politicians' view towards the farmers, there are many large-scale regulations which apply for all farmers. However, the politicians fail to recognise that there are different types of farmers, and every farmer is unique. Whether they farm intensively or extensively, or pay more or less attention to nature and the soil, the same rules apply, which is not a valid representation of reality.

This uniformity of policymaking is considered difficult by farmers, as they do not agree that this uniformity fits their farming, and they do not acknowledge continuity and stability in future policy making from the Dutch Government. The farmers experience fragmentation of policy making, which could lead to feelings of anger or frustration. In short, the farmers suffer from the lack of farmers' knowledge in Dutch politics. This is further substantiated by the absence of a political party, who stands and lobbies for the farmer's existence in the long term.

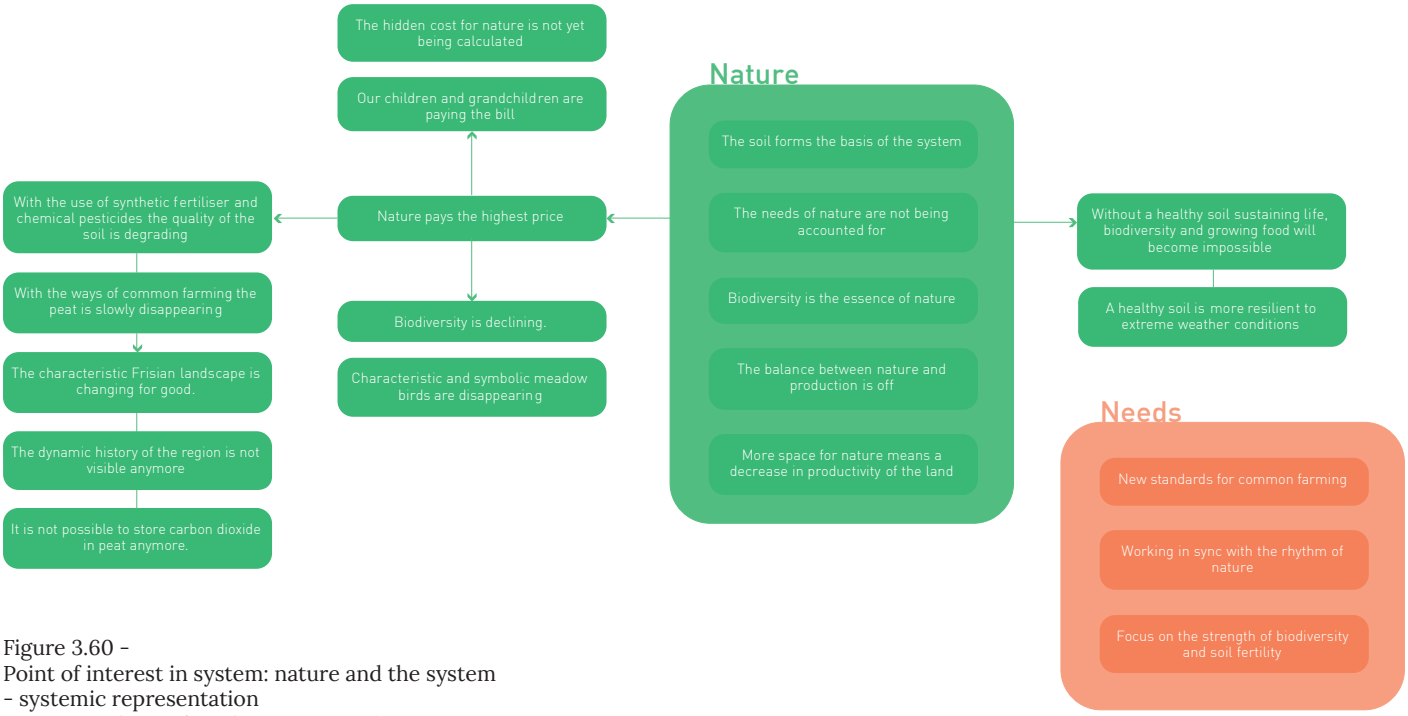


Figure 3.60 -
Point of interest in system: nature and the system
- systemic representation
(See appendix 4.4 for a large overview)

Farmers themselves no longer see a future in the survival of the farmer, due to these circumstances. However, farmers are willing to step up, and make necessary future changes. Thus, there is a will for the better, but a lack of a supportive system.

The following example highlights this will of change in combination with a poor and unambiguous policy: if a farmer would like to do their workings differently and farm in a more extensive form, for example in which the soil is better taken care of, then there is hardly any room for passion and vision as the farmer will be restricted by uniform policies. This results in 'that the pioneer farmers are quickly getting held-back by the system'. They are constantly in violation of current regulations, which are adapted to large-scale intensive farms.

In addition to unambiguous policies, there are other political factors which negatively influence the work of the farmers. One of these is the milk price. The milk price which farmers have received for a litre of milk, has hardly changed over the past 30 years. Even though the milk price has stagnated, all the costs of the farmers have increased, due to the rising inflation.

Consequently, this resulted into a farming logic, in which farmers must produce at a high rate, because they have to, and not because they want to. Consider the following calculation:

A FIXED LOW MILK PRICE + HIGH FIXED COSTS + A HIGH LAND PRICE = HIGH PRODUCTION

Due to this extreme focus on the highest possible production, many farmers have been forced to lose their relationship with their land and soil.
Despite the high production which many farmers try to achieve, the income they earn from their milk alone is not enough to live on. As mentioned in chapter 3.2.1, this forces many farmers to search for additional pillars under their business which could provide them with an additional alternative cash flow.

According to European Commissioner Frans Timmermans, the Dutch politicians are missing the "why" question. Timmermans proposes the Dutch politicians to think of questions such as: 'Why has there been such a large increase in nitrogen emissions in the first place?', 'What is the basis of this increase?' or 'What is the bigger problem causing these specific smaller problems?' (van Ruitenbeek, 2021).
Without the full story and answers to these questions, the urge for change will not arise and not be pushed to the top of the political agenda. If there is no clear authority from the federal or regional government, it is hard for citizens to feel the urge for the change of the system.

<u>Possibilities for transition</u>
The relationship between the farmers and politicians is currently full of identified tensions and pain points, but this can be turned into opportunities and possibilities for the future.

First, politicians must initiate a long-term policy on farming, thereby creating clarity for the agricultural sector. Changing regulations with a new policy every four years does not offer sustainable and stable prospects. Without clarity, farmers cannot work towards a long-term change, which could take up to 10 years and surpasses the duration of a government in office.
During a long period of transition, it is important that the right behaviour is stimulated in the right direction. An effective way to do this is by creating a system which rewards "good" behaviour by, for example, offering a higher milk price when farmers demonstrable healthier soil or more biodiversity in the yard.

Secondly, regulations which farmers must comply with, should match the way they farm. The same rules and rights, such as the current nitrogen rights, should not apply to extensive farmers, but they should apply for intensive farmers. Regulations for agriculture should therefore be coordinated per farmer, or at least per farming method.

Lastly, it is necessary for the farmers to be part of the future solution. The farmer must be included, because they are very much needed in the coming years. The farmer can no longer be seen as the 'bogeyman' of the system. However, this does mean that the view of the farmer towards politics must change as well. In the future, the farmer should become more of a connector between nature, food production and society.

Figure 8.61
Farmers protest against Dutch politics
(Hermus, 2019)

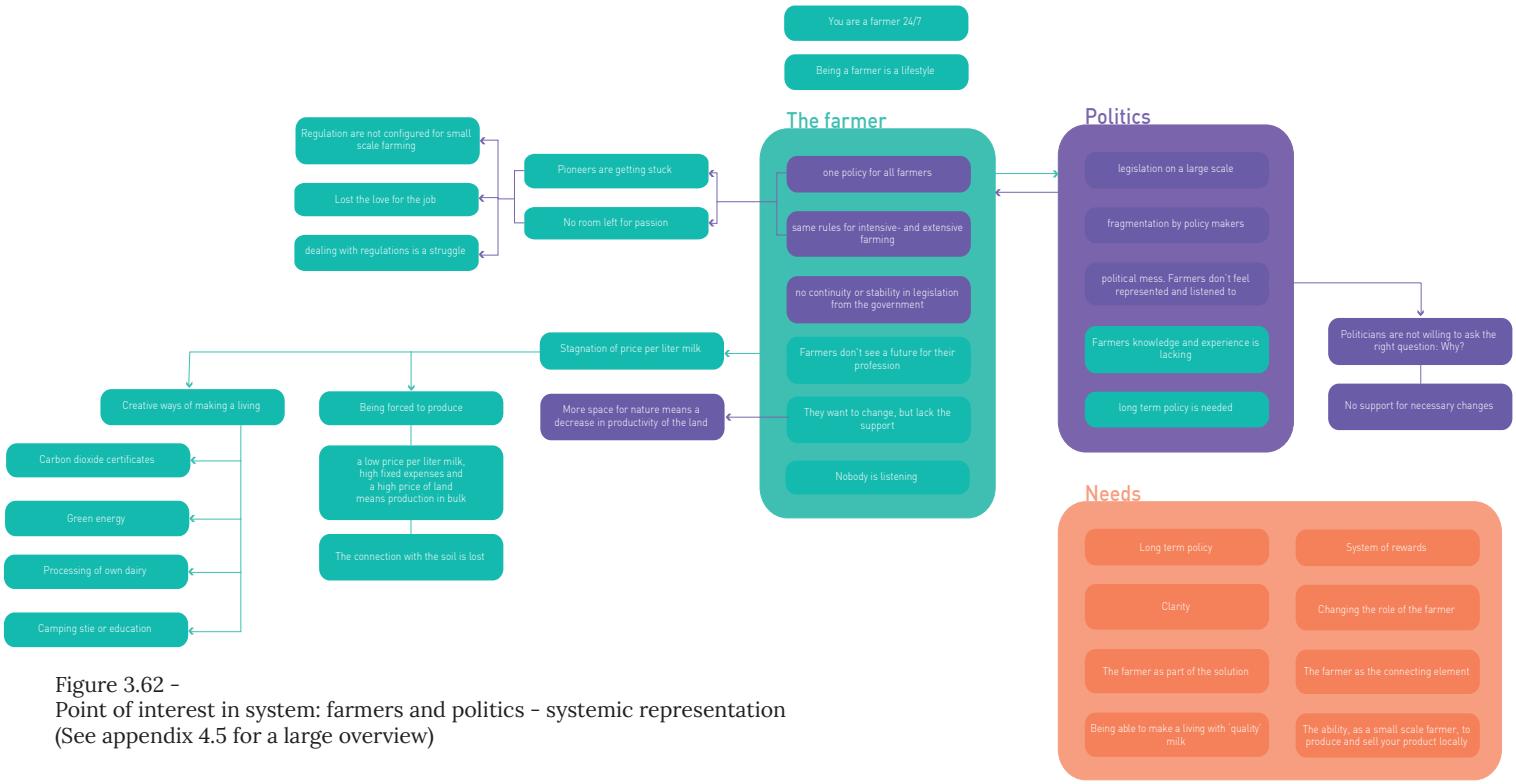


Figure 3.62 -
Point of interest in system: farmers and politics - systemic representation
(See appendix 4.5 for a large overview)

3.3.3 THE CONSUMER AND THE SUPERMARKET

The average Dutch consumer is disconnected with the food which is produced in the Netherlands. As a result, they have little or no self-reflection regarding the products they buy in the supermarket.

The supermarkets are partly responsible for the consumers' disconcerting with the products. Within the supermarket, the process and production of the offered food have been made invisible. Therefore, the consumer only sees the products the way they are displayed in the store. Without any explanation on possible consequences or differences between products, the consumers simply follow the logic offered by the supermarket.

Consumers will unconsciously conclude that "if this is offered here and it says nothing bad, then it must be good.". Supermarkets nudge consumers' attention to the products, which are most profitable for them. The result is that consumers are not aware of the consequences involved in their food, including their dairy products.

A big driving force behind this behaviour of supermarkets is our capitalist profit-driven society. As big supermarket chains have their own internal stakeholders to listen to and satisfy, it is difficult for these corporations to change their processes towards a more transparent vision. This has led to the supermarkets having too many interests within the current system, which means that change is not desirable nor profitable.

<u>Possibilities for transition</u>

For consumers and supermarkets, moving towards a transparent food system is essential. Supermarkets should show the complete transparent story behind the food they are selling. This allows consumers to have a better and more honest self-reflection regarding their food choices. In turn, consumers should gain more information and regain the connection with the food they buy and consume. Therefore, a much more vibrant agricultural culture must be created in the Netherlands, in which the average Dutch person feels more strongly identified.

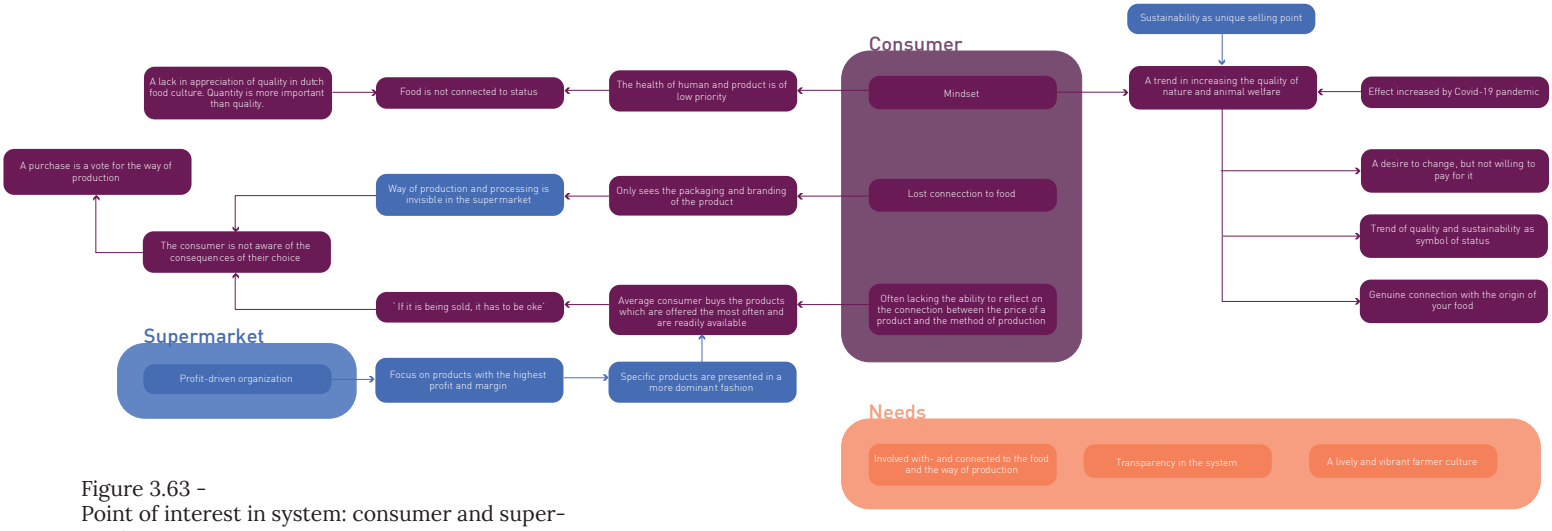


Figure 3.63 -
Point of interest in system: consumer and supermarket - systemic representation
(See appendix 4.6 for a large overview)

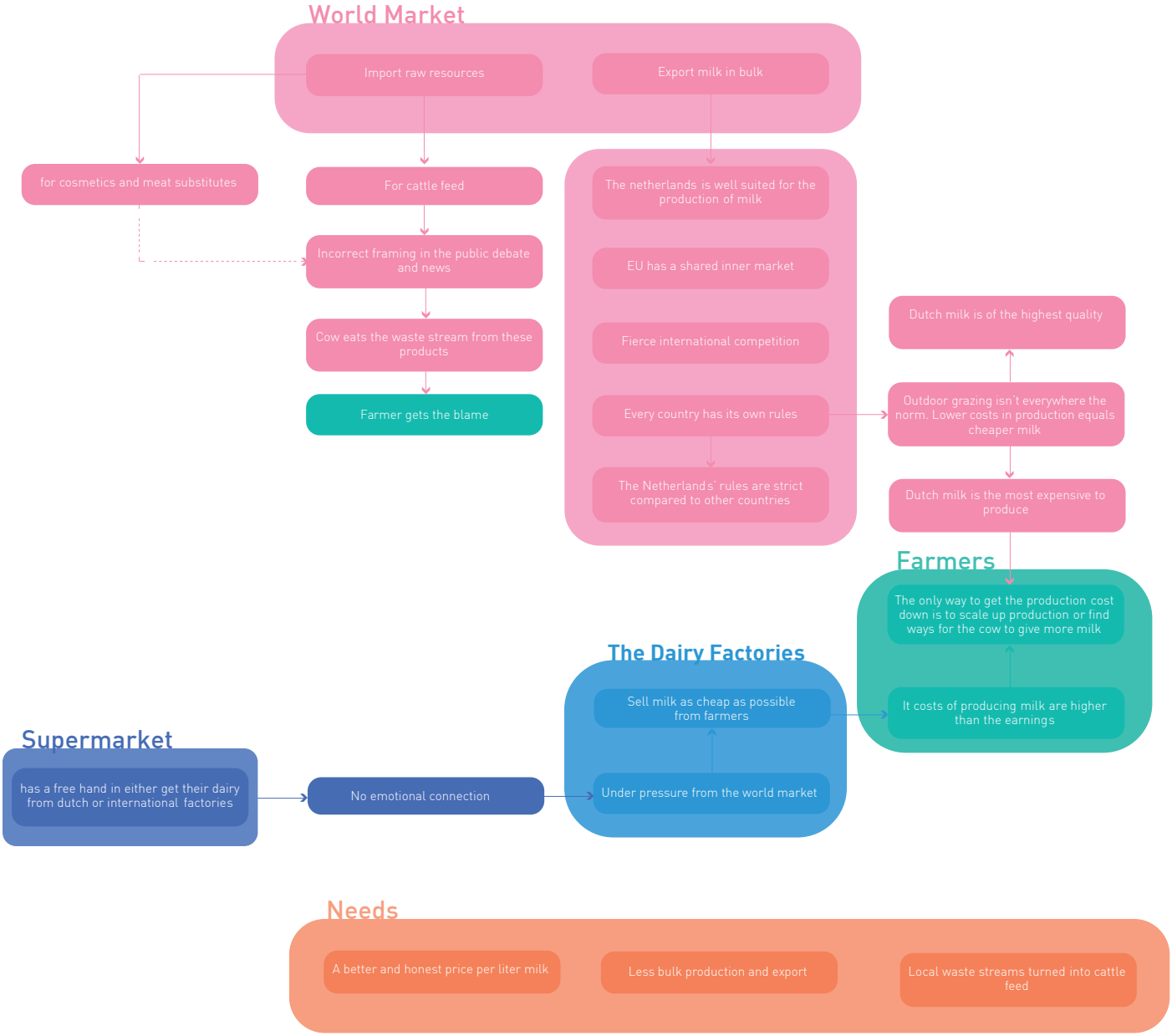


Figure 3.64 -
Point of interest in system: world market, supermarket, dairy factory and farmer - systemic representation
(See appendix 4.7 for a large overview)

3.3.4 THE WORLD MARKET, THE SUPERMARKETS, THE DAIRY FACTORIES, AND THE FARMER

Since the Netherlands has an extremely suitable climate for dairy cows, a lot of dairy is being produced and a substantial part of the production is being exported. A large part of the dairy production is exported to China. However, the vast majority is transported to countries within the European Union. The situation of world market export is not favourable to the Dutch soil, as it contributes to a more rapid depletion of the Dutch soil. Since the exported dairy is mainly large quantities of bulk milk, the result is that this dairy is produced as cheaply as possible. A reduction of export, or even no export at all, would put much less pressure on the Dutch soil. The only problem is that the Netherlands can no longer be seen as separate from Europe or the European Union. Europe has slowly become one big country, which means that there is a need for a wider perspective.

As discussed in chapter 3.2.5, lower world market prices have put Dutch dairy factories under pressure to likewise lower their prices. The supermarkets have free reign of which factory they buy dairy from, which can be both within and outside of the Netherlands. Due to the detached relationship between the supermarkets and the dairy factories, there is no emotional or loyal connection between the supermarkets and the dairy factories.

Again, farmers are dependent on the dairy factories. Since the dairy factories also want to make as much profit as possible, the farmer receives a milk price which is below the cost price of a litre of milk. Each country has its own rules and regulations, but relatively, the strictest rules apply in the Netherlands. This means there are higher production costs for dairy production. As a result, the farmer has no choice but to increase production or apply possible increases of economies of scale.

Beside export from the Netherlands, the world market also provides import. The most media-featured of these imported products are raw materials, such as soy, which is used for animal feed, cosmetics, and meat substitutes. There are some tensions regarding the import of these raw materials, for example a farmer is often blamed for the import of soy for the feed of dairy cows. While, in reality, the cows mainly eat the residual flows of these raw materials, or the scraps. The rest of the soy is used for consumption by western consumers.

"Dutch farmers use soy as feed for livestock."
– Het Parool (Het Parool, 2021)


De Nederlandse koe is verslaafd aan de goedkope Braziliaans soja, althans haar boer is dat. Maar de scheepsladingen die de oceaan overgaan, kunnen alleen worden geproduceerd als stukken natuur worden geofferd. Kan Nederland wel tot kringlooplandbouw komen als soja een van de pijlers is?

Figure 3.65 -
Text from the newspaper,
farmer is blamed for soy imports
(Smit & de Vries, n.d.)

Possibilities for transition

To stabilise the position of the supermarkets on the future world market, it is important that rules are in place to protect the Dutch farmer. The farmer must be paid fairly for the products which they supply. In addition, there must be a decrease in the quantities of bulk dairy production which are currently being exported. Instead of the large-scale export of milk, the Netherlands should focus on sharing knowledge and expertise to other countries. In addition, the Netherlands can also make profits from a high-quality landscape, which can be a tourist destination, instead of the dairy export. Finally, the dairy cows will have to be fed different feed, for example with local residual flows and not with products which are also suitable for human consumption.

3.3.5 COW AND THE INDUSTRY

As mentioned in chapter 3.2.3, the life of a cow is largely determined by the major players in the system. In the absence of stricter regulations from the federal or regional government, ethical considerations about animal welfare are the responsibility of the business community, which include the large-scale slaughterhouses, calf rearing, and transport.

Possibilities for transition

In essence, every living being, including dairy cows and bull calves, are entitled to some form of natural behaviour. This means that strict regulations must be applied to transport, rearing and slaughter of these animals. Therefore, a cow-friendly ending should beat the centre, including cow-friendly slaughterhouses and transport.

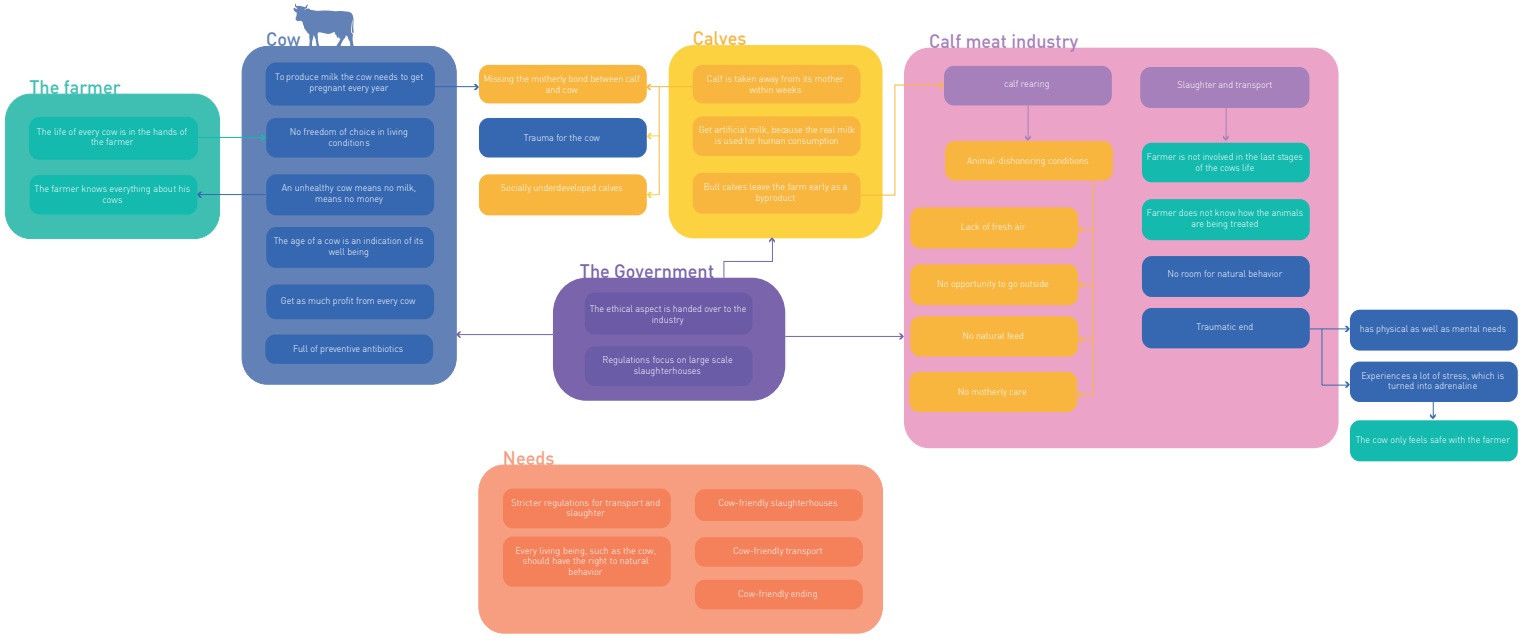


Figure 3.66 -
Point of interest in system: the farmer, the cow, the calves, the calve meat industry and the government- systemic representation
(See appendix 4.8 for a large overview)

3.3.6 MILK AND THE SYSTEM

Milk in Dutch supermarkets is safe and cheap. This is possible because milk has become a factory product. Consequently, milk has become this massive, anonymous, and uniform good, between which the consumer cannot distinguish different farming methods.

Despite the whole system taking place prior to milk being offered in stores, milk no longer holds any value. However, in the production process, the quality of the milk could be controlled, which could lead to healthier fat and protein contents. Therefore, the arising question is: 'Can high-quality milk be converted into fair values?'.

> **Managing the milk quality through nutrition**
>
> The more herbs and flowers the cows eat, the higher the quality of the milk they produce. Due to the various nutrients of herb-rich grass, cows produce milk with more unsaturated fatty acids, and therefore, a higher ratio of omega-3 to omega-6 fatty acids. Concentrates and perennial rye grass have more saturated fatty acids in the milk (Vroege Vogels, 2020).

"We know that the OMEGA-3 OMEGA-6 ratio can be favourably influenced by the way of feeding the dairy cow. Then we have to ask ourselves the essential question,why don't we actually do that?"

- Catharinus Wierda, founder 'De Fryske' Cheese

Possibilities for transition

To change the view of milk as uniform and to market milk as a high-quality product, a different coordination of business operations is required. This means other forms of milk or dairy processing is necessary. At the same time, a different message to consumers is needed. For instance information on production method or ecological footprint (impact on nature, animal welfare) should be standard available as well as value for money.

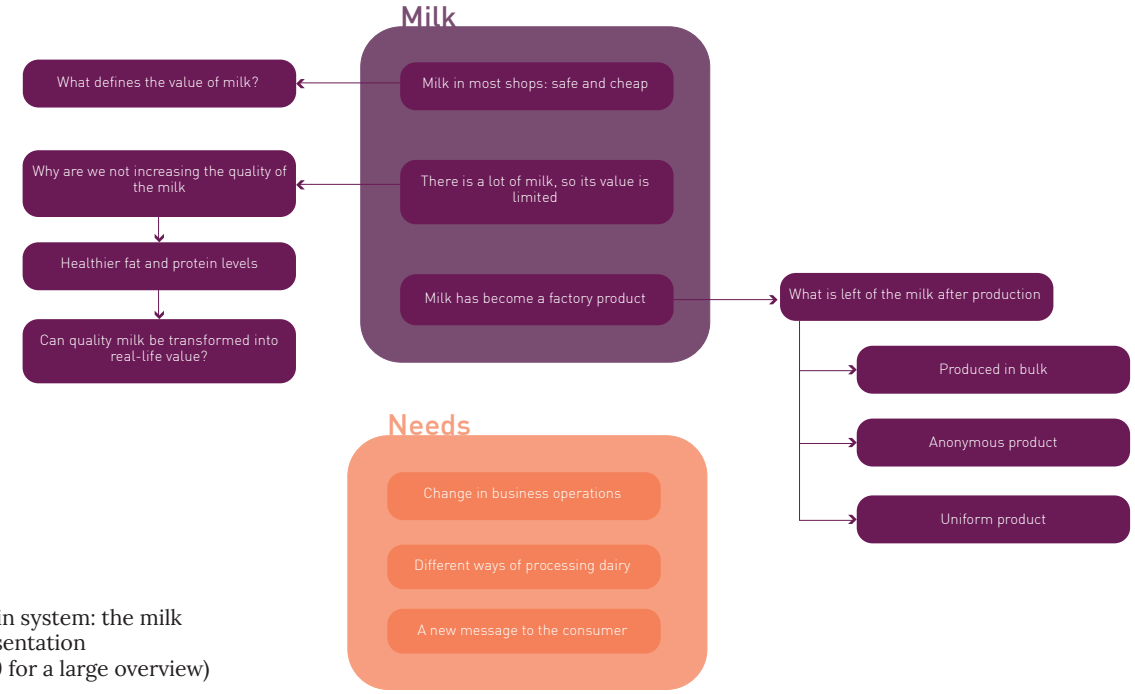


Figure 3.67 -
Point of interest in system: the milk
- systemic representation
(See appendix 4.9 for a large overview)

3.3.7 THE BANKS

As mentioned in chapter 3.2.8, banks are a determining player in the system, and partly responsible for the lack of financial incentive to change farming. The banks take out high loans with farmers, but these amounts are an important source of debts for farmers (in Dutch: vreemd vermogen).
However, in the current system, these farmers-loans are not the only loans which banks have invested in. Pesticides and fertiliser manufacturers have also received loans. Therefore, the banks have a great interest in success in the current functioning of the system, as they are financing both parties with different interests. For the banks, a transition of agriculture is at odds with the success from the current system, which currently yields higher profits. The only way to enable change on the farmyard is if banks coincide on the side of these changes.

<u>Possibilities for transition</u>

To make change possible, pioneer farmers who would like to become more nature-inclusive farmers, must be financially strengthened and backed up by the banks.

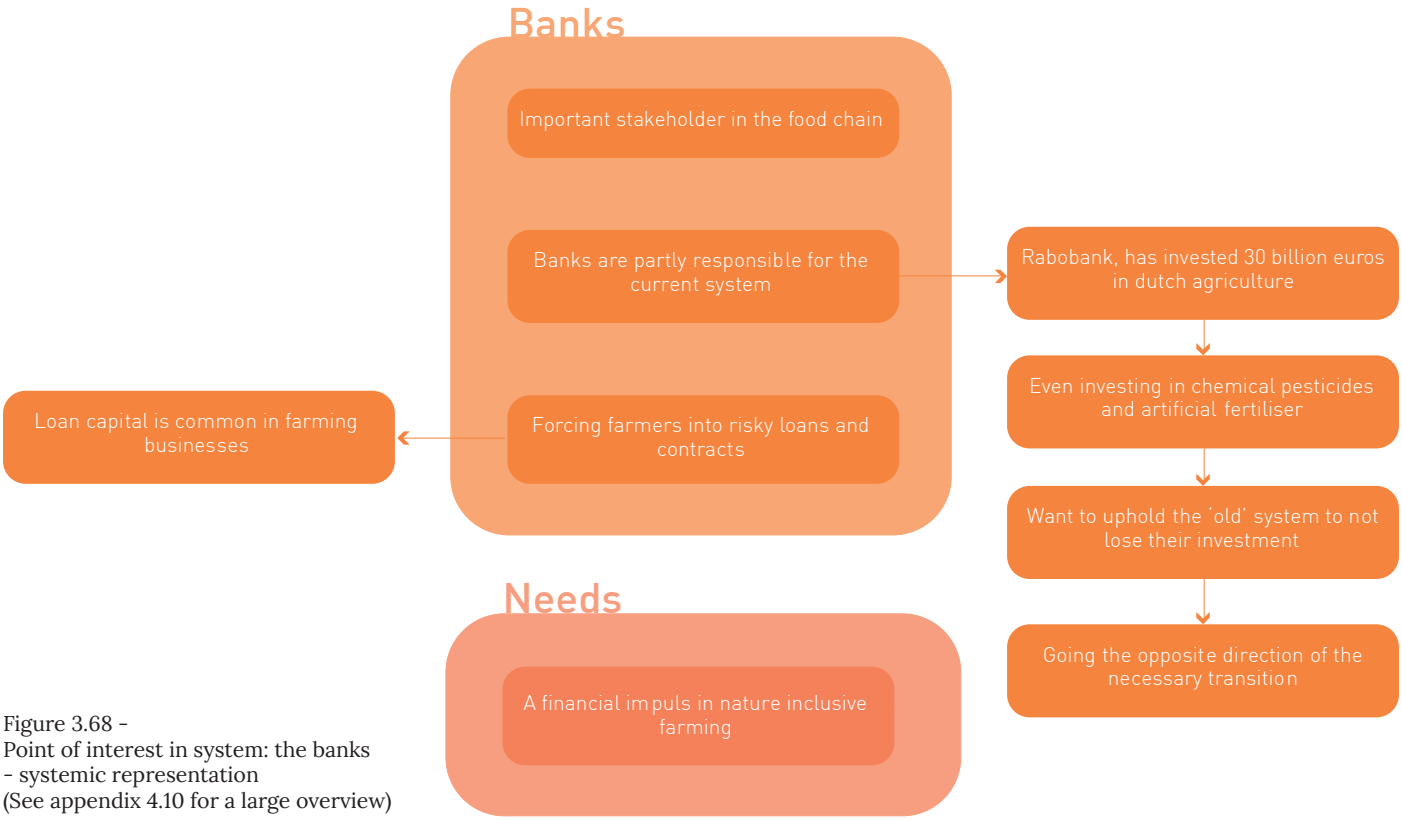


Figure 3.68 -
Point of interest in system: the banks
- systemic representation
(See appendix 4.10 for a large overview)

3.3.8 FROM AREAS OF INTEREST TO POSSIBILITIES FOR TRANSITION

Due to the variety of stakeholders, there are many aspects and opportunities for possibilities for transition. Therefore, the list of possibilities is aimed at different parts of the system. Some are aimed at a more distant future, while other possibilities are more urgent and require action now. All these different possibilities will be incorporated in the transition roadmap, which will be discussed in chapter 5.2.2.

Based on chapter 3.3.1 to 3.3.7, a short summary of possibilities for transition are included below, whereby the possibilities are prioritised from short-term to long-term.

- Starting point is the power of biodiversity and soil fertility
- More moving with rhythms of nature
- New (higher) standard of agriculture

- Clarity in politics
- Adjust the restrictions based on how a farmer is farming
- Long-term policy provided by politicians
- Rewarding system (for good behaviour regarding nature-inclusive farmers)

- The farmer is part of the solution
- Changing role of the farmer in the future
  - The farmer more as a connector (between nature, food production and society)

- A more transparent food system presented by the supermarkets
- From the consumer, connectivity with food and its production
- A living agricultural culture in th Netherlands
- A fair price for the production supplied by the farmers
- Export of knowledge and expertise instead of large quantities of Dutch dairy
- Local residual flows to animal feed

- Every living being is entitled to some form of natural behaviour
- A higher standard for dairy cattle living conditions
- A cow friendly ending
  - Stricter regulations for the latter part of a cow/calf's life

- Nature- inclusive farmers, must be economically strengthened by banks
- System in which the polluter must pay more

- More focus on milk quality
  - Other alignment of business operations
  - Other forms of milk/dairy processing
  - Different message to consumers

In summary, within the current system, profits are not fairly distributed. The present system is mainly focused on yielding high profits for the banks, the food industry, and (large) supermarkets. However, no matter the urgency of the many problems in the current system, the solutions are just as complex. Since all aspects are connected in the system, it is one big, entangled web. Where at the beginning of the project, the systemic web started with the Frisian dairy cow as a centre, the actual centre is different. It can be concluded that the whole system is one large interwoven web, with at the centre not the dairy cow, but the one stakeholder which is directly connected to the entire system as every stakeholder depends on this: the soil The soil forms the base upon which the entire current or future system is based. Without a healthy soil which supplies raw materials, the entire identified system will not exist.

"No matter how much wealth, education, and money we have, our children cannot live well unless we restore the soil and water."

- Sadhguru (Conscious Planet, n.d.)

Figure 3.67 -
working out an impression of the atmosphere, understanding the system on paper

04

GOAL SETTING

The next step in the Systemic Design Toolkit is "defining the desired future". In the first part of this chapter a vision for the desired future in 2050 will be presented.
This second part of this chapter will elaborate on the next step of the Systemic Design Toolkit: "exploring the possibility space". This section will define ideas for possible interventions, which are needed to accelerate the transition of the current system.

At the start of this project, it was clear that significant changes must be made to current Dutch agriculture, including dairy farms. However, it was not yet clear what the correct starting point for this change should be.

In the preceding steps of the Systemic Design Toolkit, the aim of the project, the current situation of the system surrounding the dairy cow, and the problems and bottlenecks were clearly

identified. This makes it possible to articulate a common desired future – a first outline of how the system can transition. Therefore, the remaining questions are:

- Towards what should be worked to when designing the intervention?
- What will the future look like if the designed intervention works as conceived and the system moves to this point?

For the purpose of this research, to clearly communicate this future, and to provide a starting point of this desired future, a 'Future Perfect Story' was composed, including visions of everyday life.

This future vision is based on articulated visions of the stakeholders, who have participated in this project, and all the in-depth research findings. Combining these various sources has led to a personal interpretation of how the future surrounding the dairy cow should look like. This is presented in a story based in the year 2050.
For extra validation of this personal vision, some additional research was performed. Additional sources of validation were added as reference at the end of this subsection.

A STORY IN THE YEAR 2050

In 2050, the Southwest Frisian soil will be healthy and full of various life. In the peat meadow, there is a favourable balance between nature and production. In other words, there is a stable ecosystem in which nature and agriculture complement each other. In addition, some Jersey cows graze on the wetland, while the healthy peat package also stores CO2 from the air. The image society used to know of Friesland has changed somewhat. First, there are fewer cows in the meadow, and the extensive meadows are no longer monotonous bright green but have become colourful plots of various types of plants and grasses. In addition, the peat meadow area is also a popular breeding ground for meadow birds, such as the Black-tailed Godwit.

After years of transition within the agricultural sector, a new standard has emerged. Farmers have moved on from obtaining the highest possible production. The primary goal has shifted to moving with nature and is based on the power of fertile soil and biodiversity. The use of fertilisers in agriculture has been banned for years. The federal government initiated and steered this development. This change in policy started with a reward system, in which farmers received extra rewards if they performed nature-inclusive actions on the farm, thereby stimulating the conversion towards nature-inclusive farming. Finally, around 2030, there was a complete ban on the use of fertilisers and chemical pesticides in agriculture.

The new farmer

Farming is a much-loved profession and in recent years, there has been an increase in young people starting to farm on a local scale. New farmers with the ambition to farm in an environmentally and inclusive way, were able to complete a successful trajectory with banks to receive new loans to get their new way of farming started.

Their work is very diverse, which is what makes it an attractive career choice. The farmer is a connector between nature, food, and society. In addition to producing food, they are mainly concerned with the quality of their living environment, the soil, and biodiversity.

On a local scale, farmers work together, as they need and rely on each other. For example, one farmer has cows, and processes and sells his own dairy products. The fertile organic fertilisers of the processes of this farmer are supplied to farmers in the area. The farmers in the area have food forests or mixed farms. The rest products from people and other farms are used as food for the animals. It has become a circular system.

There are not many animals within this new system, as animal products such as meat, dairy, and eggs, have become luxury products. However, animals are not completely left out of the system, as they still play a valuable role in converting human waste streams into nutrients.

The animals which are still found on the farms, are treated with respect and live in the most natural conditions. This upturn in the quality of animal life is due to the government. The government has drawn up new and stricter rules regarding animal welfare.

The new countryside

Over the past 20 years, the government invested a considerable amount of time and resources into the redevelopment of the countryside. Getting to this redevelopment required a radically different approach. In 2030, the government has drawn up regional long-term goals, as each area has a different soil, with regards to soil health, biodiversity, nature (nitrogen), landscape quality, and climate. These goals have been laid down by law, meaning that there are consequences attached to breaching these new laws. By inserting a reward system for farmers who contribute in a positive way towards nature and penalising negative effects, the government has created a new revenue model which has stimulated the transition to sustainable agriculture. This allowed many farmers to use their own creativity to switch to a sustainable farming business.

The conscious citizen and consumer

The new sustainable farming has led to a change in food patterns for Dutch citizens and consumers. Animal products only fulfil a small part of their diet. Mostly vegetable products are consumed, in addition to new wet saline crops. Current chefs and food influencers have inspired society to prepare new dishes, with strong regard to where the products are produced or come from. They only present products which are in season.

The Dutch citizen feels strongly connected to the food which they consume. Since agriculture and nature are more integrated, a new commitment has arisen. This development has ensured that more recreation takes place in

nature and food areas, where you can walk, cycle, and buy fresh products directly from the farmers.

The sale of food

Supermarkets often work with farmers on a local scale and are focused on local sales. Since 2022, the government has stimulated supermarkets and brands to show transparency behind the products they sold. As a result, society quickly increased demand for responsibly produced food, which led to a major switch to a more local market.

In addition, the number of farm shops and markets and small-scale local supermarkets has increased. In these establishments, many consumers buy their products directly from the farmers.

Global market

The new standard of agriculture meant that less yield could be obtained from the Dutch land. A switch was initiated within the world market export of dairy. Less revenue meant fewer export opportunities, especially to countries within the European Union. Instead of exporting bulk milk, the Netherlands now mainly exports knowledge and experience to other countries to help them to produce dairy in the most naturally responsible way. In addition, the upgrading of the quality of the Dutch landscape has attracted many tourists, which has strengthened the Dutch economy in a new way.

In summary, in 2050, agriculture is driven by moving along with the rhythms of nature. This is based on the strength and value of fertile soil and high biodiversity. The production of food is integrated with nature. The Dutch food pattern has changed to be able to feed our society. Where animal-based food once formed the basis of the daily menu, these are now an exception. As the dairy cow once was the centre of the Frisian landscape, this position of the cow has become less dominant and is now combined more with other biodiversity and nature.

Verifying sources for future visison

(Berger, 2021)
(de Boer & de Olde, 2020)
(Jonge Klimaatbeweging, 2021)
(de Kroon, 2020)
(Mesters, 2021)
(OERsterk, 2021)
(Veerman, 2021)

Figure 4.1 - Pioneer farmer Doetie, a good example for the future. With small edition, high quality and local homemade cheese at farmers market.

With a defined desired future and an overview of the leverage points of the current system, the options for designing new interventions can be investigated. This leads to the next step in the Systemic Design Toolkit: “exploring the possibility space”.
Within a Transition Design method, an intervention means designing a prototype or product, which provokes real-world action and intervenes in human behaviour. These designed interventions are aimed at transitioning the system (the problem) towards the desired future (Irvin, 2018).

Based on the future vision mentioned in chapter 4.1, and for the purpose of this research, brainstorming sessions about how to design such an intervention, were conducted by the researcher. This phase of the project was focused on investigating the highest number of possible opportunities for various interventions, aimed at several pressure points within the system.

During these brainstorming sessions, all the main players of the system and the future vision from chapter 4.1 were taken as a starting point for possible interventions. This resulted in a diverse collection of divergent ideas, which had different scopes and may be implemented on different scales. Nonetheless, all of them should provide an impetus towards the new form of nature inclusive agriculture. In total, 6 ideas were identified.

On the next page, all six ideas with the necessary change effected are described and discussed:

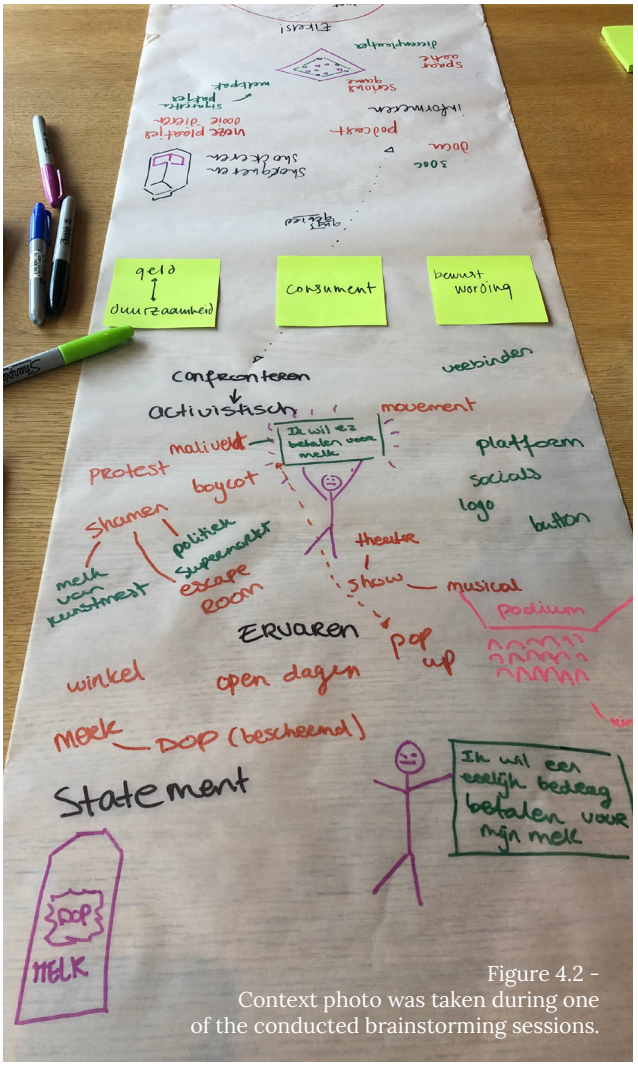


Figure 4.2 - Context photo was taken during one of the conducted brainstorming sessions.

In the current situation →	In the desired future →	The desired intervention should
The cow does not live in optimal natural conditions and is in the service of the current system.	The cow is entitled to natural life and is an equal part of the new system.	Giving the cow her voice and rights.
The farmer is currently designated as a 'wrongdoer' and is stuck in the current system.	The farmer is a connector between nature, food, and society.	Communicate the farmer's honest story and creating a new farmer identity.
The consumer/citizen is now unconscious of the consequences associated with our current system.	The consumer/citizen is involved in the system, food, and production.	Creating involvement of the consumers towards the food they consume and buy.
The supermarket consciously sells products without communicating the whole story, and takes advantage of consumer ignorance.	There is transparency from the supermarkets and they often work together with the "new farmers".	Creating transparency regarding the current range of products in the supermarket.
The government is waiting and not actively working on creating support for urgent change.	Politicians acted decisively and draw up new rules for agriculture.	Create a political support base for change.

Appendix 5 presents the visualisations of all the obtained ideas from the conducted brainstorm sessions.

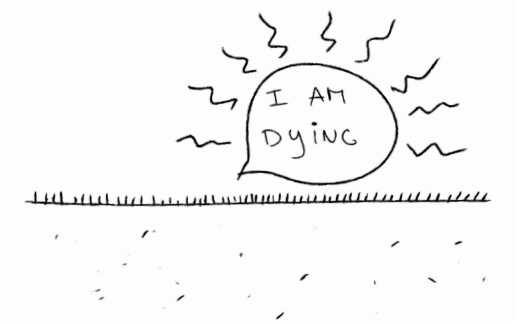
To give more direction to the design of the intervention, a clear choice had to be made on which ideas to include in the final intervention concept. Not all possibilities obtained from the research could be incorporated in the final intervention concept. That is why a selection has been made from all the ideas obtained. The final concept will be discussed in more detail in chapter 5.

The selection of intervention ideas is based on two criteria:

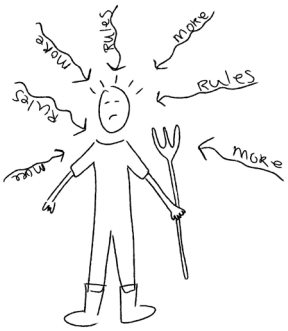
1. Can the idea be implemented and is it feasible?
2. Has the idea a clear focus on the main component for change in the future?

The following ideas were chosen based on these criteria:

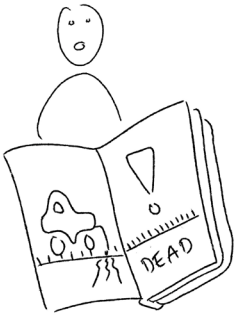
1. Giving the soil a voice in a creative way, for example through art or graphic design.



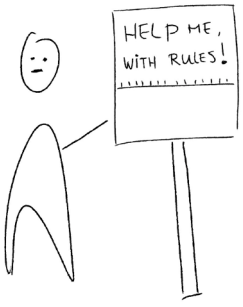
2. Communicating the farmer's entangled potential and showing how the farmer is shaped by the system, for example by creating a new farmers movement.



3. Informing the consumer about the invisible problems regarding the soil or showing them what they indirectly vote for when buying certain products, for example with a documentary, a platform, a flyer, or a poster.



4. Create political support for urgent change regarding the soil and the future of society, by means of a movement.



INTERMEZZO

A new order in society emerges from the bottom-up movement, driven by new values which represent another kind of society.
These values are not taken from the neo-liberal beliefs, such as profit, efficiency, and return on investment. These can be categorised as short-term values, which are rushed and may cause illnesses, such as burn-outs. The new order is more in balance with a perspective towards a long-term vision.

During these transitions within society, a transition period is most often characterised by preceding chaos necessary to replace the locked system towards a new order. Within the new system, values shift as part of a new paradigm “from ego to eco”.
The new order consists of a small group of relatively highly educated people. This small group of pioneers is usually followed by larger groups, which are in turn followed by a group of people who lag behind. These movements, described as commons movement, are local communities which initiate change from the bottom up.

The biggest barrier to system change is always the mental barrier. A system change requires a personal change, a change in thinking, acting, and organisation. Transitions are always initiated by people, not forced but based on free will. (Rotmans, 2017)

Time lens
Within transitions, different phases can be identified through a time lens: the pre-development phase, the tipping period, and finally the further development phase. This can be illustrated by a s-curve diagram. The time lens also shows there is never an absolute beginning or end of a transition. The s-curve shows a stylized form; however, the reality is more capricious with fluctuations in underlying cyclical and structural developments (Rotmans, 2021).

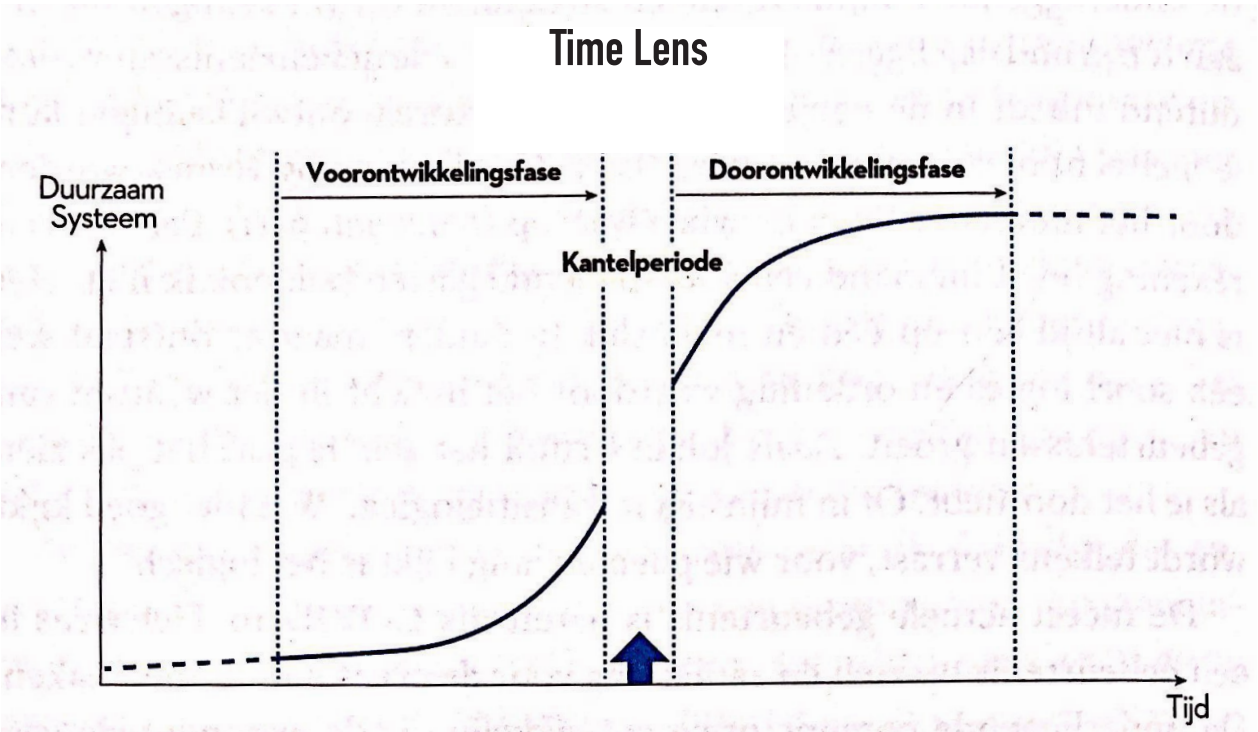


Figure 4.3 -
Time Lens, Different phases in transition - S-curve
(Rotmans, 2021)

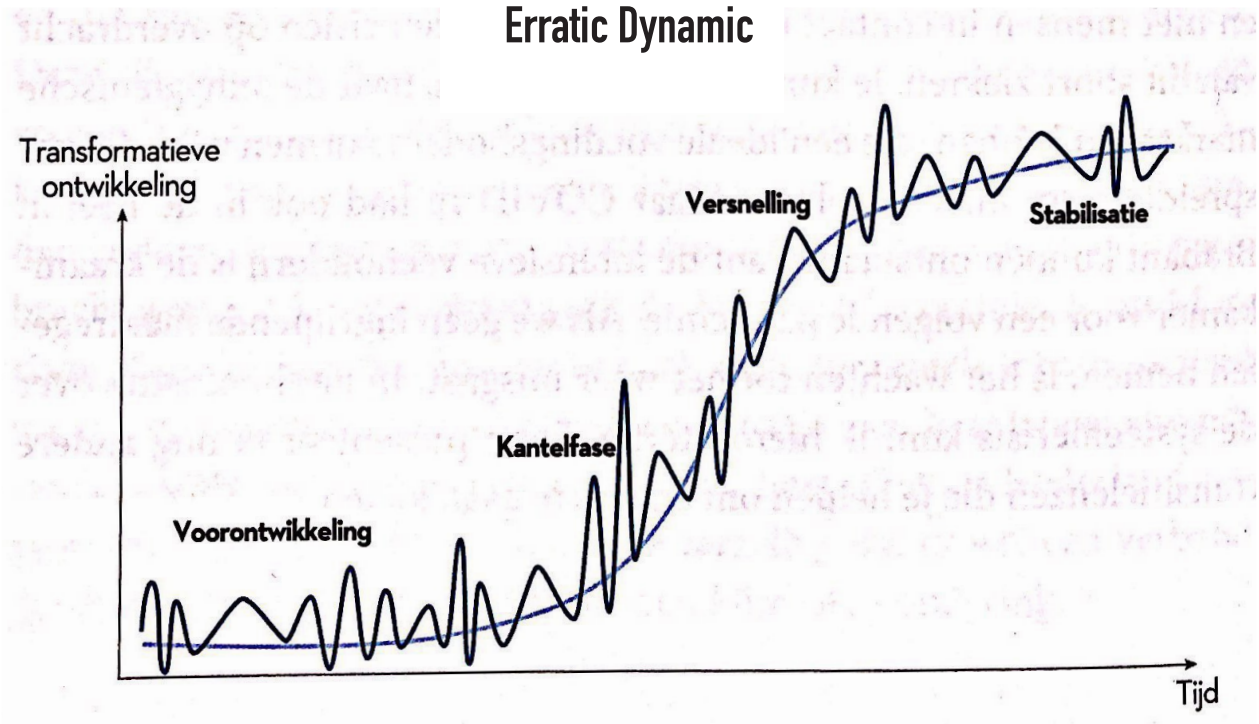


Figure 4.4 -
S-curve, in reality an whimsical shape with many fluctuations
(Rotmans, 2021)

05

FINAL CONCEPT

The Systemic Design Toolkit dictates that the next step is 'designing the intervention model'. In this chapter, the design statement, the interaction vision, and the design criteria are presented. This will give the intervention its shape.
In addition, the conducted testing of the intervention is shown. Lastly, the final design for the intervention will be shown.

5.1.1 SETTING THE STAGE FOR THE INTERVENTION

To set a clear starting point for the final design of the intervention, a design statement, an interaction vision, and a list of design requirements must be defined. The design statement captures two aspects of the intervention in one sentence: who the intervention is aimed at, and what the intervention should evoke. The interaction vision describes how the interaction should be experienced together with the intervention.

The design requirements are based on several aspects, including the design statement, the interaction vision, the chosen ideas formulated in chapter 4.2, and the theory of transition mentioned in the intermezzo. These requirements define the necessary characteristics for a successful intervention.

Design Statement

People should develop a level of self-reflection linked to their buying behaviour of certain dairy products to the invisible exiting consequences of the Dutch soil degradation.

People: Young professionals, most likely the group of people who would follow the group of pioneers within the transition process.

Based on the theory about transition in society (mentioned in the intermezzo), it was clearly stated that a transition is a personal journey, which cannot be forced, and, thus, should be taken out of free will. Additionally, the initiated change should be a bottom-up change. Inspired by these criteria for a successful system change, an interaction vision can be created, which takes those criteria into account, and helps to shape the desired interaction of the user with the intervention.

Interaction vision

In the garden, a child is exploring soil life, living within a little container with a transparent glass top. She curiously investigates which animals are living in the soil, what they are doing, and how they are taking care of their living environment.

Figure 5.1 -
Image to inspire interaction vision

This interaction vision includes the following characteristics of an interaction:

- Curiosity
- Explorative
- Self-reliant

These characters of interaction are implemented in the list of design requirements.

Style/identity of the intervention

The researcher deliberately searched for an authentic style with hand-made drawings, which are accessible for a larger public, and to prevent a glossy, advertising style, which could imply an elitist or exclusive product.

Design requirements

What the design should do:

- *The intervention should develop a sense of self-reflection, regarding food choices of the user.*
- *The intervention should inform the user about the hidden consequences of the dairy industry and dairy products.*
- *The intervention should create a movement of people who urge for political consensus.*

Which message is being delivered:

- *In a creative way: "Give voice for the soil"*
- *In a graphical way: "Reveal the entangled position of the farmer"*

How the experience should be:

- *Experience with the intervention should not feel obligated and must bea bottom-up approach*
- *The intervention should evoke the curiosity of the user*

- *The interaction with the intervention should be self-explorative*
- *The interaction with the intervention should inform the users in an explorative way*

How the intervention should look:

- *The style of the intervention should be authentic with hand-made drawings*

5.1.2 Introducing the intervention concept

5.1.2 INTRODUCING THE INTERVENTION CONCEPT

Within this subchapter the values and the working of the designed intervention will be presented.

Description of values

Purpose of the tool

The purpose of the intervention is to be a wake-up call about the present state of the Dutch food system, and specifically the dairy industry. The intervention should increase self-reflection in habits of consumers towards buying and consuming food with all the connected consequences.

Context of the tool

The context of the tool is showing the bigger picture of the state of the Dutch agriculture and the dairy farms in terms of time, profit, the price of nature, and revenue. The Dutch agricultural system is ready to implode and has reached its boundaries.

Values of the tool

With the tool, a new awareness is created, which helps increase the transition towards a nature inclusive agricultural system, and emphasises the urge for radical change.

Presenting the intervention

Part One: 'The World Behind MILK'

Envelope

Four booklets are packed in a blank envelope. The envelope is sealed, but carries a cryptic message 'the world behind milk'. The envelope should trigger curiosity and expectations about its content. Because the envelope is sealed, it prevents the receiver from taking a quick look at it (and it being thrown away). The envelope has an appealing quality, which makes you want to take it home.

Booklet 1

Booklet 1 introduces the main stakeholders of the milk industry, which are the world behind milk. In the first few pages, these stakeholders are introduced with a short description. On the last page, just before unfolding the whole booklet, a question for the user is presented. The question addresses the user and will 'ask' the user if they know how these players interact in reality.

When the user unfolds the booklet, a poster appears with a graphic abstract representation of the system and its stakeholders, and a clarifying text explaining the different stakeholder relations within the system. The text explains how both farmers, cows, and soil are being 'shaped' by the other more powerful players – not by themselves –, such as the dairy industry, the supermarkets, the banks, the government, and the consumer.

The QR codes, attached to the different stakeholders, will lead to the main platform 'Tot in de Bodem' ("Get to the root of the matter"), which provides the user with more in-depth information about the stakeholder and their role.

Figure 5.2 :
Photo of first prototype of the intervention

Booklet 2

The second booklet addresses the expectation of the consumer. This booklet dives into the dilemma of having enough food supply, but at a low price. The user learns that to achieve these low food prices, the farmers need to make use of a lot of external artificial products to achieve the high and low-priced food demand. It is the first deepening layer into the dairy system, where the user realises that underneath all of it, something is fundamentally wrong.

When the booklet is fully unfolded, through an artistic graphical representation, the user is confronted that the Dutch soil is supplied by an 'intravenous' (IV) drip of chemical fertilisers causing serious distress to it. As the soil has no voice of its own, this image represents the voice of the soil and should be confronted with what the current agricultural model of the past years has included.

Booklet 3

Booklet 3 introduces the invisible reality of a carton of milk. A carton of milk is shown as an innocent container, whereby nothing can be seen on the outside of the current recognizable packaging. As the booklet unfolds, the reality of a milk carton is explained: there is an untold story about the underlying consequences of milk production, caused by our consumption. With the key message being that due to our behaviour and desires, the consumer causes direct damage to the Dutch soil.

When the user fully unfolds the booklet, the user is confronted with the depletion of our soil, which will lead to the complete exhaustion of our soil in approximately 2035. The direct consequence of this causation is that if there is no soil, there will be no food; NO SOIL= NO FOOD. This message should confront the user with a hard reality, and which should shock the user.

Booklet 4

The last booklet proposes a possible scenario for a transition towards more biodiversity and a healthier environment, specifically targeted at the user and the upcoming generations. The user will learn that this means a significant call for change as a society. The transformation describes different user behaviours, various farming strategies, and a new form of agriculture.

When fully unfolding the booklet, the user concludes that if we want to continue to harvest in the long term, a healthy soil is essential. However, this accomplishment is a shared responsibility for all stakeholders involved. After stating this complexity, the user will be assisted on ways to get or keep getting involved by the provided QR codes. The QR codes pictured on the booklet, land the user on a different webpage of the main platform, giving some concrete proposals for individuals on what can be done. It expresses the importance of starting a movement, which needs many more followers to achieve the urgency for change.

Figure 5.3:
Photo of first prototype of the intervention, folded the booklets

Figure 5.4:
Photo of first prototype of the intervention booklet 1 first introductory page

Part two: Additional platform 'Tot in de Bodem' ("Get to the root of the matter").

The additional informative platform is a website and the overall tool of the intervention. In other words, this website is the home base of the movement, 'Tot in de bodem uitgezocht' (literal translation: "Investigated into the soil". Hereafter "Get to the root of the matter" is used).

he website offers various things, but the most important function is that it provides additional in-depth information about the designed intervention. It offers interested people the opportunity to delve more deeply into the problems of the current dairy system. This in-depth information was written by the researcher of this project. At the same time, the platform and the written text are also a connector with other initiatives, experts and organisations who are committed to transitioning towards the same future.

Already, there are many pioneers who, in their own way, are trying to dedicate themselves to a healthier, and more liveable system. Many of these pioneers have inspired this project. Therefore, the platform is also a means to bring all these existing pioneers together, and to give them more followers or inspire other farmers or stakeholders who are seeking guidance and examples. By joining forces, more critical mass is generated, which is necessary to force change.

As the transition towards a healthier and more liveable agricultural system is not only applicable for the dairy cows, but also to a much broader form of farming. Thus, the website is applicable in multiple agricultural fields and could form a broader platform. The whole agricultural world is hidden not only behind milk, but behind everything society consumes, such as arable crops or various grains. These other materials can also be explored into great detail. The platform also intends to bring these other themes to light.

Figure 5.5 -
Logo off the platform

Shout-out to an inspiring existing pioneer

Claudy Jongstra, artist and activist, and her partner Claudia Busson work from their 'Farm of the World' in Húns, Friesland on a small-scale initiative to increase biodiversity. For Claudy her monumental felt artworks, they grow a variety of plants. Instead of looking for large-scale technological solutions which increase the further depletion of the soil, they initiated the biological garden within their green enclave. By baking sour-dough bread for the local community, they increase the emotional bond with their neighbouring farmers.

The apparent simplicity of blooming flowers along fields generates conversations between farmers and citizens. Farmers are being asked to participate in a countermovement by sowing their own field margins with flowers or traditional crops. The 'Farm of the World' serves as an alternative profit example, as they show that profit is not only in the products which come from the land, but in the experience and connectivity of the farmers and society. A field pays off, even if it is because bees find food there or artists find inspiration (van Doorn, 2021).

Figure 5.6 - Farm pioneers Jongstra and Busson in Húns, Friesland

Figure 5.7 - Community kitchen, pioneers Jongstra and Bussonin Húns, Friesland

5.1.3 TESTING THE INTERVENTION

The next step in the Systematic Design Toolkit is to test the intervention. A first prototype was made to test the designed intervention with potential users in real life. The users helped to validate design decisions.

First test round

Purpose of the testing

The purpose of these tests was to identify problems within the design. In addition, the tests had to clarify whether the intervention elicited the desired response and experience from the users, to create clear opportunities to iterate towards a final design. For the final design, it is of great importance that the intervention should meet the needs and expectations of the users.

Specifically, for this intervention, clear goals were set on what the multiple test should validate. Therefore, a list of questions has been compiled, which must be answered during the tests by watching how users interact with the prototype, and listen to their feedback.

These questions are the following:

1. Does the folding of the different booklets become clear during the test? (First fold the pages over, and then unfold the entire booklet)
2. Is the experience with the booklets as intended, based on the interaction vision?
3. Is the purpose of the intervention clear?
4. What is learned from the intervention?
5. Does the seriousness of the current situation become clear in the storyline of the intervention?
6. Can the participant place the story about milk in a broader perspective?
7. Is it desirable to indicate a clear order between the different booklets?
8. What do the participants need after experiencing the four booklets? In other words, what should be added in the 'what now' on the website?
9. Potential comments or tips from the participants.

The complete design of the first prototype for this test can ben found in appendix 6.1

Testing set-up

For the testing, several participants were recruited. The participants had to represent the original target group for the intervention: young professionals. Before the testing started, the participants were asked for permission to film them during the test, and that the researcher would observe them as well.

The tests were performed individually while sitting in front of the booklets. The tests were conducted at a location suitable for the participants (at their home or office). The participants had to represent the target group of the intervention, young professionals. For this round of testing six participants joined all within the age group of 25-30. They were either graduating students or people in the beginning of their professional career.

While recruiting the participants they were already asked whether they would give permission to film the testing session. They all gave permission upfront, and they all gave permission to use their quotes

for this report and if needed for the final presentation.

The participants were handed the prototype, while they were given a short explanation. The explanation stated that they should imagine that they would receive this prototype at, for example, a farmer's market or biological supermarket.

The participants could interact with the prototype the way they wanted, since there was no right or wrong. Furthermore, they received no information about what the prototype entailed or what the purpose was.

After testing the prototype, there was room for a discussion with questions from them, but also with possible extra in-depth questions from the researcher.

Figure 5.8 -
Impressions first test round

Main take-away from testing

The testing was valuable, since the participants showed what the intervention was lacking, and where uncertainties existed. The main take-aways from the tests are summarised below. The more detailed results of the conducted tests are included in appendix 6.2

1. Does the folding of the different booklets become clear during the test? (First fold the pages over, and then unfold the entire booklet)

This became clear as many participants saw how the folding worked with the first booklet, where others learned how to interact in the following booklets.

2. Is the experience with the booklets as intended, based on the interaction vision?

Yes, for most participants, the interaction was a playful way to discover the information presented in the booklet. Also, that the information was cut into four different small stories in different booklets, was received well.

Nonetheless, as stated in the interaction vision, it is important that the user in advance understands that the booklets are not a quick flyer. The participants, however, had the expectation that it would be something which can be looked at quickly, which for some led to a somewhat disappointing overall experience because they thought they could just scan it quickly.

"The word flyer is misleading, because it is not something you can give to someone and what can be quickly read while walking. Therefore, it should be clear that it is something that you really have to sit down for. Furthermore, it must be something worthwhile to keep, so people put it in their bag and take it home and do not throw it away."

- Participant #3, 30 years old

3. Is the purpose of the intervention clear?

What the exact purpose of the intervention was, was not clear for all participants. There was still too much confusion about what the main message of the intervention was, and the expectation the users had when they started doing the test. When the user holds the package, there should be a clear expectation of what will be found inside. As "Melk is goed voor elk" was written on the cover of the booklets, it created the expectation that the booklets would end with a clear 'yes or no' answer. Therefore, a slogan like "the world behind milk" would better indicate what story inside the booklets will be about.

"I do think that this will increase the political support a little. This booklet makes the conversation more grounded, and that is a very good thing about it."

- Participant #6, 25 years old

"The design should precisely map out the problem of the soil. That could be communicated more clearly."

- Participant #6, 25 years old

4. What is learned from the intervention?

Most participants already knew a little bit about the subject. However, through the intervention, they learned more details about the topic and got a better understanding of the current situation. The intervention did teach the participants new information regarding the agricultural soil

and the need to take better care of the soil. The participants did not know that the soil degrades at an increasingly high rate.

5. Does the seriousness of the current situation become clear in the storyline of the intervention?

The seriousness of the depleting of the soil has not been experienced well enough in the booklets. The drawings in which the soil gets exhausted, can be an exaggerated and dramatic representation of reality. To strengthen this message more and to make the user feel this pain, the text can be directly aimed at the user. The user should really experience how dead soil touches them.

"It can be clearer and more extreme how this story really affects me as a consumer."
- Participant #2, 26 years old

6. Can the participant place the story about milk in a broader perspective? (that in fact the whole current Dutch agriculture is not desirable)

According to the participants, this story was clear, but some doubt remained whether this broader perspective would really stick. Therefore, it can be made more clear that this example is for milk, but that it is just as much about the general Dutch agriculture.

7. Is it desirable to indicate a clear order between the different booklets?

During the different tests, the booklets were viewed in different order by the participants. If participants conducted the test in an unchronological order, they still understood the story in the end. However, they indicated that they would have preferred to read the "original" starting booklet first, because it introduces the subject well, and makes the journey more fluid. On the other hand, they indicated that they liked it that there was no mandatory number order, as it felt just like reading without an obligation. Therefore, the suggestion was made by several participants to indicate a chronological order in a creative way, for example by a picture that changes. In that way, there is something to hold on to, but it stays a non-binding choice to follow the clue or not.

"I think the strength of this is that it does not really matter which book you pick up first. But it is nice to have a little intro first about what the topic of the whole intervention is. So, some kind of indication of the order would be nice, a visual guide for example. And it does not matter if you do not follow it. But something small symbolic is nice, so that it is not too forced, but it is there."
- Participant #6, 25 years old

"Show order in a creative way, without forcing numbers!"
- Participant #2, 26 years old

8. What do the participants need after experiencing the four booklets? In other words, what should be added in the 'what now' on the website?

After reading all the booklets, there should really be a call to action on the website, otherwise the user is lost in the complexity. Therefore, the website must complete the journey. However, since the problem presented in the booklets is not easily solved by some small tips, the advice should also be honest. It should express how difficult it is to solve and that politics are needed, but

to motivate the user into action as all small bits and efforts help.

9. How should the booklets be packed and what style should it have? (This question was added later during the testing, since this came up in the first tests)

Due to the way the booklets are packaged, tension can already be built up. Therefore, a sealed envelope would be an interesting option to pack the booklets in. In addition, the envelope style must match the message of the booklets. Therefore, the material of the envelope has to be a responsible sustainable choice instead of for example a shiny gold envelope.

10. Potential comments or tips from the participants.

Currently, the booklets express a little too much positivity, especially in the first small introductory pages of the booklets, while the message within the booklets should be very serious and should shock the user. Improving the seriousness can be reinforced by the background illustrations on these introduction pages.

Secondly, within the booklet in which the stakeholders are presented, the links between the different stakeholders and towards the whole system can be emphasised stronger by for example, drawing the systemic lines between the players.

5.1.4 ITERATION

Based on all the received feedback from the test a new iteration of the intervention was made. This iteration is shown in the figures below. The complete designs of the prototype can be found in appendix 6.3.

Figure 5.9
Photo of prototype for pre-final test of the intervention, “De wereld achter melk”

5.1.5 FINAL TEST

Pre-final test

After receiving feedback from the previous test, many changes were made on the designed intervention, therefore, the step to the final test in context was quite large. To ensure the success of the final test, a small pre-final test was conducted. The aim of this test was to identify the last possible small errors and to get an impression of whether the aim of the intervention was clear with the adjustments. In addition, the website was not part of the test before, so it was important to get a first reaction on that as well before doing the final test round.

Set-up of the pre-final test

The set-up and procedure of this pre-final test was the same as the first test round. The only difference was that one duo was added to the participant list. The researcher was interested to test how two participants experienced the booklets if they were conducting the test together. The hypothesis was that when testing together, there would be more space to have a discussion.

In total five participants joined the pre-final test. Three conducted the test individually and one duo conducted the test together.

Figure 5.10 -
Set-up of pre-final test while testing with first duo.

Figure 5.11 -
Impression pre-final test, individual participant

Main take-aways from pre-final test

- The last sentence in the last booklet "we zullen samen een nieuw voedselsysteem moeten bouwen voor de toekomst" (meaning 'together we will have to build a new food system for the future') is still a little too much pointing fingers. The last sentence should really stimulate and encourage action.
- The pictures on the cover of the booklets did not draw enough attention to the fact that they were giving an indication of the order. At first glance, they do not seem that different from each other, as they are all the same colour.
- The fact that the front of the booklets should indicate order in a non-mandatory way, remained important since the participants still liked to read the booklet about the stakeholders first.
- The link between 'the dead soil and no food for the consumer', could be made even more understandable and clearer. For example, by adding the message: A Dead soil = no harvest = no food
- On the 'What now' page of the website, extra tips could also be added, such as 'join a sustainable bank' or 'vote for a political party which considers soil health important'.

"I do think that a lot of people do not realise that the soil is so important. It is something that a lot of people do not even know or think about yet."

- Participant #2 , 33 years old

"You cannot blame people for not knowing anything about the soil yet. But it is a very important topic. But in reality, it goes even further than food, it can be seen in a broader perspective. In reality, it is about life. The soil is just the foundation of everything."

- Participant #3 , 30 years old

Final test in context

To properly validate all new adjustments to the design and the total experience of the intervention, a final test was conducted. This test was set in a setting, which was based more on reality, for example a place where the package could be handed out. The location of the test was the farmers market in Rotterdam, 'Rotterdam Oogst'. At this market, the aforementioned pioneer farmer Doetie, sells her homemade goat cheese, but much more dairy products and other food from small-scale local farmers can be found here.

The focus of the final test was to see whether the characteristics of interaction and purpose of the designed intervention were achieved. The focus was not solely on the small details of the design anymore. A possible iteration after the final test would only have to focus on perfecting the design.

Set-up of the final test in context

The final tests were conducted at a freestanding table in the middle of the market. As with the other tests, the participants sat on one side of the table, and the observer on the other side. A camera tripod with a camera was placed next to the observer, which filmed the participants if they had given their permission.

At the local market, visitors were asked if they wanted to do a test for this project. If the visitor agreed to a test, they were handed the envelope at the table. The only explanation they got was that this envelope would be something they would receive at this market on any given day, and that they could interact with it the way they wanted.

The visitors who were approached were people or couples who looked like they represented the target group of young professionals.

Figure 5.12 -
Set-up of final test at the farmers market in Rotterdam.

Results from the final test

The most important goal of this test was to validate if the purpose of the designed intervention was clear and if the interaction with the design was as intended. This had to be validated based on the visitor's reaction and their feedback. The detailed results of the final test are included in appendix xx. The summary of the test results are summarised below:

- Was the purpose of the intervention clear to all users? Yes
- Did the experience of the users look like the intended interaction vision? Yes

The reaction of the users on the folding of the booklets was extremely positive, as they really seemed to enjoy it. Their natural reaction towards the somewhat provocative posters on the inside of booklet two and three, was as indeed. They responded like "oeh auw" on the image of the soil with drip (IV), and "we are all going to die" on the image of the degradation of the soil.

After the test, almost all users wanted to bring home the package with the booklets to show to their friends.

Small final suggestions for improvement of the design based on final test:

The last QR code in the last booklet, which links the user to the website, was often missed. This QR-code is important, since it links the user to the call to action on the website, and completes the mapped out designed journey. Therefore, more attention should be drawn to this QR code. Perhaps "scan me" could be added on the poster with an arrow towards the QR code.

Figure 5.13 -
Anonymized visitors of farmers market, testing

Figure 5.14 -
Anonymized visitors of farmers market, testing

Figure 5.15 -
Finding final test, QR-code not visable enough

The visitors their reaction

"I do agree with you, 2035 is already quite close. And if you see that those agricultural lands are deteriorating so quickly, we have to do something about that."
- Visitor Farmers Market #1

"I have learned that the horizon is a bit wider, in terms of politics, farmers but also the land itself. The land is usually something which is not included. You only hear about politics, the farmer and the economy, but not about the land."
- Visitor Farmers Market #9

"So, we have to start thinking about the way we eat and drink, since it really has an effect on our own soil."
- Visitor Farmers Market #2

"I think this is appealing, an interactive booklet with a QR code. That works better than a poster on the electricity box."
- Visitor Farmers Market #4

"All these topics are topics you unconsciously know a bit about, but now you are confronted with the reality. I would like to go through these tips at home. Even though you unconsciously do a lot of these things already, this booklet is an eye-opener - you have to think about these things."
- Visitor Farmers Market #5

"It is really a journey of discovery, which I think is cool"
- Visitor Farmers Market#1

"I think you have set up a very interesting information journey."
- Visitor Farmers Market #6

"I find it really epic how the paper is folded so creatively."
- Visitor Farmers Market #7

5.1.6 FINAL CONCEPT FOR THE INTERVENTION

This subchapter will present the final design of 'Tot in de bodem'. The final design includes the last changes which were made after the final test in context. The design will be presented through an interaction scenario and pictures.

Interaction scenario

My generation, the young professionals, will receive a sealed parcel which would trigger their curiosity. On the parcel, a suggestion is made that a hidden (uncovered) truth is being revealed, and it suggests that there is a whole world behind milk/dairy products. When someone is walking around the farmers market, a harvest festival or an eco-plaza, a sealed envelope is handed to them. The envelope is completely sealed, therefore it is not convenient to open it while walking. The eveloppe is put in the bag and later taken out at home and viewed at a quiet moment.

Within the package, there are 4 mini booklets, however, it is still unclear what this exactly is.

There is something that stands out though: all four booklets, there is a picture of a small growing plant. Unconsciously, the user should choose the booklet with the smallest plant . When the first booklet is unfolded, pages with various ascending numbers are revealed. It is clear that the booklet should be read in a certain order, which leads to an individual, explorative journey through the content of the package. Even though a person may not directly conclude the hidden message, a slower approach is taken as this gives a more thoughtful process through the content.

The person slowly goes through the booklets. As a result, the person makes connections and comes to a realisation of one's own behaviour towards buying and consuming dairy food, and of the consequences of their own behaviour. When the person opens the final booklet, it should also open a window of opportunity and future scenario which gives hope for a changed reality.

Nonetheless, the booklets also cause confusion about what is happening, why this confusion is caused, and a longing for the desired future. If a person is interested in where these booklets are coming from, they can scan the QR code depicted on the booklets. The QR codes give access to a platform 'Tot in de Bodem' ("Get to the root of the matter"), which holds high-level suggestions for change and explains the current situation in more detail. However, there are some individual or person-tailored suggestions on this platform about what you, as an individual, can do to enhance change on a small scale, for example by changing behaviour by consuming bio-products only. The person should realise that transitioning into a better agricultural culture requires a fair price for buying products in order to save the future of the Dutch soil.

After everything has been read and the person is completely immersed into the topic, the unfolded booklets can be hung on the refrigerator as posters. The posters can hang there as inspiration source, reminder or even conversation starter.

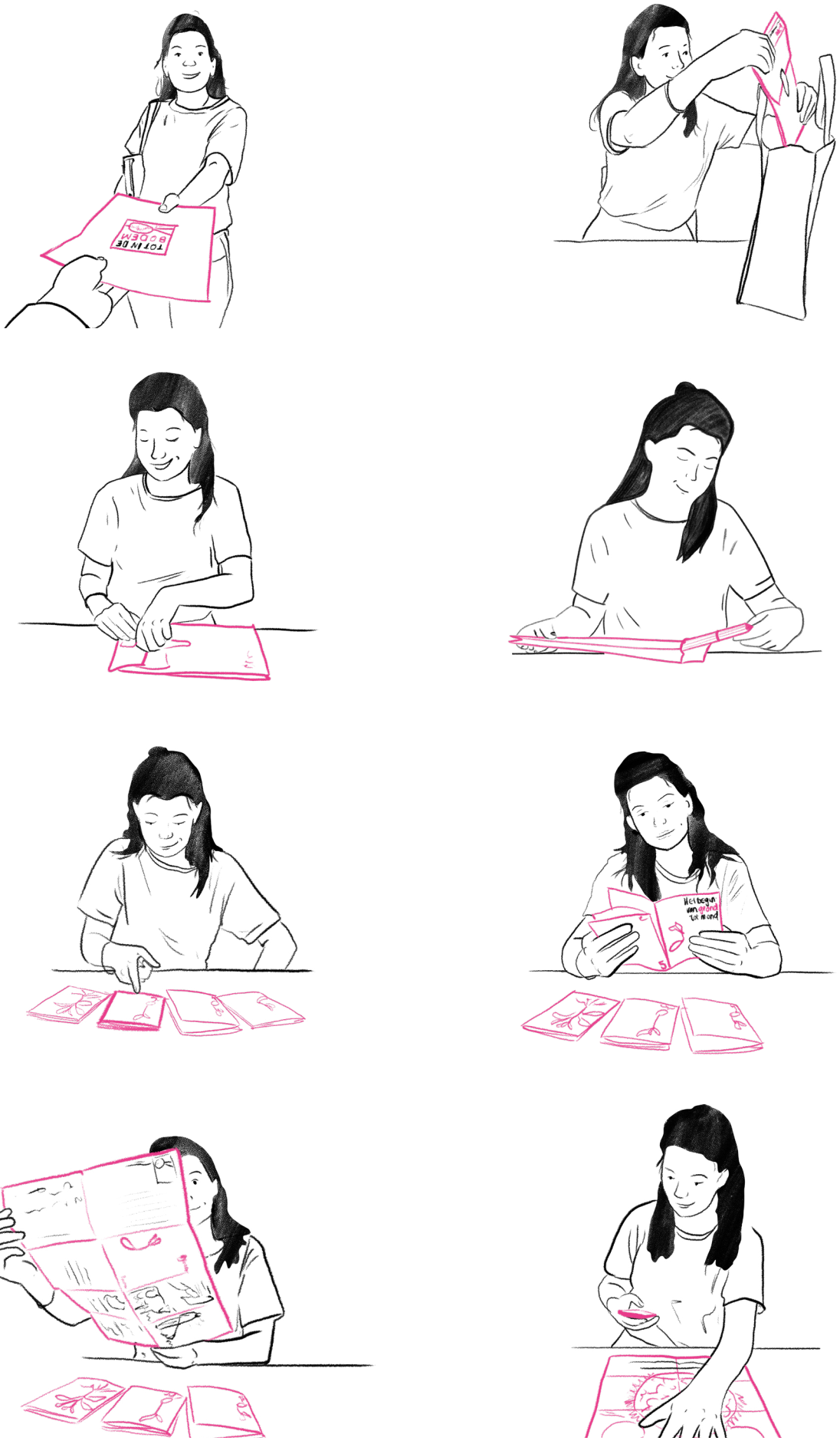
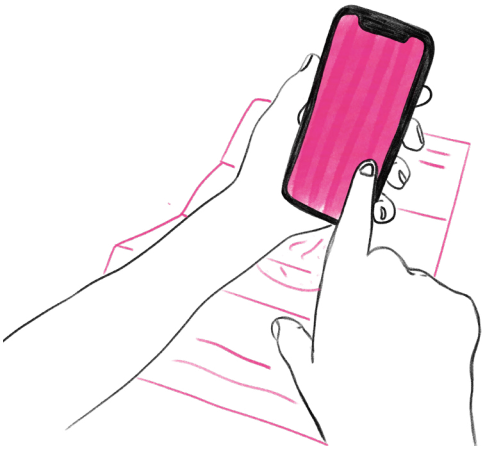


Figure 5.16 -
Graphic interaction scenario



Scan this QR-code to see a small movie, presenting ‘De wereld achter melk’.

SCAN ME

Scan this QR-code to see the online platform ‘Tot in de bodem’ and start exploring!

SCAN ME

Figure 5.17 -
The final design 'De wereld achter melk'

Figure 5.18 -
The final design 'De wereld achter melk'

Figure 5.19 -
The final design 'De wereld achter melk'

TOT IN DE BODEM

Ik wil iets doen!

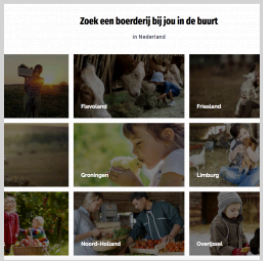
MARIA | DE WERELD ACHTER MELK | BLOG | CONTACT

De Boer

De boer en de politiek in een hevige strijd

In het systeem staan de relatie van de boer en de politiek onder spanning. Vanuit de politiek richting de boeren in sprake van grootschalige regelgeving. Voor alle boeren geleden dezelfde regels. Echter zijn er veel verschillende soorten boeren en is vrijwel elke boer uniek. Of je nou intensief of extensief

Meer weten of doen?



Een keer op bezoek bij de boer?

Altijd al een keer langs willen gaan op een echte boerderij? Er zijn veel meer plekken dan je denkt waar je een kijkje kan nemen op het boerenerf. Kijk in jouw regio waar plekken zijn waar je langs kan gaan en ervaar zelf waar je voedsel vandaan komt en leer de persoon erachter kennen.

> Zoek een boerderij

Sluit je aan bij Aardpeer

Aardpeer verbindt boeren en burgers. Met praktische plannen en aanstekelijke verhalen willen we uitgroeien tot een brede beweging. Iedereen die wil bijdragen aan een vitale bodem, gezond eten en grotere soortenrijkdom en die wil helpen om dat voor de komende zeven generaties zo te houden, is welkom. Een vruchtbare bodem voor wie zich wil inzetten voor natuurvriendelijke landbouw.
Sluit je aan bij Aardpeer door hun manifest voor de grond te tekenen.

> Onderteken het manifest

Sluit je aan bij Slow Food Youth Network

SFYN is hét netwerk voor jonge mensen die zich inzetten voor gezond, duurzaam en eerlijk eten voor iedereen. Doe je mee? Of wil jij actief bijdragen aan een

Om het apocalyptische kantelpunt van de bodem te voorkomen moet er zo snel mogelijk anders te werk worden gegaan in de landbouw en specifiek binnen melkveehouderij sector. Niet een klein beetje anders maar compleet anders. In de bedrijfsvoering moet worden uitgegaan van de kracht van de natuur, ofwel een vruchtbare gezonde bodem en biodiversiteit. De bodem is de basis voor voedsel van Nederlandse bodem op de lange termijn. Dus weg met het mantra “meer meer meer” en veel meer mee te bewegen met de ritmes van de natuur. Dit moet leiden tot een nieuwe norm van de landbouw die we nu kennen als gangbaar. De discussie moet niet gaan om, gangbaar of biologisch. Er moet een standaard norm komen waarmee we voor iedereen voedsel kunnen blijven produceren, zonder dat er straks geen voedsel meer in de schappen ligt en de bodem “dood” is.

Figure 5.20 - Impression online platform ‘Tot in de bodem’

This subchapter will present how the designed intervention is placed in time and space, and how it will mature and grow over time to finally be adopted within the system. To communicate this clearly, a roadmap to transition was created. This tool helps to plan the implementation of the intervention(s) and the need to cause the desired change through design. Based on the desired future goals, the transition is mapped by planning the intervention steps in time (Irwin, 2018).

Firstly, the place of the intervention in time and space was looked at. The main purpose of the intervention was to inform the user about the hidden consequences of dairy products, and to develop a sense of self-reflection, regarding food choices of the user. However, the intervention should have one other indirect effect, which is that it should create urgency for change to achieve sufficient political support. A step in a good direction would be to create a movement of people who urge political consensus.

"With system change, you always end up with politics."
- Meino Smits (Mesters, 2021)

A system cannot change without politics. Nonetheless, without enough support and signals from society, politics will not make major changes towards a new system (Mesters, 2021) (The Dutch Research Institute For Transitions & Erasmus University Rotterdam, 2021).

In the image below, the designed intervention can be set in time and space.

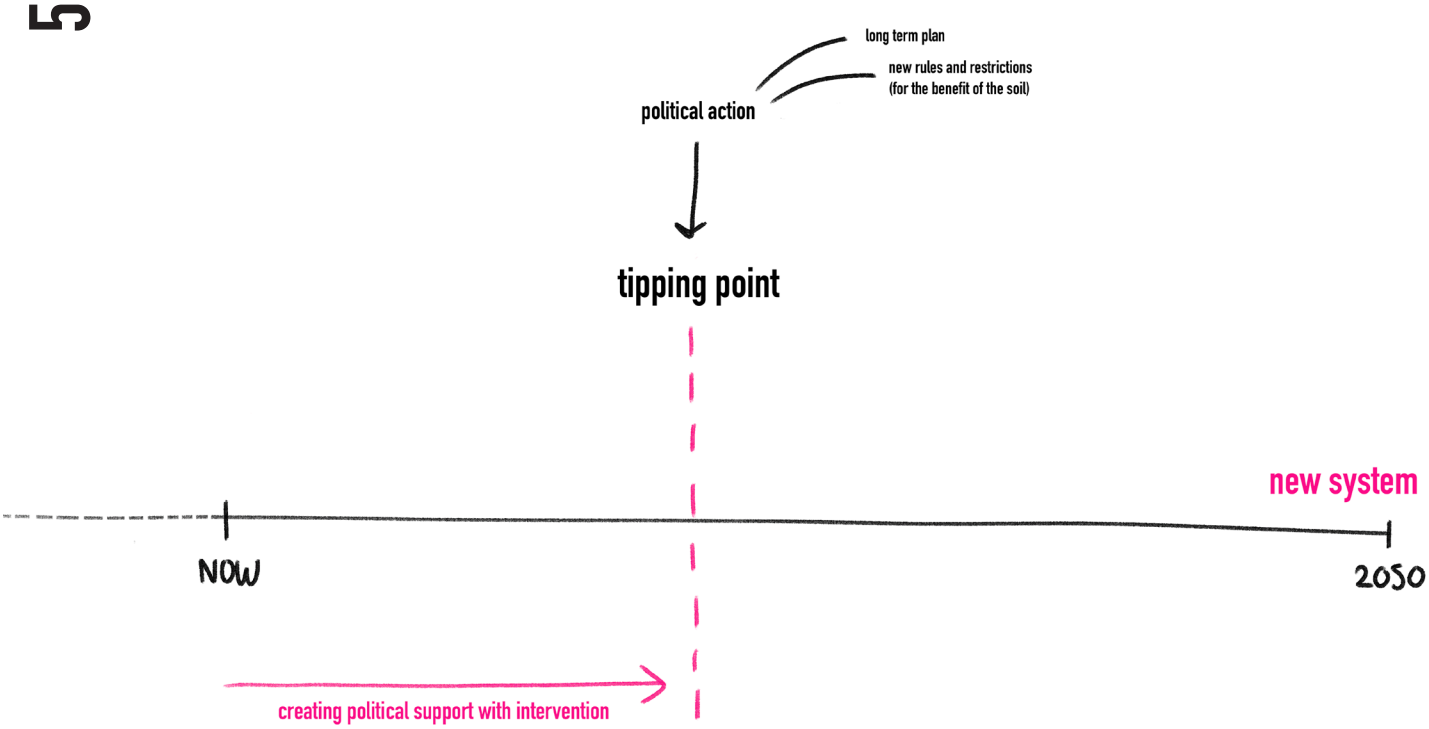


Figure 5.21 -
Time frame for intervention, to create political support

5.2.1 IMPLEMENTATION OF "TOT IN DE BODEM"

For the intervention to be successful, a structured and well-thought out planning is needed to ensure the intervention is to be implemented in society. The implementation can start small and will develop over time.

Scalability

For this project, the platform and the envelope with the booklets convey the desired story on its own, thus no additional communication or explanation by a researcher is necessary This makes the intervention easily deployable on a large scale. In addition, the website and the paper product do not pose a high financial burden, as a result, no high entry costs are required to launch the intervention.

The concept of the platform 'Tot in de bodem' and the attached designed intervention 'De wereld achter melk' are readily to be expanded on a larger scale or with further intervention or design stages. For example, the intervention 'De wereld achter melk' is a designed concept in which the user emerges within the story behind milk. However, more individual investigation can be done by visiting the platform "Tot de bodem", which focuses on various topics. Further development of these two products could include the identical investigation of other food products. Different editions could be launched within society. For example, 'De wereld achter vlees' ('The world behind meat'), 'De wereld achter sla' ('The world behind lettuce'), 'De wereld achter aardbeien ("The world behind strawberries"), and so on. These editions could be spread in the same way as the physical packages of the 'De wereld achter melk' ("The world behind milk") but could also launch as digital versions on the platform.

Therefore, the platform 'Tot in de bodem' can function as the home base for the series of the 'Wereld achter…' ("The world behind …"), and can also be used to reach a bigger audience by offering in-depth information concerning the current food system and the desired transition.

In the long-term, the platform could grow into an organisation which organises informative lectures, events or other ways people can connect to the story of 'Tot in de bodem'. Therefore, to keep up with the increasing work, an organic expansion of the team working behind the platform is needed

Joining forces

For the platform and concept to grow, develop, and have a bigger team behind it, a collaboration with at least one other party would be necessary. This second party can either be an existing initiative who the 'Tot in de bodem' team can join forces with or the platform 'Tot in de bodem' can further develop on its own with the help of an investor.

For the first scenario, 'Tot in de Bodem' can for example be implemented as a separate new section on another initiative on their platform. The already familiar platform and network of the initiative could immediately promote 'Tot in de bodem', spread the envelopes or even develop further interventions. Possible initiatives to work with could be "Land van Ons", "Aardpeer"' or

"Wij.Land". These initiatives are also trying to raise awareness for the importance of a healthy soil within the Netherlands. The "Tot in de bodem" concept could really support and strengthen their message to help and reach more people.

For the second scenario, financial support would be needed to be able to maintain the creative processes of "Tot in de bodem". Therefore, various investors are needed, preferably non-political companies or investors who are in support of sustainable change within agriculture. Some banks, such as "Triodos Bank" or "ASN Bank" have various financial programs to support green initiatives. Other examples could be to raise funding through the provincial government or the federal Ministry of Agriculture. Lastly, companies such as Stichting Demeter or retailer Ekoplaza could be interested. However, finding an unbiased investor could pose difficulties. This should be weighted very carefully by the team of "Tot in de bodem".

Network

The development of the intervention is closely associated with a growing network. Establishing a name as a new stakeholder in a large system and already existing initiatives takes time, therefore society should be given time to familiarise themselves with a new stakeholder. In other words, building a network takes time, patience, and effort, but very necessary as a network is essential for further development of "Tot in de bodem".

By connecting initiatives, who are already committed to promoting a healthy soil, over time a strong network could be created. The collaboration works in both ways, as on the platform, existing initiatives can be put in an extra positive light, and the existing initiatives can promote 'Tot in de bodem' in their circles.

5.2.2 PATHWAY TO TRANSITION

Through implementation of the transition over time, a tipping point of the transition will occur, which could lead to more active action of politicians or more attention on various (social) media platforms. In the transition pathway figure (see below), the implementation of "Tot in de bodem" is summarised into three milestones, which should stimulate an early tipping point and thus a faster transition.

In practice, however, after the tipping point, a transition still takes a lot of time, as big changes are still required. A transition has a snowball effect. This means that in the long-term, even after the tipping point, there should be space for an opportunity to implement new ideas of newly involved or inspired people. Depending on the phase within the transition, different needs may arise, which were not counted upon at the start. Therefore, there are only milestones included before the tipping point, but not after. These milestones will need to be included and designed, but how will remain a mystery for now (Agri Meets Design, 2019).

The milestones for 'Tot in de bodem', accelerating the transition towards the tipping point could be the following:

- Milestone 1: The minimal viable product for the intervention, with the kick-off online platform 'Tot in de bodem'. Launch of 'De wereld achter melk' at farmers markets through the Netherlands together with investor or initiative. At the same time this is the moment to expand the network and broaden social media attention.
- Milestone 2: Expanding the intervention with a new series of 'De wereld achter...' For example the world behind meat, eggs, lettuce. Design and develop those series as physical products which can be distributed to the public. This series can also be represented digitally on the platform and be promoted on the social media channels of 'Tot in de bodem'.
- Milestone 3: Expanding the platform even more. With a network of people surrounding the platform, 'Tot in de bodem' can also organise lectures, events and other connecting and in-depth activities.

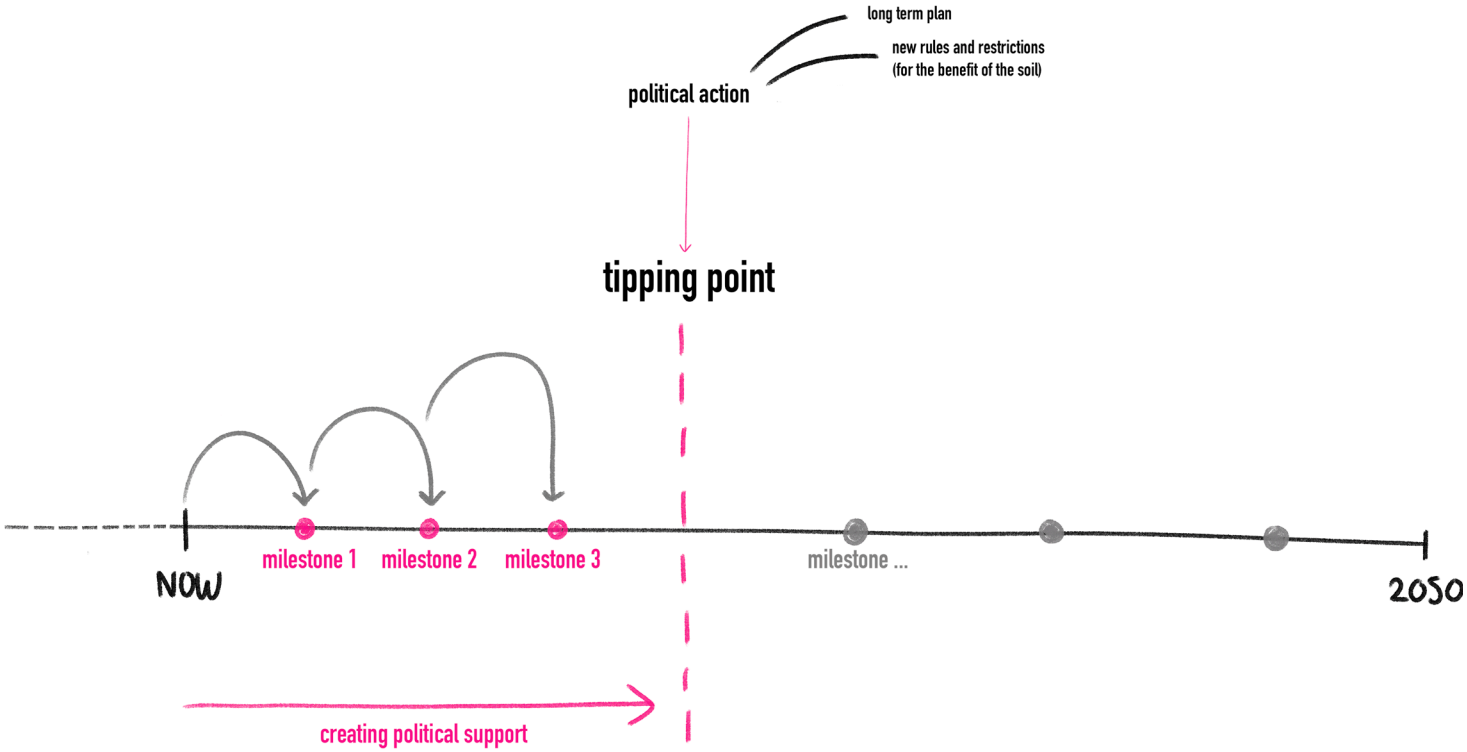


Figure 5.22 -
Pathway to transition of 'Tot in de bodem', including three defined milestones

06

EVALUATION

This chapter contains the conclusion and the discussion of the project, followed by recommendations on study improvement. Firstly, the conclusion is based on looking back at the initial aim of the project, and reflecting whether this aim has been achieved within the conducted research and the designed intervention. In addition, the project is evaluated on which parts went well, and which could have been better.

The discussion analyses the evaluation by regarding to which extent this project can be scientifically justified and describing the scientific limitations. Based on the evaluation and discussion, this chapter ends with recommendations on how to improve this study.

The aim of this project was to investigate the current system of the Frisian dairy cow, to find a new perspective on the complexity of the problem, and create a fitting intervention which should bring about change towards a sustainable future for agriculture.

Through the multidisciplinary holistic research of this project, in which non-human stakeholders are included in addition to human stakeholders, a new and more sustainable view on the current complexity of the system of the Frisian dairy cow was founded.

By analysing the current system and performing in-depth research into all current stakeholders, their agendas, and their intertwined relations, the research concluded that the Dutch soil forms the basis of the complex system of the Frisian dairy cow. If society remains status quo, the Dutch soil will be exhausted, which leads to decline of food and dairy production, and loss of biodiversity.

This finding was used as the starting point for the designed intervention. The goal of the intervention was to develop a level of self-reflection among young professionals of their buying behaviour of dairy products and the invisible exiting consequences of the Dutch soil degradation.
A series of testing with the iterated design intervention, a series of booklets with information and infographics, showed that these young professionals learned and started reflecting about this direct link between the dairy products and the Dutch soil degradation.
The intervention was received as a ‘wakeup call’, and the subjects expressed that they would like to adjust their behaviour by taking small first steps in the right direction.

Figure 6.1 -
Final design, 'De wereld achter melk'

Research

During the research, the biggest focus was on the perspective of the farmer, as within the literature and media, an honest perspective of this stakeholder was lacking. To create a realistic and honest picture of the farmers' perspective various farmers were interviewed, as there are different types of farmers who farm based on divers ideals.

To represent the voices of the stakeholders who do not have a voice, such as the Dutch soil, nature, and the cow itself, a diverse selection of experts was included and interviewed for this research. However, due to the time frame of this project and that the entire research was conducted by one researcher, current politicians, supermarket managers or people within the dairy industry have not been spoken to. Meaning that within the system, not all stakeholders have been able to present themselves in an equal and consistent way. Therefore, for stakeholders, such as politicians, the dairy industry and supermarkets, in-depth research was conducted to represent their perspectives.

Another evaluation point was the length of the report. As various parties were interviewed and in-depth research was conducted, the research part of this report is substantiated. One could argue if sharing this scientific knowledge in a report is the best way to communicate the new perspective on dairy agriculture – reading a thick pile of paper is not very inviting. A more interactive way of communicating including a combination of text and videos, which could convey the complex story and research in a more efficient and appealing way and could reach a wider audience.

Goal setting

Within the 'goal setting' phase of the project, the research findings were translated to a future vision, which in turn was used to explore the intervention spaces and create ideas for these possible interventions.

After concluding this desired future vision based on my own research, other research projects, such as 'Re-Rooting the Dutch Food System' were published, which shared a lot of the same elements within their future vision. This was a valuable validation as it strengthens the correctness of the conducted research for this project.

Even though the presented future vision covers almost all areas of the system, exact details about these areas are yet lacking. Due to the timespan and goal of this research, this was not a priority, however having a more detailed version of the desired future vision would help people to imagine this future.

Final concept

The goal of this phase of the project was to create intervention which should stimulate the transition towards a more sustainable future for agriculture. Due to the multidimensional input of the research, many suitable possible intervention spaces became apparent, and could have been implemented in different places on the timeline of the desired transition.

The aim for this project was to design and develop one intervention. This has been done successfully. However, a transition is a process that takes years. It would therefore be a good addition to give concrete form and shape to the following tactical interventions within the transition long-term pathway. One solution could be to plan all desired interventions in advance, which will strengthen the individual interventions.

Research

This research was based on quantitative data, received from various interviews and in-depth research from various sources. However, the research had some time constraints and was conducted by only one individual. Therefore, when analysing and concluding the data, the outcome and the new vision surrounding the Dutch dairy cow could be received as subjective. Another researcher could have concluded a different vision with the same data and resources, thus the reproducibility of this research is more difficult compared to a qualitative study.

In addition, due to the short time period of this research, not every stakeholder could represent them-self. As the researcher could easily connect to various farmers and soil-experts, these stakeholders were given a bigger voice, which could be a distortion of the reality surrounding the dairy cow. If the research was to be reproduced, the 'politicians', 'dairy industry', and larger 'supermarkets' representatives should be interviewed to provide their aspect on the Dutch dairy system.

Goal setting

As for the research part of this study, the articulation of the desired future vision as a result from the research could be received as subjective. Any other researcher could have chosen to focus on another aspect of the dairy agricultural transition, such politics or retailers, which could have led to an entirely different conclusion. However, as creating an intervention is a creative process, the goal setting is inherently a subjective concept, and is therefore considered the most valid way of conducting this type of research.

One downside of this research however, was that not all stakeholders could represent themselves. Thus, the future vision is just an interpretation of reality. If the goal setting would be reproduced, all involved stakeholders should articulate the common desired future.

Final concept

A different interpretation of the data and future vision might have been developed when another designer would have performed this project. Since the designed intervention has been a creative translation of a personal vision, only one solution for a broadly complex problem has been explored. Meaning that this truth is not the only truth. Therefore, the outcome of this project cannot be seen as the only solution to the problem.

6.4 Recommendations

This subchapter will present recommendations for the future. The recommendations are based on the input from the evaluation and discussion, and form the basis for possible further development.

Research

When continuing the research of this project, the following recommendations are proposed:

- All stakeholders of the system should represent themselves, to create an equal and complete view on the current system. Therefore, in addition to the conducted research, the 'politicians', 'dairy industry', and larger 'supermarkets' representatives should be interviewed to provide their perspective on the Dutch dairy system.
- The research should be conducted by a larger team of diverse (design) researchers to create a more objective data analysis outcome.
- To communicate the results of the research to a wide audience in an efficient and appealing way, an alternative and more interactive way of communicating these results should be used. In which, for example, text and visual materials (photos, videos, infographics) are being alternated and presented in a dynamic way, see the example below.

Goal setting

The following recommendations for goal setting in future research are proposed:

- Articulate a common desired future vision, including all the identified stakeholders and based on their interviews, to receive a more objective future vision.
- A larger and more diverse team of (design) researchers should interpret the system analysis into a vision for the future.

Final concept

When research would be continued on the designed intervention and to implement this on a large scale in society, the following recommendations are proposed:

- The designed intervention should be tested on a larger group of users, within the target group. In addition, a larger team of designers should create various iterations of the intervention. The team of designers does not have to be large, but the designers should have different backgrounds to increase perspective. Every designer can interpret the same data in a slightly different way.
- The team of designers should initiate more design and shape to the next

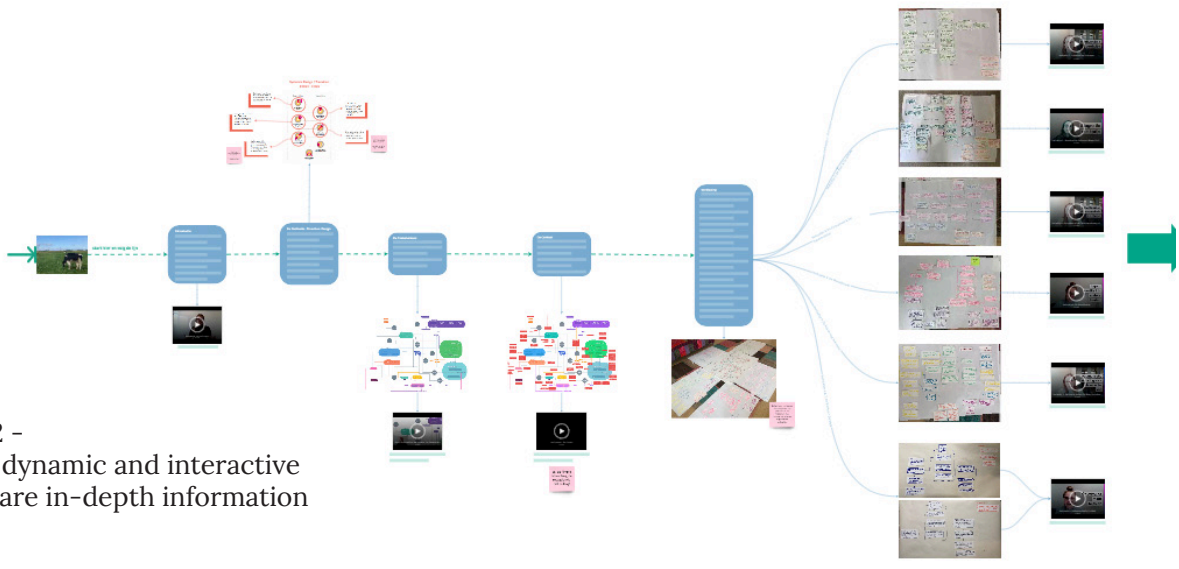


Figure 6.2 -
Example, dynamic and interactive way to share in-depth information

intervention steps in the transition pathway. Transition is not accomplished by only one intervention, but multiple ascending and intertwined interventions. To really stimulate the desired transition towards a sustainable future for agriculture, a long-term plan is needed, and will need to be designed and shaped as well.

If this this project was to be continued, based on the research, vision, and the designed intervention, the following recommendations are proposed:

- There should be a brainstorm with a larger team about the possible intervention spaces and opportunities.
- The intervention should be developed by a team of designers, which will contribute to open minded ideas and stimulation of each other's creativity.
- The design team should develop several intervention concepts, to test which concept targets the best sense of self-reflection among the users, and which one is received best.
- Besides designing a new intervention, it should also be defined how the intervention will mature, grow, and be adopted in the system. Meaning, that a new matching roadmap to transition needs to be made, and the following interventions need to be designed and included in this updated roadmap.

Recommendation through testing

During the testing phase of the concept, there were some participants who made creative suggestions, which were worthwhile to mention as possible recommendations.

One of the recommendations was to create a complete story of the world behind milk by pairing all the posters on the inside of the four booklets together to form one big poster. An interesting way to design this big poster is to depict on each separate poster a quarter of an orb, which represents the soil and have it appear in one of the corners of the poster. When all the four posters would be paired together, they would form one big orb in the middle, which could represent the earth. The combining of the four posters could then tell the complete story in one big overview, but each separate poster still tells their own story as well. The sketch in figure xx is an impression or example of this suggestion

Due to the limited time of the project these suggestions could not be explored. However, these various creative suggestions could contribute to the unity of the design. If this project was to be continued, based on the same research, vision, and the designed intervention, the proposed recommendations would be a good avenue to explore.

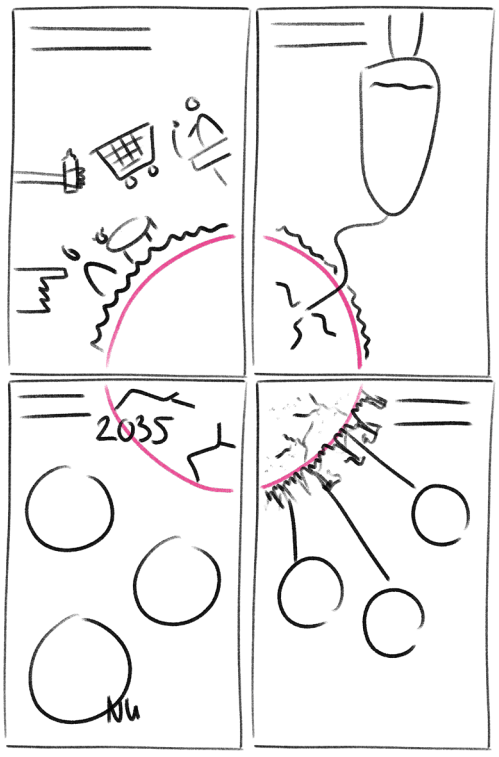


Figure 6.3 - Impression of recommendation through testing

07

REFLECTION

Reflecting on the method:
This project was the first time for me using the design method 'Transition Design'. I had to explore for myself how this method worked in practice. Luckily, a lot of literature was available about this method, which gave a lot of guidance for how I should build up the project. At the same time, I had to interpret how to execute the exact activities within various phases by myself, as there were no complete examples of existing projects. The process has really been my own interpretation of the activities of the method, based on my experiences, design, and research skills I developed at the TU Delft over the past six and a half years. Overall, I think I have managed to go through the Transition Design process quite well, but with a personal touch.

Reflecting on the result of the systemic approach

It was interesting and inspiring to experience how the stories of the participants and literature together could map out a complete system. By building a system based on this data, the current situation of how everything is connected and how internal relations function, could be better understood.

When a system is mapped out properly and realistically, it really helps to see where the pain points are and what the associated consequences will be on the various areas and stakeholders within the system.

This makes it possible to see which problems have "priority" over the others, and what large problem really underlies beneath the other smaller problems. I think that looking at big societal problems through a systemic lens can help to get a better understanding of reality, and help to determine which action can really be taken in order to actually solve problems.

Reflecting on the interviews

I found it very special how open-hearted the farmers and experts I interviewed were. Some really shared their personal and emotional stories with me, which gave me a real glimpse into their lives.

How an interview came about, was a valuable experience, especially interviews with the farmers. The farmers were usually a bit more distant and probing at the beginning. However, after telling something about myself, the project, letting them know that I really immersed myself into their context, and showing that I respected their perspective, their attitude often shifted. Once they felt at ease, I was often welcomed with open arms as they shared many joyful or (very) sad personal stories. What has stuck with me most, is the following quote of one of the farmers.

"I have to make sure that I do not work myself to death, as it means nothing to others. I struggle with those things. It seems that everyone and everything works against me with all those rules. Then I think to myself: what am I doing wrong, why can't I just do what I want to do. I am doing exactly what everyone wants me to do. I try my best for the meadow birds. I try my best to raise the water level and to preserve peat. And yet, I fall under the same rules as all those intensive farmers who ruin everything. It is so frustrating, and I have nowhere to go or turn to. All I can do is let it go."

To me, these words tell a whole story, as they tell exactly what is wrong with our current system, yet they are extremely emotional as well. I was overwhelmed that this farmer shared these words with me. It was a true honour to be trusted by the farmers, and to be told these feelings of frustration. I feel like these moments will forever connect me to this subject and the environment. I will never take my food for granted, knowing and having experienced what plays behind it. I will never look at Friesland the same again. And above all, this only makes me want to commit myself even more to improve the world of food and thereby change this unfair situation for our current farmers.

7.2 Reflection on personal experiences

As the subject of this project is close to my heart, it made my motivation to work on this project infinite. There were some occasional obstacles along the way. Nevertheless, I have never experienced the subject of this project as annoying or boring. After the project, I want to continue my career with similar complex issues, regarding the food and the food chain. In the long term, I even hope to make a positive contribution towards the world which I experienced, and needs to change. I am truly grateful that through this project, I was able to find my passion.

Due to my concussion, I had to develop a completely different way of working than I was used to before. Instead of working on a tight schedule, I now had to let go of all planning and use every bit of energy I had to keep myself busy and stay on track. Sometimes it could be really difficult if real steps within the project had to be taken and concrete work needed to be delivered, especially when I could only work for an hour or two a day. Whenever I felt in a 'flow', I had to stop again because of the headaches or general pain in my head.

These moments required a lot of perseverance, but my enthusiasm for this project and all its special experiences and encounters, helped me through the recovery process. It was something to hold on to and gave some form of structure. The project gave me a reason to get out of bed in the morning and work on something important. Despite both mental and physical effort I had to put into working on a regular basis, it also provided me with positive energy.

When looking back at the whole journey of the past year, I believe it was also a valuable life lesson. For example, to experience that things can go completely different than how I envisioned it at the start, or that it is okay to let go of an original plan. The project outcome would never have been the same as how it would have been without my concussion. Nevertheless, I am extremely proud and happy with the result. I would not want the result to be any different. I will always look back with joy on what I have achieved this year.

Figure 7.1 -
First cow I petted during the project

Figure 7.2 -
While giving my family a tour of a dairy farm

08

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Adriaan Geuze (2021), In-depth interview domain expert history Frisian landscape, 4 March 2021

Anne (2021), Interview domain expert dairy factory, 3 Oktober 2021

Sietske Klooster (2021), Interview domain expert Transition Design for agicultural sector, 1 November 2021

10

APPENDIX

COLOFON

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Photography Maria Geuze

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