Increasing consumer involvement in sustainable agri-food systems

Master Thesis
Strategic Product Design
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MASTER THESIS

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PREFACE

This thesis concludes my master Strategic Product Design and almost seven years of learning at the Faculty of Industrial Design Engineering in the inspiring environment of the TU Delft. Before you start reading the results of my work, I would like to thank some people who supported me in my final project.

Firstly, I would like to thank my client mentor Hanneke for providing me the opportunity to do a graduation project on the topic of sustainable agriculture and access a network of inspiring and pioneering farmers who can call themselves Caring Farmers. Your pragmatic view and experience in the sector were inspiring and also taught me a more realistic view on problems in the sector. I would also like to thank Josephine for providing me with inspirational tips, links, and comments. Thank you for helping me through the tough part of the project by listening to the wide range of ideas and brainstorming about those with me.

Thank you to my team of supervisors from the faculty for guiding me through this project. Jan, thank you for your endless stream of educational metaphors that helped me to make decisions and find focus for the project and for making me believe in my skills as a designer (and gezond verstand). Jotte, thank you for supporting me during the first phase of my project despite your tight schedule and the small creature growing inside of you. Your view on systemic (food) design helped me to explore the agri-food sector and deepen my understanding of it. Lise, thank you for jumping in to guide me through the second half of my project. Your critical questions helped to reflect and iterate during the project and your reassurance helped to grow my confidence when needed.

I would like to thank the people that I interviewed throughout the project for taking the time to answer my questions and give me some insight into their view on the agri-food sector. These conversations were the foundation of the result of this project. I was surprised by how I was welcomed on the farms that I visited. Seeing the openness of the farmers that I spoke to made these interviews feel like a daytrip. I would like to thank the participants of the ideation session for making time to come up with new ideas for the design challenge that I formulated.

Doing a project on a topic that is currently widely exposed in the media was both a blessing and a curse. I would like to thank all the people that sent me news articles, initiatives, and ideas about the transition and problems in the agri-food sector. These things inspired me and sometimes put me on a different path but they definitely helped me during this project.

Lastly, and maybe most importantly, I would like to thank my friends and family for helping me through this process. Just by listening to my complaints, struggles, and obstacles you already supported me a lot. But thankfully, you pushed me to also discuss the content of my project, practice my presentation on you, and to help me with brainstorming. You were there for me when I needed a shoulder for support or something to take my mind off the frustrations of the project.

Enjoy reading!

Carlijn

EXECUTIVE SUMMARY

As society, we have lost connection to our food and how it is produced. The international market in which Dutch farmers operate has elongated the path from farm to fork and created an anonymous food chain. Food production has been intensified over the years with agriculture practices evolving with a focus on efficiency and high yields. This has resulted in a highly polluting sector that is responsible for 34% of human caused greenhouse gas emissions (Crippa et al., 2021). The current agri-food system is therefore environmentally and socially unsustainable. Alternative food systems are being explored which might offer a solution to these challenges. The implementation of nature inclusive farming focuses on realizing an agriculture sector that integrates food production and nature preservation. Project client Caring Farmers aims to stimulate nature inclusive farming in order to tackle the environmental and societal challenges of the agri-food system. The design challenge of this project was: How can the transition towards a nature inclusive agri-food sector in the Netherlands be accelerated through the enhancement of the relation between farmer and consumer? With a systemic design approach and qualitative research, it was concluded that the role of the agri-food sector is changing. An opportunity exists to reintegrate farming in society and create a system that expands its focus for farming beyond economic production towards its societal relevance. The environmental and societal services that farmers deliver to society should be valued to ensure a fair income for them and for the sector to become more sustainable. The thesis proposes a three-horizon strategy on how to create value for the ecosystem services that farms can deliver to society. By implementing a system that monitors ecosystem services like biodiversity, soil quality, and carbon sequestration, these values can be quantified. In the first horizon, a product-service system is designed to make farms more accessible for citizens. With an application, citizens can visit farms and learn about sustainable agriculture. The second horizon embeds this application in a platform that enables farmers and citizens to monitor the ecosystem services on farms. Through citizen science projects, visitors help farmers to collect data about these services. This facilitates research about the impact of sustainable farming on the environment so that the vision of the third horizon can be realized. This vision shows a societal system in which farmers and citizens collaboratively work towards a sustainable agri-food sector where ecosystem services are valued and appreciated. The strategic roadmap is supported by visualisations of the application and platform. Furthermore, an implementation roadmap was created to support the organisation in the implementation of the strategic advice and design products. This project provides a different view on the role of agriculture in the Netherlands by looking beyond the need for fair food prices. It provides a vision where the appreciation for the work of farmers is divided into multiple services instead of embedded in the price of a carton of milk.

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CHAPTER 01
PROJECT INTRODUCTION AND APPROACH

This chapter kicks off with a general introduction about the current problems in the agri-food sector, the context of this design project. The challenges in the sector and focus of the project are explained along with the relevance of this thesis and opportunities for innovation.

Afterwards, the project client is introduced; an organisation that aims to improve sustainability in the Dutch agriculture sector. The background, the current activities and goals of the organisation are described. Finally, the design challenge and the approach of this graduation project are explained at the end of the chapter. Within the project, an exploration- and ideation phase can be distinguished. The starting point for the project is the design challenge. Several design methods and tools are used to explore the context of the problem in the first phase and to come up with ideas and a design concept in the second phase.


© Caring Farmers

1.1 AN UNSUSTAINABLE SECTOR

The Netherlands is world famous for its farming practices and efficiency. It even received the title of second largest agricultural exporter in the world by National Geographic (this statistic is further discussed in paragraph 3.2) and was praised by David Attenborough for its size and efficiency (Attenborough, 2020). Both mention how this tiny country is the second largest exporter of agriculture products worldwide and applaud the expertise of Dutch agriculture. However, farmer protests, emission crises and other problems in the sector show a different side to a successful sector.

The negative side effects of the current design of the system are becoming more evident and urgent.

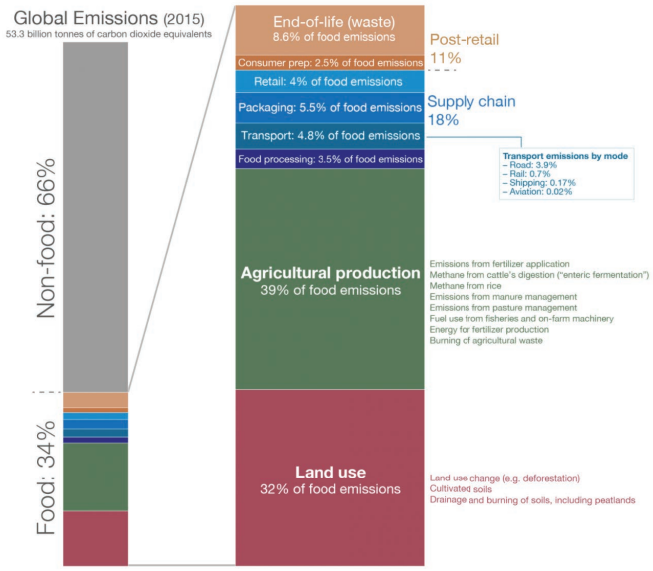


Figure 1.1: One-third of global greenhouse gas emissions come from food systems. (OurWorldinData.org. Data source: Crippa, et. al, 2021)

Environmental impact of agriculture

The agri-food sector is responsible for about 34% of global GHG emissions caused by humans (Crippa et al., 2021). Figure 1.1 shows the distribution of these emissions across the food-supply chain. By far the largest contributions come from agricultural production and land use. Emissions from agricultural production result largely from fertilizer application, manure and pasture management. Land use emissions are mostly caused by deforestation to make more land available for agriculture. The environmental impact of the sector is largely influenced by the diet of (mostly western) populations. Figure 1.2 shows the carbon footprint of the average diet of European citizens (Sandström et. al, 2018). It shows that 83% of emissions come from dairy, eggs, and meat consumption. Farming animals requires much space and their manure results in high emissions. Furthermore, the industrialization of farming has resulted in loss of biodiversity, air- and water pollution and depletion of fertile soils (EEA, 2015). Monocultures and the use of chemicals on the land have a high impact on the quality of the soil, reducing the amount of nutrients that are available for crops to grow in the future. Adding transportation distances and inefficient use of nutrients this has resulted in a highly polluting system. Many scientists therefore argue that the sector plays an important role in the climate change crisis. The Dutch agriculture sector is responsible for approximately 14% of CO2 emissions (Moerkerken & Smit, 2014).

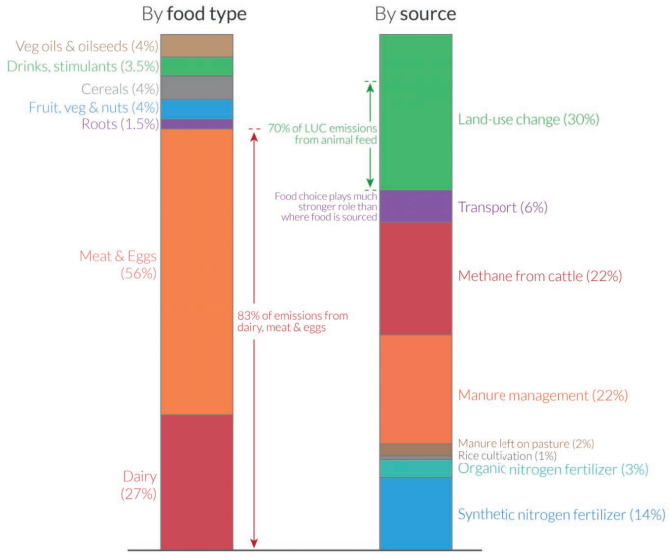


Figure 1.2: Carbon footprint of diets across the European Union: by food type and source. (OurWorldinData.org. Data source: Sandström et. al, 2018)

Frustration among farmers

In the Netherlands, a series of farmer protests that started in 2019 demonstrate the frustration among farmers and their dissatisfaction about national policies. According to agricultural newspaper Boerderij (2019) the farmers demanded attention for the 'continuously changing regulations and the general lack of understanding and respect for farm work'. The protests were organised by the 'Farmers Defence Force' (FDF) and supported by LTO, the largest advocacy organisation for farmers in the Netherlands. With their large tractors, farmers went to the political capital of the country and blocked several important roads causing traffic jams all over the country. The motive for these protests were new governmental regulations for nitrogen emissions of the sector. This is explained further in chapter two. In general, many farmers are frustrated about the (unjustified?) blame and responsibility that they get in tackling climate change issues. An important topic in the 2021 governmental elections in the Netherlands was the reduction of livestock because of the high emissions that they cause. This endangers the continuation for many livestock farmers. The sector has been shrinking over the last decades. Many farmers also struggle to find a successor for their company (CBS, 2021). The position of the farmer in the future is insecure.

Value of food

Industrial agriculture has helped to reduce the financial costs for food production, making more food available for a lower price. However, many consumers are unaware of the environmental costs of food production. With the growth of supermarkets, food production has become more anonymous. The chain from farm to fork is long and anonymous. In the current Dutch system, a quarter of food is wasted (Van Dooren, 2019). With this statistic, it can be assumed that we have lost a sense of value for food.

In chapter two, these problems and their root-causes will be discussed more thoroughly. Some people say that the food system is broken. But, as design agency IDEO (2021) argues, the food system is working exactly how it was designed. The focus of the agricultural sector has been on high yields and low economic costs, sometimes referred to as the industrialization of farming. The system successfully reaches these goals. The system is extremely complex with many actors involved in long supply chains. It is intertwined with economy and politics but also influences ecology and our socio-cultural systems.

1.2 THE TRANSITION OF THE AGRI-FOOD SECTOR

Many policymakers and large stakeholders agree that the food industry needs to become more sustainable, ecologically as well as economically. With current production methods, the soil on farmland is depleting rapidly and an increasing amount of land becomes unsuitable for agriculture (Tan, Lal & Wiebe, 2008). Moreover, worldwide population growth demands an increase of food production meaning that the sector needs to become more efficient while using less resources. This is a complex challenge in an even more complex system since stakeholders and their sub-problems are interconnected. Finding the right balance between providing nutritious and affordable food for everyone and reducing the negative side-effects of agriculture and food consumption on the environment and climate.

The FAO (2017) says: 'One clear message that emerges is that 'business-as-usual' is not an option. Major transformations of agricultural systems, rural economies and natural resource management will be needed if we are to meet the multiple challenges before us and realize the full potential of food and agriculture to ensure a secure and healthy future for all people and the entire planet.'

SYSTEM TRANSFORMATION IN THEORY

A system transformation is a 'large societal change, in which the functionalities of the system are redefined and restructured' (Beers, 2016). The agri-food sector in the Netherlands has the societal functions of providing food and nature. Because of the problematic side-effects of how these functions are currently fulfilled, the system needs to be restructured. The requirements for the system are being redefined. The new system is therefore not better (or worse) than the old one, it simply fits the evolved context better. In this report, the system is divided into three levels in the multilevel framework (Geels, 2002), see figure 1.3. A transition is defined as a structural change in the regime. The regime is in this case the dominant and prevailing agri-food system. A transition occurs as a combination of different actors and sub-sectors (Geers & Schot, 2007). Not only governmental parties, but also societal organisations and citizens play an important role. Therefore, a systemic design approach is applied. The multilevel framework is used in chapter two to display the evolution of the sector. In chapter four, trends that form the niches of this framework are discussed. The final design concept also uses this framework to structure the suggested strategy to realize systemic change.

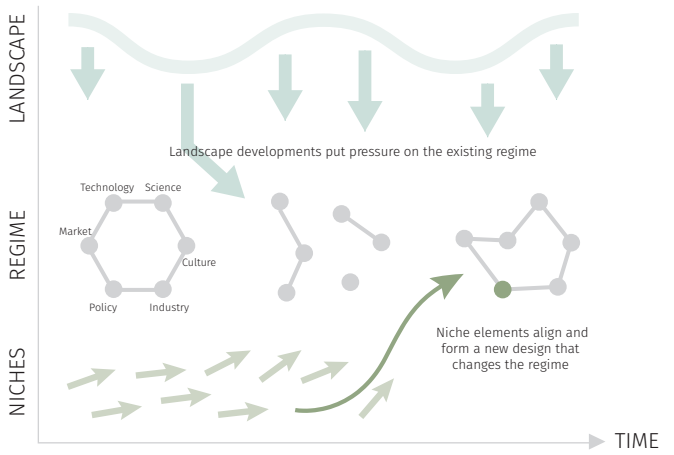


Figure 1.3: The multilevel perspective model (Bilali, 2019)

The transition of the agri-food sector involves policymakers, companies in the supply chain, farmers and consumers. Creating a sustainable food system is an ambitious goal on which all these actors have to collaborate. The Food and Agriculture Organization (FAO) of the United Nations defines sustainable food patterns as: 'diets protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources' (FAO, 2010).

Several reports have been written about the transition by governments, research institutes and NGOs. The main message from the reports relevant for this project are described below. These reports have been an important resource for the choices made about the focus and direction of the design challenge.

EU Farm to Fork strategy
The European Union (EU) created a strategic plan to make the agri-food sector more sustainable. The 'Farm to Fork' strategy 'aims to accelerate the transition to a sustainable food system' by changing the way we consume, produce and distribute food (European Union, 2020). According to the plan, the food system of the future has a neutral or positive impact on the environment; adapts to and mitigates climate change; reverses biodiversity loss; and ensures food security and safety. Furthermore, the plan focuses on affordability of food and fair economic returns in the supply chain. The strategy contains a proposal for a legislative framework for policy that supports the plan.

LNV - Visie Landbouw, Natuur en Voedsel waardevol en verbonden
The Dutch ministry of Agriculture, Nature and Food Quality (LNV) wants to transition our agri-food sector towards a circular and nature-inclusive one in 2030. The vision of the Dutch ministry acknowledges that the way we currently produce food is unsustainable for the environment. According to the plan, the Dutch agriculture sector needs to become circular to reduce its impact on the environment (Ministerie van Landbouw, Natuur & Voedselkwaliteit; 2018). The focus shifts from lowering the cost price of products to lowering the use of resources for production by (re)using these resources more efficiently. The vision does not give a clear definition of circular agriculture but describes the following three goals to support the vision:

- A healthy economic position for people in the sector that facilitates innovation in, and continuation of companies.
- The value of food increases. Food waste is strongly reduced and the (psychological) distance between producer and consumer is smaller.
- The Netherlands plays a vital role in the progression of the agri-food sector and is a leader in circular agriculture.

WUR - Re-rooting the Dutch food system: from more to better
A prominent research institute for development in the agri-food sector is Wageningen University Research (WUR). They developed a vision and strategy for the transformation of the sector called: 'Re-rooting the Dutch food system: from more to better'. Their vision embeds agriculture in society and the ecosystem and is based on healthy agroecosystems (De Boer & De Olde, et al., 2020). The vision provides an inspiring view on the ideal food system in 2050 in the Netherlands: 'We will produce and eat our food within the planetary boundaries of the food system and respect the essential rights of humans and animals'.

1.3 LEADING THE TRANSITION: CARING FARMERS

The project is executed for the 'Caring Farmers', an advocate group for pioneering Dutch farmers that is committed to making agriculture in the Netherlands circular and nature inclusive in 2030. Nature inclusive farming is not defined but guided by the principles of working with nature instead of against it (Caring Farmers, 2021).

The organization embodies a progressive approach to agricultural innovation, showing a different side to society. Members of the foundation are farmers, supply chain partners and consumers who are concerned with this transition. Anybody that wants to help with making the sector more sustainable can join the organisation.

Caring Farmers have developed a 'code' for the community. Their vision consists of three focus areas in their mission towards nature inclusive agriculture, see figure 1.4.

Animal welfare
Reducing the amount of animals in agricultural companies and improving the well-being of these animals by mimicking their natural habitat as closely as possible.

Nature and biodiversity
Increasing biodiversity on farmland and providing space for nature to flourish.

Shortening (or closing) the chain
(Re)using waste products more efficiently and creating a more direct relation between food production and consumption.

You can read more about the foundation on the website www.caringfarmers.nl

Caring Farmers was founded in 2020 by three pioneering farmers.

KIPSTER

Founder Ruud Zanders
Kipster: The first CO2 neutral and animal friendly egg producer.

HERENBOEREN
SAMEN DUURZAAM VOEDSEL PRODUCEREN

Founder Geert van der Veer
A growing community supported farming business model in the Netherlands.

NATUURDERIJ KEIZERSRANDE

Founder Annette Harberink
A nature inclusive farm where agriculture and nature preservation are integrated.

Today, more than 200 farmers in the country joined the community. The community consists of a diversified group of farmers with different visions and beliefs about sustainability and their journey into transitioning towards sustainable agriculture. Despite their different views and expertise, the community shares a future vision where agriculture is nature inclusive and circular.

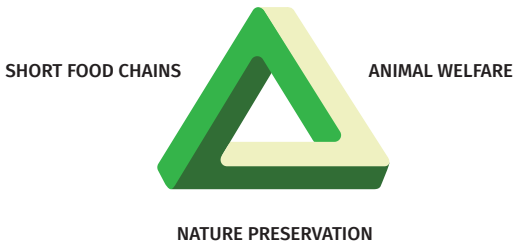


Figure 1.4: The values of Caring Farmers

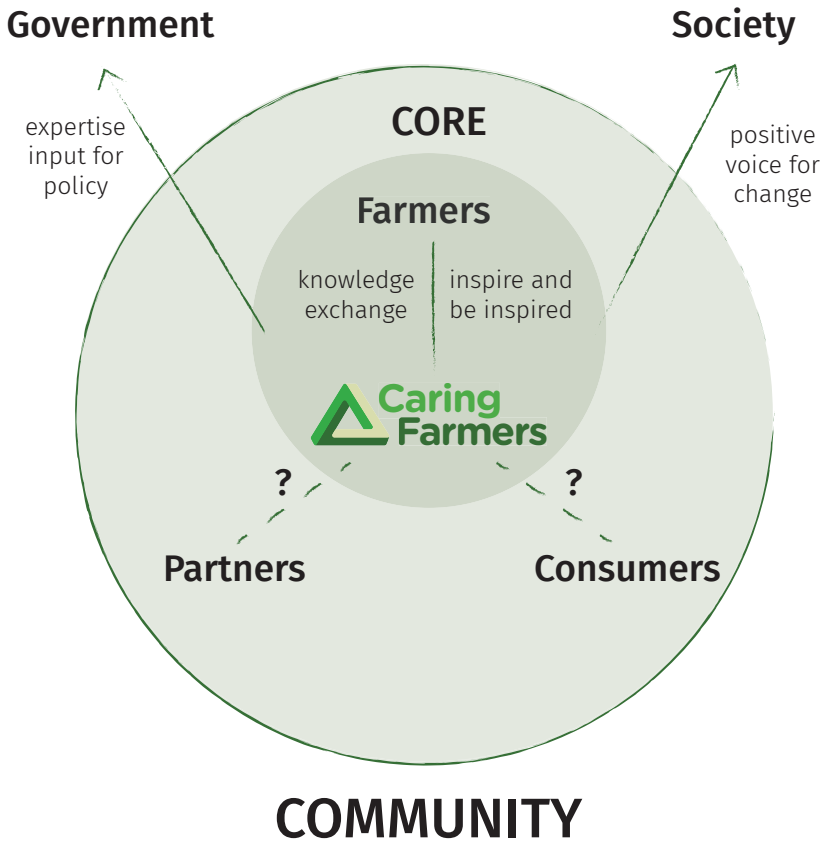


Figure 1.5: Focus of Caring Farmers organisation

CURRENT ACTIVITIES

Caring Farmers is a young community that is still exploring and growing its activities (see figure 1.5). Currently, they organise farmers meetups to learn from each other and inspire new practices. Furthermore, they have a wide network in the agriculture sector. They provide solicited and unsolicited advice to the ministry of agriculture (LNV) and are part of an industry expertise group for the implementation of new agricultural policies.

These farmers want to provide a progressive view and approach on farming. Instead of working against the government and other stakeholders, they want to start a dialogue between stakeholders to come up with solutions for agriculture in the future. These farmers are adopting innovative new ways of farming but need the help of consumers and other partners to accelerate this transition. The Caring Farmers have a large support base. With this design project I will look into how the Caring Farmers can benefit from this community.

1.4 SCOPE OF THE PROJECT

Caring Farmers has a clear idea about their vision for agriculture in the future. Their activities currently focus on connection between farmers and opening the dialogue with policy makers. However, part of their vision that is not yet expressed in their activities concerns shortening the supply chain and connecting with consumers (see figure 2). This project will research the relation between farmer and consumer and look for ways to enhance it.

FARMERS

Farmers have lost connection with consumers. They have been forced to increase production efficiency over the years and rely on the demand of powerful retailers who determine product prices. Furthermore, farmers are increasingly dependent on governmental rules and subsidies. They have difficulties innovating because of their dependency on these short-term rules. Their dependency and distance to their clients puts them in a difficult position, making their businesses economically and ecologically unsustainable.

CONSUMER

Consumer behaviour towards food consumption is highly unsustainable. Low supermarket prices are the norm. The consumer is used to having all products available at all times, for the lowest price. We seem to have forgotten the value of food, where it comes from, and how much effort is needed for the production.

The position of these stakeholders results in a large gap between farmer and consumer.

> **The design challenge for this project is:**
> How can the transition towards a nature inclusive agri-food sector in the Netherlands be accelerated through the enhancement of the relation between farmer and consumer?

Supported by the vision 'Re-rooting the Dutch food system', it is assumed that the involvement of consumers in food production is needed to accelerate the transition towards a more sustainable sector. The result of this project serves as a tangible framework for activities to pursue supported by an overarching strategy developed in the project. The suggested strategy is translated into a design concept for the Caring Farmers community to help them to enhance the relation with consumers.

1.4 PROJECT APPROACH AND METHODS

The approach for this design project is based on the double diamond model that was introduced by the British Design Council (2004). The model splits the design process in two separate phases (or diamonds). Each phase starts with a diverging exploration phase, followed by a converging synthesis phase in which findings are combined to provide a focused deliverable.

Systemic design

The challenge for this project lies within the transition of the Dutch agri-food sector towards a circular and nature-inclusive system. The complexity and transitional nature of the challenge therefore require a systemic approach to problem solving. Circular design principles (IDEO & Ellen MacArthur Foundation, 2018) deliver a suitable mindset for this transition design challenge. A systems mindset is at the core of this project. Systemic design is embedded in strategic design, which focuses not only on the desirability of a project, but also takes viability and feasibility into account, as shown in figure 1.6 (Calabretta, Gemser & Karpen, 2016). To analyse the agri-food system, different systemic design tools and frameworks are used. Important is the use of the GIGA-mapping tool (see Appendix J) to understand the system and relations between (seemingly) unrelated entities (SOD, 2012). With the tool, an extremely extensive visual map was created that shows the complexity of the system and helped the designer in analysing different findings. The multilevel framework is used to analyse the evolution of the system and to make a prediction of the future.

Co-design

Throughout the project, consultation was sought from different stakeholders such as the project client, farmers, involved consumers and experts on certain topics. They contributed to all phases of the projects by justifying analysis and research insights, co-designing solutions for the design challenge and validating the final design concept. Several methodologies were applied such as interviews, expert meetings, and a co-creation session.

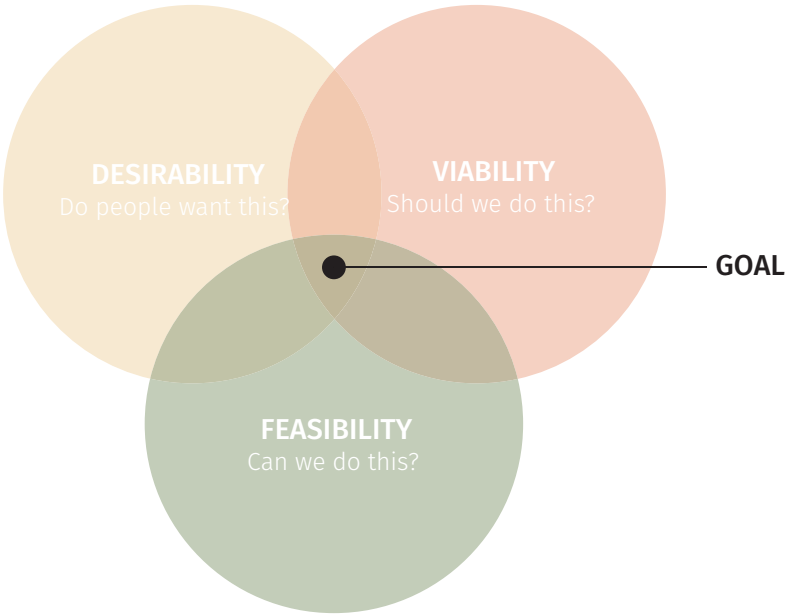


Figure 1.6: The goal of strategic design

DIAMOND 1

The first diamond of the project consists of explorative research into the relation and context of farmers and consumers. It deploys an iterative approach in which findings from the different contexts are used to uncover new findings in other contexts.

In the diverging 'Discover' phase, qualitative research is done by interviewing farmers and other stakeholders. The results of the interviews are supplemented by literature and trend research. In the converging 'Define' stage. The results of the explorative research are analysed and synthesized. A system map is created to gain insight into problem areas and opportunities to find solutions. The map also displays social and economic dynamics in the system.

The diamond is divided into four areas. The first area 'historical & current context' is described in chapter two. It is an exploration of the agro-food sector to explain system dynamics and interactions in the current landscape. The farmer and consumer are characterized in chapter three. It dives into the position, needs and motivations of both key-actors. Lastly, chapter four summarizes the findings and translates these into a strategic advice for the Caring Farmers organization. It identifies problem areas and advises an approach to connect farmers and consumers. The strategy serves as a design direction for concept development in the second phase of the project.

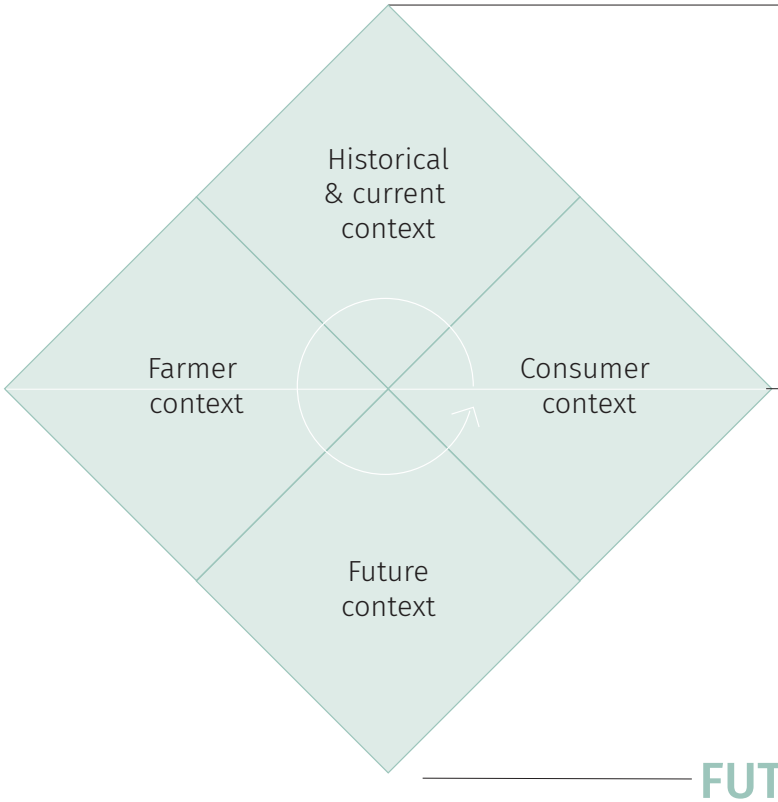
DIAMOND 2

From the conclusions and strategic advice of the first part of the project, a future vision is created which serves as a starting point for the development of ideas and the final product of the project. A design challenge is formulated accompanied by a set of criteria for the design. This creates a framework that is later used to evaluate the ideas that were generated.

Ideas were developed using different brainstorming and ideation methods, both in group setting and individual setting. How-to's, analogies and metaphors were used to generate a wide set of ideas. An ideation session was held with creative consumers. An iterative design process was applied by getting feedback from stakeholders throughout the design process. The organisation and several farmers were involved in the design process to create a fitting design and a sense of ownership over the end-result from the stakeholders. The systemic design approach was also used in the second phase by implementing a multilevel model design into the final product. The levels were integrated in a design roadmap which provided the steps needed to reach the future vision.

The final product was validated with stakeholders using different methods. A survey among consumers was held to reach a broad audience for feedback. Furthermore, the board of the organisation provided feedback on the design in a validation session. Several elements of the design were prototyped.

DISCOVER



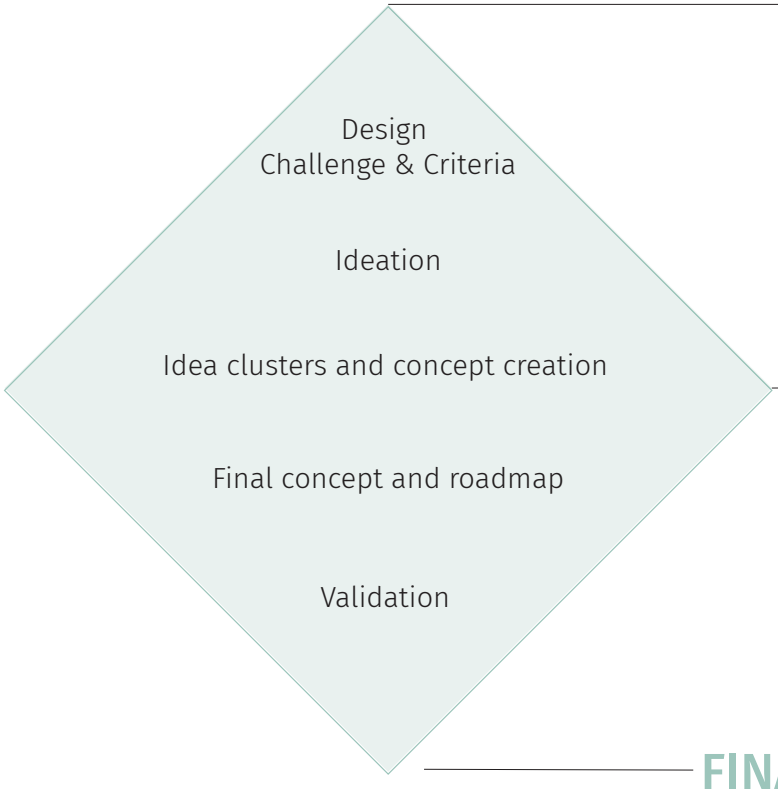
Qualitative research
- interviews
- trend research
- literature research

DEFINE

Futures thinking
- GIGA mapping
- multiple level perspective
- stakeholder mapping

FUTURE VISION

DEVELOP



Idea brainstorming
- Analogies & Metaphors
- How might we ... questions
- Creative session

DELIVER

FINAL PROJECT RESULT

CHAPTER 02
DEVELOPMENT OF THE AGRI-FOOD SECTOR

To better understand the gap between the two parties, the context of their relation was researched. This was done with a future thinking approach. By using a multi-level perspective approach, developments of regimes and landscape become visible (Bilali, 2019). The futures thinking approach emphasizes the importance of understanding historical developments to design for the future (Roumiantseva & Weissburg, 2016). This chapter gives an overview of the development of the agri-food sector in the Netherlands over the years. In this overview, the position of farmer and citizen and their relation is emphasized.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2.1 EVOLUTION OF THE AGRI-FOOD SECTOR

APPROACH

Food and agriculture are embedded in culture and society. Consumption patterns and behaviour influence agriculture practices. To understand the current system in the Netherlands, a timeline was created to show shifts, developments, and the underlying motives for the current agriculture landscape. This timeline is not objectively complete but shows elements relevant for this research project. It displays an overview of developments of the Dutch food and agriculture system.

The multilevel perspective model (MLP)

The timeline displays three levels, based on the multilevel perspective model (MLP), displayed in figure 2.1 (Bilali, 2019). The MLP is a transition framework often used in research and design for sustainability transitions. The model is divided into three layers and shows development and interaction between these layers. The top layer shows events in the **socio-technical landscape**.

Innovations and trends are displayed in the bottom layer and form the different **niches of the system** (micro level). These two layers explain the **socio-technical regimes** in the middle layer of the model (meso level).

The figure on page 24 displays the evolution of the agri-food sector over the last decades in the MLP framework. The main developments in the agriculture regime (green), the food chain regime (blue) and the consumption regime (yellow) are shown over time. Niche developments that have influenced the systems are connected with lines to the regimes. Furthermore, several landscape developments that had an impact on the regime are shown and connected to the coloured timelines. Some of the landscape developments were a result of the dominant regime in that time but led to a change in the system eventually. The main developments of the three developments are summarized below.

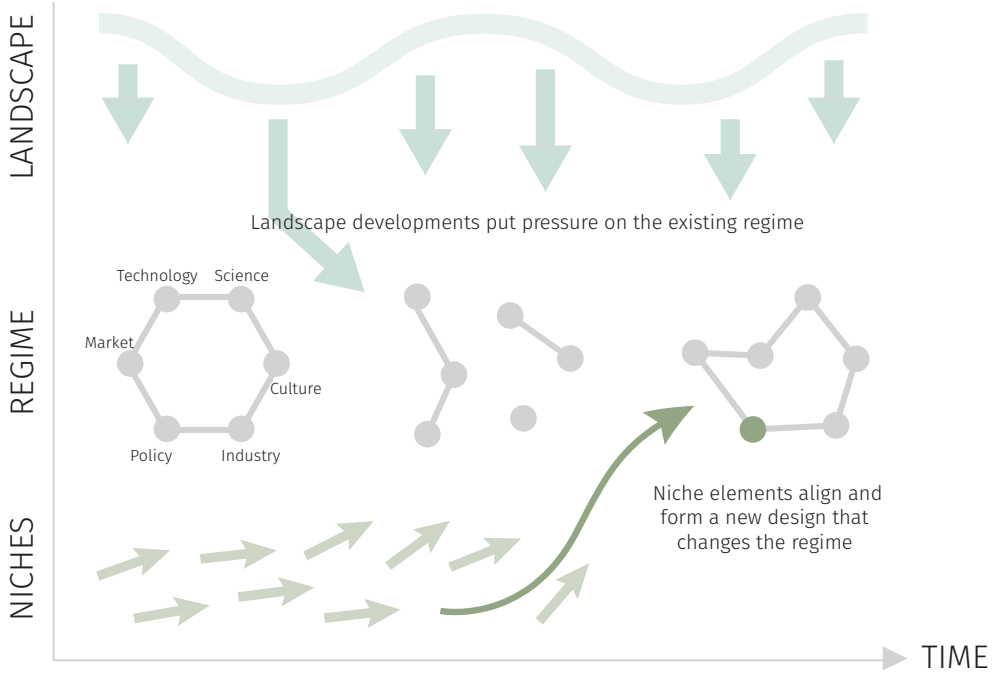


Figure 2.1: The multilevel perspective model (Bilali, 2019)

INDUSTRIALIZATION OF FARMING

The hunger problem of WWII and a quick rise in population growth afterwards had great effects on agriculture in the Netherlands. The Dutch government made large investments to increase yields on Dutch farmland. The focus of these subsidies was on improving efficiency and lowering costs to produce food. This meant that agriculture companies had to grow and specialize in the production of a few crops. Diversified farms that produced meat, dairy and vegetables in a polyculture system changed into monoculture farms producing fewer products on larger pieces of land. Additionally, chemical fertilizers and pesticides gained popularity because they helped to increase yields in the monoculture farm. All these developments have helped to increase production yield over the years. However, farmers had to increase the energy input to get the same yield because of land and soil depletion. In 1950, every 100 joule of fossil energy resulted in 107 joule of food energy. Currently, the same amount of fossil energy only yields 6 joule of food energy (Smit, 2018).

Globalization and the free market in Europe put more pressure on the increase of efficiency in the sector. Dutch farmers had to start competing with agricultural companies in other countries. Other climates are sometimes more fitted to produce certain crops. Also, parts of the processing of food have been exported to other countries because of lower labour costs. The Dutch consumer was introduced with new food products. Potatoes were partly replaced by rice and pasta. Farmers are now competing in a global economy.

ANONYMIZATION OF THE FOOD CHAIN

The food chain has become longer and more anonymous over the years. In 1950, people bought a large portion of their food from the local farmer, milkman, or butcher. As a consumer, you were led by availability in your area. You bought your products locally and seasonally. Potatoes sometimes had a funny shape but that was okay because you knew the farmer that grew it. Nowadays, you can buy (seemingly) perfect potatoes all year round in the supermarket around the corner (Verweij, 2020). We have lost connection to the origin and production of food. Farmers had to start competing in a more anonymous system when supermarkets became their direct client. Supermarkets became the main supplier of food for households, making them very powerful. The buy-in offices of supermarkets determine what we eat and what the prices are for those products. In the Dutch food system, only five buy-in offices are responsible for the purchase of most supermarket chains (PBL, 2012). Buying from 65.0000 farmers in the Netherlands, this provides them with a powerful position to negotiate the lowest price.

INSTANT GRATIFICATION SOCIETY

As a result of industrialization, people started working more and further away from home. Dinner time was cut short and people were on the road more often. This caused a demand for convenient food products. Microwave meals were introduced in 1990 and supermarkets increased the accessibility of fast and easy foods. Because we spent less time and money on food, processed foods that had a longer shelf life gained popularity. On top of that, fast food restaurants, meal delivery services and on-the-go foods played into the increasing demand for convenience. In our current society, we have become accustomed to instant gratification of our needs in the form of quick and short rewards. This all comes at the cost of our health. Processed food and its constant availability have caused an explosion in obesity in today's society.

EVOLUTION OF THE AGRI-F

1960 | 1980

LANDSCAPE

POST WWII: NEVER HUNGER AGAIN
Government invests in growing agriculture sector through subsidies

FEED A GROWING POPULATION
Food production focuses on high calorie products to use scarce land as efficiently as possible.

OPEN ECONOMY
Free trade in Europe
an increase in food
More foreign foods
duced in the Netherl

AGRICULTURE REGIME

EXTENSIVE POLYCULTURE FARMING
Farming is part of family life, with a focus on self-sufficiency and small markets.

INTENSIVE MONOCULTUR
Farming practice focuses
yield and lowering cos
disappear and large agri

FOOD CHAIN REGIME

URBANISATION
People move to the city. Cities and population density grows.

CONSUMPTION REGIME

FAST & EASY
People work further away from home. Less time spend on cooking and eating.

INSTANT GR
Consumers
to be avail
within close

NICHES

Yield efficiency innovation
Farming innovation focuses on increasing yield/m2.
- Chemical fertilizers
- Pesticides
- Large machinery

Large scale monocultures
Farms grow and focus on monoculture production.

Time = money
Meals are on the go and need to be easily prepared.

Dining experience
Growth of restaurants.

Processed foods
Consumption of processed products increases.
- on the go: McDonalds
- packaged foods in supermarkets

Production for export
Food transportation increases

Food safety
Expiration date
Food label
Production regulations

OOD SECTOR

2000 2020

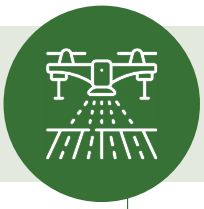
results in
transport.
are intro-
ands

RACE TO THE BOTTOM
Farmers are forced to expand to increase efficiency

DIET RELATED DISEASES
Health is affected by changed diet: increase of obesity and chronic diseases.

CLIMATE CHANGE
Natural disasters and changes in weather increase awareness of climate change

RE FARMING
on efficiency: increasing
sts. Small family farms
culture companies arise.

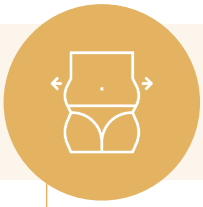


INDUSTRIALIZED FARMING
Farming is efficient and specialized. Food production shifts to cheap labour countries. The pressure on yield efficiency increases.

GLOBAL FOOD NETWORK
International markets result in worldwide competition for food production.

ANONYMOUS FOOD CHAIN
The farm to fork path becomes long and anonymous.

RATIFICATION
desire products
able at all times
e proximity.



OBESE SOCIETY
Processed and convenient food is popular, consumption increases.

CONSCIOUS CONSUMERS
Consumers start asking questions about the orgin, content, responsibility of products

Organic food movement
A niche market for organic products arises.

Quality marks
Organic
Fair trade

Convenient foods
Meal delivery
fast food chains
On the go eating
Meal boxes

Experience economy
Multi sensory dining.
pop-up restaurants.

Health movement
Clean/healthy eating
plant based diets
superfoods

Back to basic
Craftsmanship appreciation. Minimalism, tiny houses and similiar movements grow.

2.2 THE CURRENT AGRI-FOOD LANDSCAPE

With the development of the agri-food sector explored, we can now dive into the current state of this landscape.

A misconception about Dutch agriculture

It is often claimed that the Netherlands is the second largest exporter of agricultural products worldwide. However, 30% of Dutch food export is not produced in the Netherlands (Erisman & Poppe, 2020). Furthermore, export of flowers (the largest export product) is included in statistics saying that the Netherlands is the second largest exporter of food products. Without flower export, Germany would be the second biggest exporter. Behind flowers, meat, and dairy count as the second largest export product in the Netherlands. Approximately ⅔ of Dutch farmland is used to produce livestock feed (Cormont & Van Krimpen, 2016). Despite this, the agriculture sector is still impressive and prominent in the world. Furthermore, the landscape of the Netherlands consists of more than 50% of agricultural land (CBS, 2020c).

FARMERS DEPEND ON MANY STAKEHOLDERS AND SUPPLIERS

The map in figure displays the field of stakeholders that are involved with farmers and more specifically with the Caring Farmers community. The stakeholders are divided into their roles and relation to the Caring Farmers. Stakeholders in the inner ring have a direct relation to the organization. Stakeholders in the outer ring of the map have an indirect relation. Some important stakeholders that have a high influence on farmers in general are discussed.

The industrial farming industry is extremely valuable since it provides society with essential goods and provides jobs for farmers and other people working in the industry. What is more, multinational companies with yearly revenues of over 10 billion euros operate in the current farming industry (Oudman, 2021). Multinationals are the **suppliers** of chemical fertilizers (Yara), seeds (Syngenta), and machinery but also the food processors (Unilever) and **buyers** of products (Ahold Delhaize). The revenue models of these corporations are built on the existing agri-food system that strives for high production and low cost-prices. The financial interests of these powerful companies sometimes prevent changes to occur in the dominant regime. For example, a supplier of chemical fertilizer will lose its income if farmers start producing biologically.

Next to the influence of powerful buyers and suppliers, farmers depend on **banks and other investors** to invest in the expensive land, stables, and machinery for their business. Agricultural companies in the Netherlands are worth millions of euros because of their size and the high prices for land use. Farmers that want to make a transition in their company towards biological production or less animals per hectare struggle to find investors to finance the transition (informal meetings). It is assumed that approximately one third of dairy farmers in the Netherlands are under special management of their bank because their income is not high enough to pay the interest of their loan (Trouw, 2016). This means that the bank has more control over the operations of the company. Rabobank is the largest bank for farmers in the Netherlands with over 30 billion euro in Dutch agriculture. Only 3% of this money is invested in biological farmers (Trouw, 2021). The bank recently recognised that they are partly responsible for the current problems in the sector.

Figure 2.2: Stakeholder map of Caring Farmers

POLICYMAKERS

Food producers depend on governmental policies for rules and legislation around production methods and allowed additives (nutrients, chemicals). Many companies also depend on subsidies for innovation in their business. Policymakers play an important role in the development of the sector. Agriculture differs from other sectors and is therefore regulated more closely by policymakers.

The most important circumstances that agriculture operates in are (European Commission CAP, 2021):

- Agriculture supplies humanity with one of their basic demands: food.
- Despite its vital role, the income of farmers is approximately 40% lower than in other sectors.
- Agriculture is extremely dependent on climate and weather influences.
- Economic market forces are difficult to apply because of the dependence on seasons (time) and harvest (leading to large supplies at once).
- Agriculture practices have a high influence on the environment.

Because of these circumstances, governments play an important (regulating) goal. In Europe, the sector is regulated and supported through the **Common Agriculture Practice (CAP)**. The policies in the CAP are meant to support farmers in production efficiency and guarantee their income while also regulating effects on the environment and society. The policy is managed and financed through the EU. Approximately one third of the entire EU-budget is spent on the agriculture sector. Of the 58,83 billion euros spent on agriculture, 41,43 billion euros is issued to income support of farmers, providing over 22 million jobs in Europe. The other part of the budget is spent on development and innovation in the sector. Europe has an exemplary role in agriculture and is a net-exporter of food products. The EU has a strong international position that it wants to maintain in the future.

Nitrogen crisis

On top of European policies that farmers must comply with, the Dutch government regulates the Dutch agricultural industry with extended policies. Farmers deal with regulations for their operational businesses such as the use of crop protection products and the number of animals per hectare that can be held. Because of the impact of food production on the environment, more regulations have been created that focus on the maximum allowed emissions of methane, carbon, nitrogen, and other greenhouse gases. Especially nitrogen emissions became important to regulate. Because of the large livestock sector, the Netherlands has been dealing with a manure excess since the start of the century. Manure contains NH3 (a form of nitrogen) which impacts the environment negatively. Because emissions of these gases have exceeded the environmental limits over the last decades, a plan was realized by the government to reduce the emission of nitrogen in the country; the PAS (Programmatische Aanpak Stikstof). However, in 2019 it became clear that the measurements to reduce the emission of nitrogen were not met which resulted in a nitrogen crisis in the country. Because of the emission of NH3 from manure, politicians and nature organisations proposed to reduce the livestock sector by 50% (NRC, 2019). This resulted in resistance from many farmers and was the reason for the start of the farmer protests at the end of 2019 (NOS, 2019).

2.3 IMPROVING PRODUCTIVITY SUSTAINABLY

The world population is estimated to grow to more than 9 billion people by 2050. An important question is if we can produce enough food to feed this population. Production of food needs to increase and become more efficient. Currently, fertile land and water are already becoming scarce and the negative impact of agriculture on climate change intensify (FAO, 2017). Global food production is responsible for 25% of greenhouse gas emissions and 60% of biodiversity loss (UNEP, 2016). With the Paris-agreement in mind and the negative impact on the environment, the sector needs to be redesigned. It is a challenge to find balance between producing enough food while reducing the impact on the environment (as shortly explained in chapter 1). Therefore, alternative food systems and approaches to farming are being developed which might offer a part of the solution to this complicated challenge.

THE TRANSFORMATION OF THE AGRI-FOOD SECTOR ACCORDING TO POLICYMAKERS

The reformation of the agri-food sector has been an important topic for policy makers. Both the Dutch Ministry of Agriculture, Nature and Food Quality (in this report referred to as LNV) and the European Commission have written elaborate reports on their vision for the sector in the future. The EC formulated a 'Farm to Fork strategy' that fits the Green deal and strives for a 'fair, healthy and environmentally-friendly food system' in the future (European Union, 2020).

The new Common Agricultural Policy (CAP) of the European Union

In October 2020, the Member States of the European Union reached an agreement for a new CAP that will come into effect in 2023. The renewed policy is formed in line with the 'Green New Deal', the European strategy for a sustainable Europe in which the reduction of 55% of GHG-emissions is a key goal. However, many environmental organisations have expressed their concerns about the new policy. They claim that only a third of the future CAP-budget is meant for sustainable development in the sector (Natuurmonumenten, 2020). While the other part of the budget supports industrial (and unsustainable) agriculture, prohibiting the transformation of the sector. In an open letter to the European Union, the organisations demand that policymakers reform the CAP to be more in line with the Green Deal and Farm to Fork strategy.

The Netherlands as circular agriculture frontrunner

To tackle the societal challenges like depleting soils, loss of biodiversity and climate change in general, the Ministry (LNV) has developed a vision for the future of the Dutch agriculture sector. According to LNV, a solution to these challenges lies in the implementation of circular agriculture. They want the Netherlands to be the frontrunner in circular agriculture in 2030 (Ministerie van Landbouw, Natuur & Voedselkwaliteit, 2018). Their view on circularity involves the efficient use and sustainable maintenance of resources and the optimisation of (residual) flows and reducing the amount of waste products and emissions.

Due to our open economy, parts of agriculture processes are already moving towards other parts of the world. Land use and labour are relatively expensive in the Netherlands which will result in more (intensive) agriculture moving towards other parts of the world.

With these developments, a new approach to farming in the Netherlands is needed that tackles the environmental challenges mentioned before and can exist in the international competitive landscape. The focus in this project is on nature inclusive farming since this is the focus area of the project client Caring Farmers. The concept is in line with the circular agriculture vision of LNV but takes it a step further by looking for ways to integrate agriculture better in our natural ecosystems.

NATURE INCLUSIVE FARMING

There is no agreed definition for nature inclusive farming yet, but most people agree that it involves working with nature instead of against it. My interpretation is that this view on agriculture embeds farming in the ecosystem and tries to take responsibility for the influences that farming has on the ecosystem, trying to minimize its negative effects. For Caring Farming, nature inclusive farming includes the following themes:

- Local food supply chains
- Improve animal welfare
- Nature restoration or preservation

Nature inclusive farming tries to reduce the use of external inputs in agriculture and allows natural mechanisms to work so that the ecosystem can be restored. Examples are using natural pest management and reducing the use of fertilizer on the land. Monocultures are replaced by polycultures so that the different crops are more resilient to pests. The use of heavy machinery on the land is cut down so that nutrients and plants in the soil can develop naturally. These are operational changes that do not only influence the business of the farmer but also their relation with other stakeholders such as suppliers of fertilizers and machinery, making farmers less dependent on the inputs of these stakeholders.

Nature inclusive farming is growing

For farmers nature inclusive farming means learning and implementing new methods for almost all elements in their business. The competitive environment and unsustainable nature of the current agriculture sector make farmers search for new farming methods and income models. Some farmers are adopting more nature inclusive practices and become aware of the importance of biodiversity on their land. Organic farming falls within the boundaries or nature inclusive farming. Providing more space for animals on the farm and natural elements to grow are other methods. The government is even starting to give out subsidies for farmers to grow trees and increase the biodiversity on their land. Monocultures can be replaced by more diverse farmlands such as permaculture, polyculture, agroforestry and intercropping. Farmers generate extra income from educational and recreational activities on their farms. New income models are formed through community supported farming or subscription structures, these are discussed further in chapter four.

Short food supply chains

Next to adopting more nature inclusive farming methods, the concept also involves shortening supply chains and direct contact between farmer and consumer. This reduces transportation distances and emissions of food production. Furthermore, research about short food supply chains (SFSC) suggests that these supply chains facilitate a relation between farmer and consumer because the product reaches the consumer embedded with information (Marsden et al., 2000). Short food supply chain is an umbrella term for different models and businesses that focus on the inclusion of production/origin information on products. Methods on how to do this differ greatly but they aim to increase the value of the product for consumers.

CONCLUSIONS

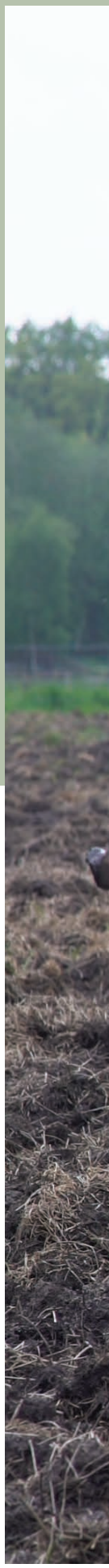
- Food production has been intensified over the years. Agriculture practices evolved with a focus on efficiency and high yields. This has resulted in a sector with many powerful and wealthy stakeholders.
- The international market in which Dutch farmers operate has elongated the path from farm to fork over the years and created an anonymous food chain.
- How we feed ourselves and retrieve our food has changed over the last century. As society, we have lost connection to our food and how it is produced.

Additionally, the agri-food system has negative external effects on the environment. GHG emissions and loss of biodiversity put high pressure on the environment which must be reduced to establish a sustainable sector that can feed a growing population efficiently. Alternative food systems are being explored which might offer a solution to these challenges. The implementation of nature inclusive farming focuses on realizing an agriculture sector that integrates food production and nature preservation. Project client Caring Farmers aims to stimulate nature inclusive farming in order to tackle the environmental and societal challenges of the agri-food system.

‘The food production of the future requires a shift in how we think. We currently produce what we want to eat. But we should be eating what the ecosystem can produce. The capacity of the planet should define what we can consume.’

- GEERT VAN DER VEER (HERENBOEREN)

CHAPTER 03
THE GAP BETWEEN PRODUCER AND CONSUMER



This chapter explains the needs, struggles and position of the two key actors for this project: the farmer and consumer. To gain a deeper understanding of the position of farmers and consumers and the reasons for the gap between the two parties, interviews were held with both stakeholders. The insights from these interviews are supported by literature and trend research.

First, some contextual information about agriculture and farmers in the Netherlands will be provided. The positioning of farmers in society will then be discussed resulting in problem areas from the farmers' point of view. Afterwards, the consumer and food consumption in the Netherlands is analysed, with an emphasis on sustainability. The analysis will zoom in on the conscious consumer that is concerned with climate change and realizes the impact of their consumption choices.


© Caring Farmers

APPROACH

To gain insight into the position and opinion of farmers in the Netherlands, semi-structured interviews were held. Interviews help to create a deeper understanding of the stakeholders so that better fitting solutions can be designed (Creusen, Hultink & Eling, 2013). The participants in the interviews were members of the Caring Farmers community who had already implemented parts of nature inclusive methods that were discussed before. These participants were chosen because they are in the target group of the organisation. Moreover, their stories uncovered the motivations for farmers to change their businesses and adopt more sustainable farming methods.

The first farmers (referred to as Farmer 1) are the owners of a biological dairy farm, part of their products are sold directly on the farm through a subscription model. They also held pigs, chickens and had a vegetable garden at the company. The second farmer (referred to as Farmer 2) is the owner of a biological agriculture company, growing a great variety of organic crops for the organic market. Approximately a third of his sales were done directly to the client in the small supermarket that was present on the farm. The third farmer (referred to as Farmer 3) has a mixed company with cows, a small greenhouse and fields where different crops are grown. On the farm, they produce cheese and have an organic supermarket where customers can buy products from their farm and other organic producers in the area.

Other actors were interviewed to deepen the understanding about the gap between farmers and consumers. One of the founders of Caring Farmers was interviewed and three consumers, two of which already supported the organisation. Lastly, an expert on sustainable strategy and innovation was interviewed. With her economic background and as a member of the CSA concept 'Herenboeren', her view helped to position the insights from the two stakeholders in a wider perception.

In the interviews with farmers, fivel topics were discussed:

- The motivation and process of **adopting nature inclusive farming methods on the farm**
- The perceived relation of the farmer with **consumers**
- The perceived position of the farmer in relation to other more **conventional farmers**
- The reason for **joining Caring Farmers** and the farmer's expectations of the organisation
- The farmer's **vision for the future** of agriculture in the Netherlands

The interviews with consumers discussed the following four topics:

- The **motivation** for the consumer to join Caring Farmers
- The **involvement** and expectation of the consumer with the organisation
- The **connection** of the consumer with farmers and local food systems
- The **contribution** that the consumer wants deliver to the transition

In total, seven interviews were held, the set-up for these interviews can be found in Appendix A.

Next to the interviews, many insights into the context of the farmer were gained from the largest opinion poll that was held among Dutch farmers in 2018 and 2019 (Trouw, 2019). For the project, editors from the newspaper Trouw worked together with research institutes to develop a questionnaire that was sent out to 15.000 farmers in the country. More than 2200 farmers responded which gave insight into how farmers feel about their position in society and the future of the sector.
With support from literature research, the insights that were gained from these interviews are described in the following two paragraphs.

3.1 FARMERS IN THE NETHERLANDS

This paragraph elaborates on the problems and challenges for farmers in the current system. The Dutch agriculture sector is in a political-societal crisis according to 71% of farmers (Trouw, 2019). The main insights that were gained from the interviews and that are relevant for this research project are discussed.

THE AMOUNT OF FARMERS IN THE NETHERLANDS IS DECLINING

Becoming a farmer is apparently not attractive anymore. In 2020, 59% of farmers above 55 could not find a successor for their company (CBS, 2021). It is difficult to take over a farm because their size makes the investment too high for young farmers. While company-sizes are increasing, the number of farmers has been decreasing over the last decades. In fact, the number of agricultural companies has shrunk with 63% since 1980 (CBS, 2020). The profession has lost its appeal. Today, less than 3% of the Dutch labour force works in agriculture. This percentage contrasts with the 20% that was active in the sector until 1945 (Erisman & Poppe, 2020).

During interviews, farmers expressed their concern about the lack of new farmers in recent years. This explains the (seemingly) absence of competitiveness between many farmers. They mentioned their excitement about new (young) farmers starting a company in their proximity. Together they hope to create a stronger position for the sector and a louder voice towards other stakeholders.

'I'm very happy when I see new young farmers arrive in the neighbourhood.'
- farmer 1

FARMERS WANT TO BE INDEPENDENT ENTREPRENEURS

Farming is an entrepreneurial profession. Many farmers point out the feeling of freedom and connection to nature as important drivers for their work. Working on a farm is a 24/7 job but it involves a great feeling of ownership and responsibility towards the company. 'Owning' a piece of land, nurturing it and harvesting its products make for a romantic image of being a farmer.

In reality, farmers are not as free as it might seem. As an entrepreneur, the farmers have lost their independence. They have lost their position as an expert. Rules and regulations determine their farming methods, as explained in chapter two. Large buy-in offices and supermarkets determine their product and price. Investors determine the future (size) of their company. Trouw (2019) concluded that farmers feel like over-regulation prevents them from being an entrepreneur.

STUCK IN A RACE TO THE BOTTOM

As a result of the high influence of other stakeholders in the system, many farmers feel like they are stuck in a race to the bottom. There is a high level of competition with other farmers and importers which is exploited by their buyers. The buyers of their products contain and maintain all the power, demanding the lowest price. Farmer 2 and 3 even mentioned that supermarkets and other buy-in offices sometimes prohibit farmers from adopting biological or sustainable practices because it is not in their interest. This forces them to stick with conventional farming because they are afraid to lose their client.

Farmers are pushed by policymakers and investors to make certain business decisions. However, these stakeholders lack a long-term vision for their business. As a result, many farmers are forced to raise their loans but are unable to pay off or sell their farm

(Wiskerke, 2019). They are forced to keep competing in a race of lowering their cost price and increasing efficiency.

FARMERS FEEL MISUNDERSTOOD

As mentioned before, the Netherlands is on the verge of a large agricultural transition. Many farmers need to make a transition in their business. At the same time, society complains about animal welfare, greenhouse gas emissions, and food safety (and diseases). These issues are widely exposed by the media, usually blaming farming methods as the cause of the problems. In the opinion poll of Trouw, more than 80% of the farmers agreed with statements that they work very hard but barely receive appreciation for their work, the same percentage of farmers feel like they are always blamed by the media. As a result, many farmers are angry and started protesting the agriculture policy in 2019. The Farmers Defence Force (FDF) is a farmers advocate group that organizes these protests. The farmers that were interviewed for this project mention that they do not agree with the methods of the FDF but understand their frustration.

'People think that the farmer is an environmental criminal, but without farmers there would not be food. They are also the cheapest gardeners of the landscape, which is often forgotten'
- anonymous (Trouw, 2019)

Farmers are willing to change their business
More than 80% of Dutch farmers want to change to more ecological farming methods (Trouw, 2019). Half of the farmers believe agricultural companies should shift their focus beyond export to nature inclusive agriculture approach in which collaboration with nature is key (Bouma & Marijnissen, 2019). However, they need a larger support base from society to make the transition. This includes financial support from the government and investors as well as insurance from consumers that their sustainable but more expensive products will be bought.

NATURE INCLUSIVE FARMING IS REWARDING

Interviewees mention that farming with nature in mind is much more dynamic and fun. Activities differ from day to day (farmer 1, 2, and 3). They feel more autonomous because they depend less on large investors and subsidies. Additionally, the appreciation from society and the next generation for their way of working makes nature inclusive farming rewarding (Van der Lelij & Vrakking, 2019).

Nature preservation is only a cost for farmers
Despite the societal relevance and pleasure that farmers gain from working with nature in mind, they also struggle with it from a business perspective. Growing trees and a biodiverse range of grasses and herbs means trading off on efficient land use. There is no economic value to nature on farms, so it costs the farmer land and labour to increase natural land on their farm. These ecological costs or values of farming are not considered in business calculations. This problem is discussed further in chapter four. There are some subsidies for nature preservation but in general, government contributions make a sharp distinction between farmland and nature.

'Nature (or green) is only seen as a cost by policy makers and investors. (...) A business plan for a sustainable (nature inclusive) farm is incorrect on paper (does not make enough money)'.
- Farmer 2

'We are planting wood embarkments because we think it's good for nature and we enjoy

them, but on the same time it feels stupid because it also feels like giving up expensive land'.
- Farmer 1

CONSUMERS HAVE LITTLE TO NO UNDERSTANDING ABOUT FARMERS AND FARMING

Consumers are fed by media coverage about farming, which usually has a negative tone. Furthermore, we are told about the importance of animal welfare and biological products but not about the trade-offs that farmers need to make to comply with these wishes. Consumers want healthy (pesticide free) products but lack a deeper understanding of why it makes a product more expensive. On a larger scale, consumers do not realize the importance of sustainable and organic or nature inclusive farming. It makes it difficult to convince consumers to pay for the sustainability contribution of their product.

'Sustainable production is being worked on all fronts within agriculture. An occasional societal 'pat on the back' would be appropriate and needed!'
- anonymous (Trouw, 2019)

FARM AS A (LOCAL) EXPERIENCE

The pressure on low cost-prices and efficiency in the sector made farmers look for new ways to generate income. Farmers are adopting side businesses to connect with consumers. Farmers sell their story and organize activities for consumers to participate and experience the farm. In the recent 'experience-economy', consumers desire these kinds of stories as a (seemingly) authentic experience (this is further explained in chapter four). However, these activities often take up a lot of time and energy for the farmer without getting much (financial) compensation in return. An experience is only interesting several times a year, this is not a sustainable business model for farmers. These activities are also not what drives the farmers. They enjoy spending time on their land, not explaining about it.

'It is frustrating to see that our neighbour with conventional dairy cattle sells his 'local' milk just as easily as we do.'
- Farmer 3

CONCLUSIONS

- Many farmers are frustrated because of their d**ependence on powerful stakeholders**. Even though an increasing number of farmers want to become more nature inclusive, they struggle to change because of the dominant (industrial) system. **Nature inclusive farming does not have enough economic value** to make it viable for farmers. This prohibits many farmers from adopting more environmentally friendly farming methods.
- **Farmers feel misunderstood** by society. They feel like they are blamed for environmental problems but their position as nature manager is forgotten or not appreciated.
- **Consumers have little appreciation for and knowledge about food production.** They do not understand the necessity for higher food prices.

3.2 SUSTAINABLE FOOD CONSUMPTION

From the previous paragraph, we can conclude that farmers are willing to transition to more sustainable farming methods but lack understanding and support from society. Next to agricultural practices, food consumption plays an important role in the sustainability of the agri-food sector. What, when, and how food is consumed influences the environmental impact that food has.

ENVIRONMENTAL IMPACT OF FOOD CONSUMPTION

To feed the Dutch with the current consumption pattern, 2,5 times the agricultural area of the Netherlands is needed. (Van Oorschot et al., 2012). This is influenced by what is consumed and how much of it. More efficient use of land, water and nutrients for food production can help to reduce the environmental impact. Since this impact varies between different food products, consumption choices influence the size of the impact. Taking this impact into account and reducing it as much as possible is referred to as environmentally responsible consumption (ERC). ERC is defined by Gupta & Agrawal (2017) as: 'any consumption-related behaviour, namely, acquisition, use, and disposal, undertaken in a manner such that it reduces the negative impact of consumption on the environment'.

A person's food takes up approximately 18% of their climate footprint (Aleksandrowicz, 2016). This footprint can be reduced in many ways. For example, adopting a vegetarian diet already reduces this footprint with 31%. Because the production of meat requires more land and water but also results in more GHG emissions. Figure 3.1 shows an overview of the land needed for 1000 kilocalories of a food product (Poore & Nemecek, 2018).

Next to changing to a more plant-based diet, other behaviour changes can also reduce the environmental impact of food consumption. According to Poore & Nemecek (2018), 9% of food emissions come from consumer food waste globally.

Value of food

Approximately one third of the food that is produced worldwide for human consumption is wasted or spoiled (Gustavsson et al., 2011). The FAO (2017) defines food loss and waste as 'a decrease, at all stages of the food system from production to consumption, in mass and/or quality, of food that was originally intended for human consumption, regardless of the cause'. In European countries, 40% of food waste and spoilage occurs at the retail and consumer level, mostly due to the high standards and the excess availability of food. These high standards are partly caused by the anonymization of the food chain that was mentioned in chapter two. Food of good quality is wasted because consumers can choose alternatives that have a better shape or fewer spots. The resources and labour that go into producing the products are invisible for consumers and reduce the

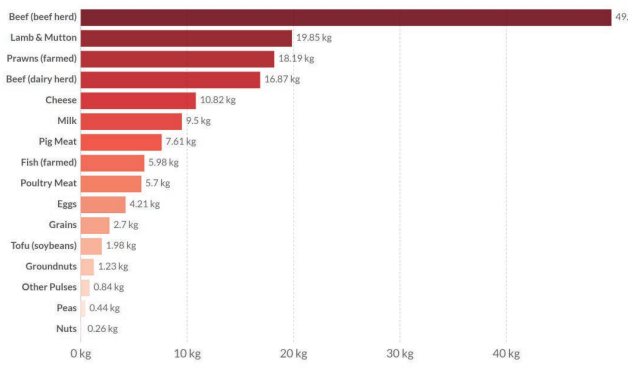


Figure 3.1: Greenhouse gas emissions per 100 grams of protein. Data from Poore & Nemecek (2018), image from Ourworldindata.org

intrinsic value that consumers have for the products. Deepening this understanding could contribute to more responsible consumer behaviour and change the relation that consumers have to their food, for example by growing food products yourself. This helps to increase the awareness of the costs that go into production, reducing food waste and increasing the acceptance to pay a higher price for food products. A price in which ethical and sustainable production are accounted for.

'If you grow a tomato yourself, you will value and eat it, regardless of what it looks like'.
- Farmer 2

Organic and local products

Compared to what is eaten by consumers, eating local products does not have a significant influence on the GHG emissions of food consumption (Poore & Nemecek, 2018). It reduces transportation emissions and food spoilage due to travel distances, but this amount is insignificant in relation to changing a person's diet. However, eating local products can contribute to the intrinsic value that consumers have for food. It creates a closer relation between food production and consumption and the stakeholders that are involved.

Organic or biological products are produced with nature inclusive principles in mind, reducing the negative impact of food production on the environment. The consumption of products with such certifications is slowly increasing. The market share of organic and biological products has been growing slowly over the last years (Logatcheva, 2017). The biological market has been a niche for a long time but might break into the dominant regime when understanding and acceptance increases.

BEHAVIOURAL CONTEXT OF SUSTAINABLE FOOD CONSUMPTION

'As long as the supermarkets are packed with products, people won't understand the problem'.

Dutch consumers are slowly becoming aware of the impact of their consumption patterns on the environment but this awareness does not (yet) lead to significant changes in buying habits. Despite different campaigns and increased availability of meat-substitutes, meat consumption in the Netherlands has risen again in 2019 (Dagevos et al., 2020). More information about consumption behaviour of consumers can be found in Appendix B.

For many consumers, food consumption is not directly linked to environmental impact. According to Booth & Coveney (2015) this is caused by the disconnect of consumers and food production, preventing them from realizing the environmental impact that food products have. Additionally, food consumption is considered to be a short-term and individual activity whereas 'doing good for the environment' has a non-personal effect on the long term (Hoek et al., 2017). This distinction is referred to by Tromp and Hekkert (2019) as the difference between user-centred design and society-centred design.

Furthermore, a great psychological distance towards climate change issues prevents consumers from feeling the urgency of acting on it. Psychological distance to a problem or event is explained by McDonald et al. (2015) by four questions:

- Will it happen? (hypothetical distance)
- Is it happening in the near future? (temporal distance)
- Is it happening near me? (spatial distance)

- Is it happening to people like me? (social distance)

Climate change generally is an abstract problem because the effects are often doubted, creating hypothetical distance. Additionally, these effects will not happen in the near future but affect future generations, resulting in temporal distance as well. According to the construal level theory, this psychological distance makes people judge the problem as more abstract in return (Liberman et al., 2003).

For a design to be sustainable, Tromp & Hekkert (2019) suggest shifting the focus from short-term concerns to long-term benefits. So instead of trying to persuade consumers to buy sustainable foods, their understanding of the context and of the long-term impact of food consumption could be increased. To come up with a fitting solution, not the consumer but the citizen must be addressed.

The conscious consumer struggle

Consumers that realize the environmental impact of their consumption behaviour still struggle to act accordingly; this is explained by several factors. These insights were gained from interviews with conscious consumers.

Perception of low impact

An argument often used in the sustainable consumption discussion is: 'My purchase decisions won't impact and change the system'. In this case, psychological distance is used as a coping mechanism to confirm a person's behaviour (McDonald et al., 2015). The person is distancing themselves from their impact on the issue and their possibility to contribute to a solution.

Responsible consumption is complex

Making sustainable consumption choices can be complex due to the many factors that influence the impact of food. For example, the rule of buying local items to be responsible cannot always be applied. Buying green beans that were grown in Kenya can have a lower environmental impact than green beans grown in the Netherlands because the Dutch greenhouse requires a much higher external energy input that even compensates the transport emissions of the Kenyan beans (Ronde, 2014).

Consumers want to help, but struggle how

Partly due to the complexity of sustainability described before, consumers are struggling with how they can personally contribute to creating sustainable change. People want to see and feel the impact of their work to feel satisfied which often makes a financial donation anonymous and therefore unrewarding. Also, polarisation in the media and among experts about the best ways to tackle this wicked problem creates hypothetical distance among consumers. If experts cannot agree on the best method(s) to create a sustainable agri-food sector, how can consumers decide on their contribution?

The conscious consumer is constantly struggling to make the 'right' decision

The food consumption context is extremely manipulative. Conscious consumers constantly struggle with making 'the right choice' because of the temptation to buy the cheaper or more convenient option. Emotional marketing of large brands and cheap prices create a difficult environment to make a conscious choice. This is especially visible in large supermarkets.

CONCLUSION

Sustainable food consumption is emotional and difficult to influence. To come up with a fitting solution, not the consumer but the citizen must be addressed.

3.3 CURRENT FARMER-CONSUMER RELATION

Great psychological distance between the two parties

Farmers need more appreciation and understanding to create a support base for the transition towards nature inclusive agriculture. As consumers, we enjoy the perks of the current agriculture system. We pay low prices and have continuous access to a wide variety of products. As citizens however, we are confronted with the flaws of the system (Beers, 2016). The national nitrogen crisis that is partly due to intensive livestock breeding visualizes the effect of agriculture on citizens. Nitrogen emissions in the Netherlands are out of proportion and need to be reduced to meet national limitations (RIVM, 2020). Farmers are frustrated because the high emissions are a result of the race for efficiency and lowering the cost price of livestock breeding. It is part of the price we pay for the cheap production of meat. To reduce the impact of agriculture on the environment, measurements like cutting down the livestock sector are necessary. However, this also means that consumption of meat should be decreased. Change in demand and supply should go hand in hand. Otherwise, the problem is just shifted over the border of the country.

The polarisation between farmer and citizen

The nitrogen crisis is just one example of a controversial problem related to farmers. The loss of birds in our landscape, spread of animal diseases and viruses, and increasing draughts are some problems that have a complicated cause. Instead of looking for a shared solution, actors point fingers towards each other which creates more polarisation and misunderstanding between parties. Farmer's view towards citizens is sometimes as stereotypical as citizens who solely blame farmers for animal cruelty and environmental pollution. Some environmental activists make a relation between livestock breeding and the WWII holocaust. At the same time, a spokesperson of the FDF made a reference to the oppression of Jews in the war in a speech about the position of farmers in society. These are extreme statements, but they illustrate the frustration and polarisation between actors.

Looking for connection and collaboration

The polarisation between parties in society gains great attention in the media. Luckily, there are also many people looking for connections and taking responsibility for their contribution in these issues. Caring Farmers realize the urgency of the problems and the need for a transition of the sector. To accomplish this, awareness among other actors and citizens is needed.

CONCLUSIONS

Opportunities for the enhancement of the relation between farmer and consumer are:

- Shift the reputation of the farmer from nature destroyer to nature preserver or manager.
- Communicate the ecological and social contribution of nature inclusive farming to citizens and policy makers. Values such as biodiversity, carbon capture, water- air purification, and recreation contribute to a healthy and sustainable society.
- Redefine the functionality of the farm, from a linear business to social system to reduce their dependence on powerful stakeholders and make their business more resilient.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CHAPTER 04
THE FUTURE OF THE AGRI-FOOD SECTOR

The previous chapters discussed the development of the sector and the underlying dynamics of the gap between farmer and consumer. This chapter will dive into how this might develop in the future. By researching and analysing trends within the sector and in other industries, signals for changes in the landscape can be identified (Simonse, 2017). Trends within the agri-food sector were explored and combined into niches that have potential to change the future of the sector. These will be discussed in paragraph 4.1. Paragraph 4.2 describes which niches offer potential to transition the landscape into a future that is in line with the goals of Caring Farmers. The strengths and particularities of these niches are analysed. Together, they form the building blocks for a general vision for the future of the agri-food sector. The vision is based on the principles of nature inclusive farming. It shows an alternative role for agriculture in the Netherlands in a future where efficient bulk production is no longer the primary focus in the sector.

APPROACH

This paragraph describes niches formed by trends in the current landscape. Trends derived from literature research of trend reports, interviews with conscious consumers, and observations of niche-initiatives in the agri-food sector. Trends are signals of changes in the existing landscape that can provide insight into how a sector might develop (Simonse, 2017). They are therefore the foundation on which a vision for the future can be created. Trends can be social movements or changes in preferences or attitudes among consumers, companies, or policy makers. Several trends can form a niche in the multilevel perspective model. Loorbach (2007) refers to niches as 'new technologies, new rules and legislation, new organizations or even new projects, concepts or ideas'. Examples of niches in the agri-food sector are organic agriculture and alternative (local) food systems (Bilali, 2019). A transition in a regime (the agri-food landscape) can occur when niches are powerful enough to challenge the dominant socio-technical system. With a growing support-base these niches can scale-up and serve as an alternative to conventional practices. The transition of a meat-based diet towards a (mostly) plant-based diet is an example of a niche that is challenging the current regime and might become more mainstream in the future.

Important to note is that the identification of trends and prediction of the future is subjective, meaning that conclusions are an interpretation of the designer. The vision for the future is a prediction based on these interpretations and the goal of the project client.

4.1 NICHES FORMED BY TRENDS

RESPONSIBLE CONSUMERISM

With a large variety of goods easily accessible for consumers, the realization of the negative effects of (over)consumption has grown. For example, the popularity of initiatives to reduce food waste display the growing awareness of consumers.

Too Good to Go is a platform for local businesses to offer leftover food boxes from their shop or restaurant. Consumers can order boxes and pick them up. The app creates a platform to connect local businesses with leftovers with consumers.

Furthermore, concerns about climate change and the impact that our consumption patterns have on the environment raise questions about our personal carbon-footprint on this planet. Tools have even been developed for consumers to calculate their footprint by the WWF (2020), see figure 4.1.

In line with the recognition of a person's personal footprint, the awareness that your spendings support a certain company and thus serve as a vote for the future you want to live in has grown as well. Brands are playing into this by displaying their sustainable initiatives and linking these to the sales of their products. For example by planting a tree for each pair of shoes a customer buys.

Responsible consumption in the agri-food sector

Within food consumption, consumers can make responsible decisions by eating and drinking products that have a low environmental impact and that take animal welfare into account. Kipster is a poultry company that produces eggs from chickens who are fed with waste streams. Animal welfare is also a priority in the company which results in a responsibly produced product for consumers.

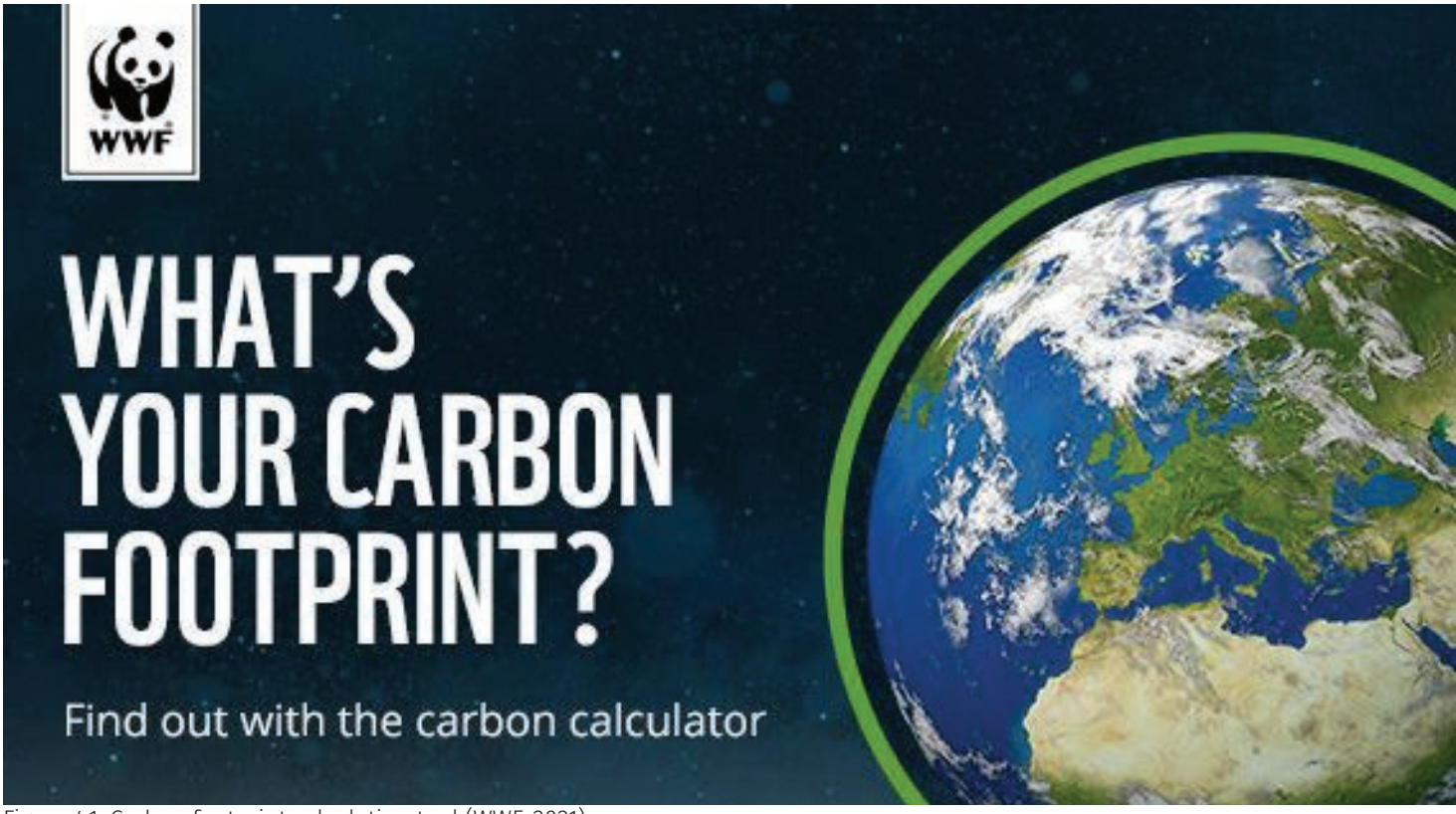


Figure 4.1: Carbon footprint calculation tool (WWF, 2021).

HYPER TRANSPARENCY

In our information economy, transparency of companies and industries has become increasingly important. Citizens can now research these entities and their background and base their consumption decisions on more information. The Dutch 'eerlijke geldwijzer' (honest money guide, see figure 4.2) is a great example of this demand. An independent entity brings out a yearly report on the business ethics of banks in the Netherlands. The banks are rated on aspects such as income equality and investments in the fossil industry. More people want to know the background of the businesses that they support with their spendings. Similar initiatives are present in the energy and insurance industry.

Transparency is especially important in the agri-food sector since these are subjected to long supply chains and involve ethical issues such as animal welfare. The amount of certifications on food products has been growing over the last years. Although currently more than 100 quality marks exist in the food sector, only 10 have received the titel of 'top quality mark' after a research from Milieu Centraal (2016). These are displayed in figure 4.3. The most popular ones are currently biological and fair trade in the Netherlands. However, with more certifications popping up, the consumer is often confused about the differences and relevance of these certifications.

An example of company transparency in the food industry is the 'Open chain' initiative of Fair trade chocolate company Tony Chocolonely. Their goal is to make the supply chain of chocolate production more ethical. They are working with local farmers and are openly sharing this part of their business while also admitting that their supply chain is not 100% fair (yet).

Technology for transparency

Technological innovation can help to make the food system more transparent. Blockchain technology offers the opportunity to track food products from their origin and can help to improve the certification and traceability of food (De Boer & De Olde, 2020).

Figure 4.3: Top quality marks for food in the Netherlands

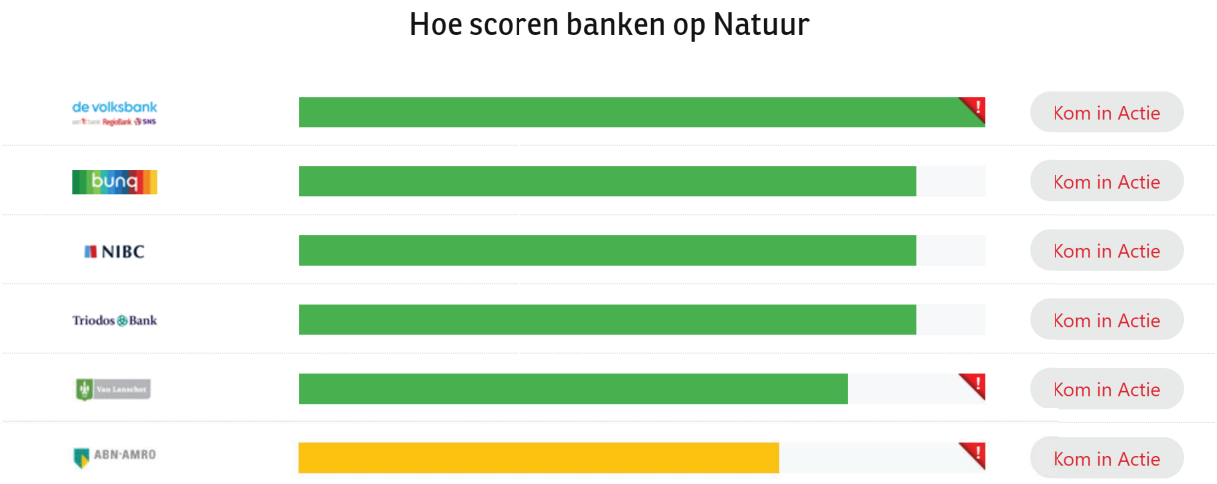


Figure 4.2: Eerlijke bankwijzer (eerlijkegeldwijzer.nl)

VISIBLE IMPACT

In line with responsible consumerism, consumers want to know the impact of their personal contributions. Not only do people want to contribute to a better future, they also want to know how their contribution impacts this future. Instead of donating €50 to a good cause, the supporter wants to know that their contribution helps to feed 5 children in Africa. Companies and NGOs are looking for ways to make the impact of their supporters more tangible and personal.

An example within the agri-food sector is 'Land van Ons'. This is a cooperative that buys conventional agricultural land with the investments from people in the cooperative. The land that is bought will be restored by increasing biodiversity and soil health on the land. An interviewee mentioned that 'It feels good to steal a piece of land from conventional farmers to give it back to nature'.

Figure 4.4: Land Van Ons homepage (landvanons.nl)

Figure 4.5: Moestuintjes promotion (ah.nl)

PROSUMERS

Prosumerism is the blurring line between producer and consumer and refers to consumers taking part in the design- and production process. This trend is visible across many industries. Consumers want to make or repair more of their own clothing and repair cafes and tutorials help consumers to fix their own electronics. It is supported by social platforms on which consumers can find and share information. More tools and technology are available for consumers to produce their own products. Emerging technologies such as 3D-printing make production cheaper and more accessible. The internet serves as a massive database with endless tutorials and 'Do It Yourself' (DIY) videos to create clothing, furniture, games, and other products. Some people argue this trend is a response to the loss of craftsmanship and the excess availability of products. Creating a product yourself adds intrinsic value to it that cannot be bought through an online webshop.

In agriculture, prosumerism is expressed in people increasingly growing food products at home or in community gardens. An example is the supermarket promotion of small 'moestuintjes' (see figure 4.5). Prosumerism got a boost due to the Covid-19 crisis this year. With the decline of social activities, people started looking for new and alternative pastime activities they could do at home. Growing your own vegetables became increasingly popular. Over the last years, the demand for vegetable gardens (volkstuinen) has grown quickly in the urban areas of the Netherlands (ASN, 2020). Many people that live in city apartments do not have much outer space in their homes and found a solution by buying a garden space close to their house. These gardens are used for recreation, growing crops, and facilitate community building between the owners.

DESIGN GUIDELINE

Facilitate consumers to be involved with food production and related activities.

TOGETHER IS BETTER: COOPERATIVES

Another growing phenomenon are small scale cooperatives. This trend is part of the sharing economy where a group of people share the ownership over a product. Cooperatives are for example present in the energy sector where people share the energy from renewable energy sources such as solar panels.

In the agri-food sector, cooperatives play an important role in the creation of alternative food networks. In these networks, a small community shares the responsibility of their food production and distribution within the community. Farming cooperatives and supermarket cooperatives are gaining popularity.

EXPERIENCE ECONOMY

According to Euromonitor (2017), 'there is a fundamental shift in consumer values towards experiences that bring happiness and well-being'. People tend to spend money on experiences rather than possessions. Furthermore, the experience of buying products also becomes more important for consumers. Companies are competing to create a seamless experience but also one that is personal and authentic for the customer.

ALTERNATIVE (PLANT-BASED) FOODS TO FEED A GROWING POPULATION

Meat consumption is known to have a high impact on the environment because of the GHG-emissions, water- and land use of meat production. This has resulted in alternative plant based products growing in popularity.

Figure 4.6: Vegetarian Butcher

Meat substitutes

Over the last years, the availability of meat-substitutes has grown in supermarkets. The revenue of meat-substitutes has risen with 51% since 2017 until 2019 (VNT, 2019). In the Netherlands, the Vegetarian Butcher (see figure 4.6) became popular because of their vegetarian alternatives to many Dutch meat-products. Furthermore, the industry is experimenting with more alternative food products as a response to the growing world population and the future demand for food. Technology is an important element in these developments. Lab-grown meats and milk machines that can produce milk from grass are ways to reduce the amount of animals needed for food production. Describing the development of all these alternative foods goes beyond the scope of this project, but it has its influence on the Dutch agriculture sector.

DESIGN GUIDELINE

Create an (community) experience around nature inclusive farming that increases awareness.

Figure 4.7: Support your locals campaign (InStock, 2021)

PROUDLY LOCAL

In line with the 'responsible consumption' and 'experience economy' trend, is the trend to shop and source products locally. By buying from local shops, consumers support the local economy of small businesses. This can be seen as a response to the long and anonymous chains that were discussed in chapter 2. Some people argue that shopping experiences are more enjoyable when you buy from local businesses that you know and trust. It creates a different buying experience that can feel more satisfying. Furthermore, local products are often seen as unique, carrying the story of a local craftsman instead of a large corporate.

Local farm shops have always been around but lost their market position to the more convenient supermarkets where consumers could buy all the products in one place, around the corner of their house. The Covid-19 crisis gave a new boost to local shops with national movements to '#Support Your Local'. The revenues of local bakeries, butchers and vegetable shops increased between 30-40% during the first months of the crisis (NOS, 2020). Not only did people have more time to buy their groceries, the crisis also emphasized the vulnerability of local businesses. This gave a new impulse to local shopping, integrated in the convenience context. For example, Rechtstreex offers people in the area of Rotterdam to shop for local products through their webshop. This way, consumers can buy products from local farmers without having to spend time visiting all the farms.

Figure 4.8: Local food initiatives (Boerschappen, Rechtstreex, R'damse Oogst

BEYOND ECONOMIC COSTS AND BENEFITS

The climate crisis has exposed flaws in the economic system. Many social and environmental values are not expressed financially which means that they are often not represented in the market price of products. A growing group of people argue that these costs must be included in the prices of products we buy so that companies are inclined to take the impact on society and the environment into account. An organisation has developed a calculation model of the so-called true price of products which takes environmental and social costs into account (Trueprice, 2019). Building on this trend are organisations that deal in carbon credits. When governments started implementing rules for the maximum allowed GHG-emissions of companies, these emissions gained a financial value that is now being used to compensate the emissions of these companies with green projects, see figure 4.10 (Southpole, 2021).

Figure 4.9: True price of a chocolate bar (Trueprice, 2019)

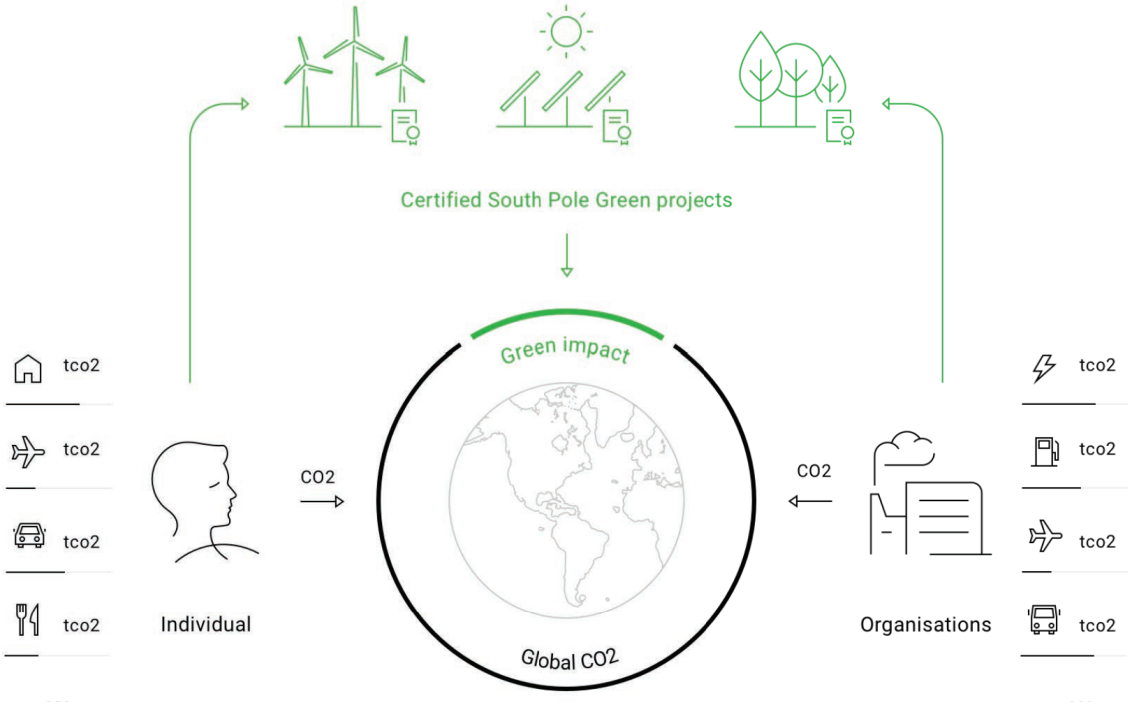


Figure 4.10: Carbon compensation scheme (Southpole, 2021)

4.2 ALTERNATIVES IN THE AGRI-FOOD SYSTEM

AGRO-ECOSYSTEMS

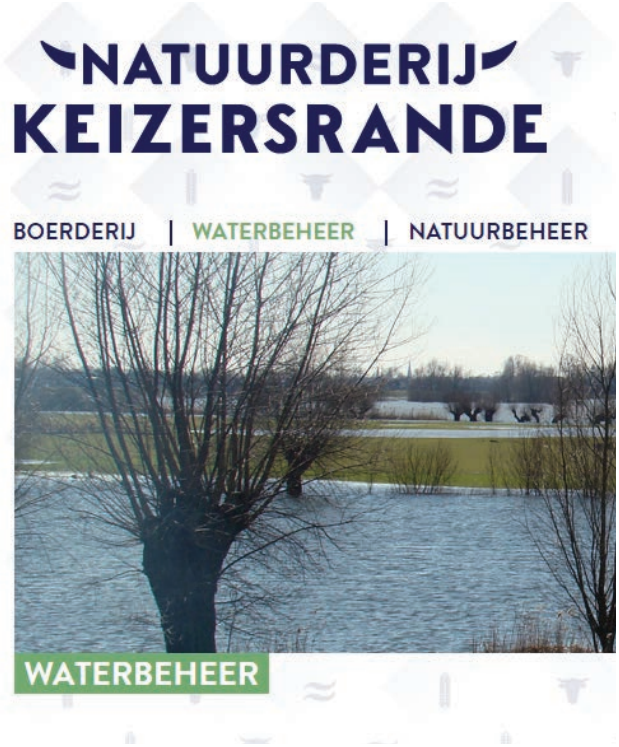
A niche within the agriculture sector are agro-ecosystems where the lines between food production and nature conservation are blurred.

Food forests

Agroforests or food forests (voedselbossen) are a popular example. It basically is a forest that mostly contains food-producing trees and plants. It therefore looks like a forest but can be compared to a farm in terms of purpose. In these food forests, a lot of room is provided for natural elements to grow and they are often an attractive spot for birds and insects because of the many different plants, herbs and trees that are grown. They have a much more positive impact on biodiversity and soil fertility than conventional monoculture farms. Next to that, the forests are attractive for citizen recreation. Many food forests are being started throughout the Netherlands with a group of involved volunteers who help to plant trees and maintain the forest. According to an interviewee, it is a way for them to be outside in nature and do some physical work. Some even like to call it meditative.

Natuurderij Keizersrande

An example of a company where agriculture and nature are combined is 'Natuurderij Keizersrande' in the Netherlands. It is a unique project that displays how farming, ecology, economy, and recreation can be integrated (Ijssellandschap, 2021). The main business in the company, a biological dynamic dairy farm, is combined with secondary tasks like nature conservation, water management, increasing biodiversity, recreation, and education. The company is situated in a unique location



along an important river and an area that falls under nature conservation programs. This offers the opportunity to combine these tasks and gain a source of income out of food production and nature conservation. Half of the farm's income comes from the nature preservation budget from the government (Keizersrande, 2021).

This budget facilitates and demands that agriculture is practised within ecological boundaries and is therefore a great example of how different societal services can be combined in one agricultural company.

DESIGN GUIDELINE

Explore other roles that agriculture can fulfill which relate to ecosystem- and societal services.

CONSUMER INVOLVEMENT IN FOOD PRODUCTION

Cooperatives in the food system increase the involvement of consumers with food production. Currently, approximately 150.000 people in the Netherlands are part of a food community (Van Kampen, 2020). These communities are local and direct partnerships between consumers and producers. The members pay a monthly or yearly contribution to cover the production costs of the agricultural company. In exchange, they receive (part of) the yield. Different forms of communities exist, the overarching concept is called Community Supported Agriculture (CSA). In CSA concepts, the risk of the business is shared among the community instead of carried solely by the farmer. In many of these communities, members co-decide on the cultivation plan of the farm or they help out with operational tasks like harvesting and product distribution. Some popular CSA examples are Herenboeren, cooperative supermarkets and self-harvest farms. Local food systems offer consumers the chance to take responsibility for the impact of the food they consume and be more involved with how their products are grown. It increases their awareness of the context of food production. According to Van Kampen, being part of the community 'provides a feeling of belonging and actively working on the transition of the food system'. It is essentially a small, sustainable and fair food system.

Herenboeren

Herenboeren is an example of a local food community. The concept offers consumers the opportunity to collectively buy a piece of land in their area to build their cooperative farm. A farmer is hired as an employee, ensuring a continuous income. With the farming community, a cultivation plan is made. The members in the community make an investment and afterwards pay a monthly fee. In return for this fee, they receive a box with the harvest from the farm every week. Since it is a cooperative, people are forced to think differently about the financial transactions they make for their food. A member of Herenboeren mentioned that people feel ownership over the farm and want to take care of it, despite its direct results.

Furthermore, the members can see the results of their consumption choices. Interviewee and founder of the concept explained that members of the farm saw that half of their property was taken up by the cows. They started wondering if eating beef and cheese was worth all that space when they could also use it to grow different types of vegetables on that piece of land.

Other concepts in which consumers are involved more directly with food production are more accessible because they require lower investments. An example is the self-harvest farm where members pay a monthly fee to harvest their chosen products from a vegetable garden. Additionally, some farms created their own community of consumers with memberships or local pick-up options. These concepts take the traditional retailer out of the food supply chain and create a direct relation between producer and consumer. Food becomes less anonymous for consumers and more personal.

DESIGN GUIDELINE
involving people with food production by creating part-ownership of the company enhances the relation between the consumer and their food (producer).

‘Our farm has not yielded what we expected so far, but people in the community have become extra motivated and started thinking about what they could do to contribute to making the soil healthy again’.

- HERENBOER (ANONYMOUS)

VALUE FOR ECOSYSTEM SERVICES

Environmental and social costs (or values) are often not considered in the agri-food sector. As mentioned in chapter three, it is difficult for a farmer to receive extra money for his products when he uses more environmentally friendly methods or provides space for rare bird species on his land. The effects that agriculture has on the environment is not calculated in the prices that they are paid. A solution that does take these effects into account are organic certifications. They are an indicator that the farmer practices more sustainable agriculture, this is also reflected in the prices of organic products compared to other products. However, the market share of organic products in the Netherlands has been fluctuating around 3% over the last years (IRI, 2020) This system requires the consumer to decide about whether to pay for this value in a competitive context, without much understanding of the difference between the organic and normal products. As explained in chapter 3, conscious consumers often struggle to make a responsible decision in this context. This problem does not only occur in the agri-food sector but in many other industries such as fashion too.

Even though the costs to society can be high, they are often not considered during production and calculated in market prices. However, many studies have calculated environmental costs of for example emissions of GHG and other harmful substances into the environment. The Dutch study 'Monetaire milieuschade in Nederland' has calculated that the emission of harmful substances into the air, water, and soil amounts €31 billion of environmental damage in 2015 (Drissen & Vollebregh, 2018).

The realization that some services that can prevent these damages are not valued financially by society are summarized in the concept of 'Payment for Ecosystem Services (PES)'. PES is a relatively new concept which is struggling to find its roots. The idea is simple, we have to go beyond the economic value of nature and look for ways to value the ecosystem and the services it delivers to our society. These services can be divided into three categories:

- production services like food, drinking water, wood, fibre, and biomass
- regulating services like water storage, carbon sequestration, soil fertility, coastal protection, and purifying power of water and air.
- cultural services like science and education, nature recreation, natural heritage, and symbolic value

Especially regulating services in this concept are difficult to value since we hold

a perception that these natural services are free because no one owns them or is rewarded for the services (FAO, 2007). They are collective services for which it is difficult to argue that individuals must pay to protect. With this analysis, it can be argued that farmers play a much bigger role in our society than just providing the food we eat and the milk we drink. Farmers are natural resource managers because they depend on and generate many ecosystem services that fall under regulating services. The way that they produce food and maintain their land can either degrade or enhance ecosystems. This impact is not reflected in their income and reflecting these values in the prices of products might not be a fitting solution either since these services do not have an individual but collective nature.

CONCLUSION

The environmental and societal services that farmers deliver to society should be valued to ensure a fair income for them and for the sector to become more sustainable. This conclusion serves as a guideline for the design challenge. The challenge focuses on finding ways for citizens to become aware of, and value these services better in the future.

FUTURE IMPLEMENTATION OF ALTERNATIVES

These alternatives for the agri-food sector are in line with the vision that Van Olde & De Boer (2020) developed for the future of the sector. According to the report, food production in the future is part of daily life: urban gardening for prosumers, visiting food forests or picking gardens to harvest your own food. These activities are only responsible for a part of people's food consumption, but they help to realize the value of food. It increases consumer awareness of seasonal food production and connects consumers with producers and nature (De Boer & De Olde, et al., 2020). 'Various forms of farming communities will ensure that consumers and producers collaboratively shape the way their food is produced'. The value of public goods is recognised by society. Clean water, healthy soil and a diverse range of species and landscapes is valued by people. The report also describes that in this future vision, a broad range of indicators determine the wealth and wellbeing of people in society. These indicators focus on environmental and social values instead of the current GDP indicator. The focus shifts from more to better production.

Policy

Policy is lagging on these trends. Their distinction between food production and nature conservation makes it difficult to finance nature preservation on agricultural land. The example 'Natuurderij Keizersrande' displays the integration between agriculture and nature but unfortunately, this project is still quite unique in the Netherlands. There is little to no focus on the environmental values that agricultural companies can deliver and they are difficult to quantify and thus value financially by policymakers. Slowly, policymakers start to realize that environmental values should be appreciated financially in agriculture. For example, by including agricultural companies in the emission trade system of CO2 (D66, 2021). A hopeful development for the future. CSA concepts like Herenboeren struggle to comply with the standard regulations for farms while operating as a cooperative. These regulations hinder innovative concepts to develop quickly since they are focussed on the traditional farming models that currently exist.

Caring Farmer's role in the transition

Caring Farmers have defined their goal as accelerating the transition towards nature inclusive farming in the Netherlands. However, no clear definition of the term exists yet, let alone an instructions manual for how to get there. Nature inclusive farming derives from the principle of working with nature instead of against it. But it is also embedded in the idea that agriculture should have a broader focus than food production, taking societal impact into account as well.

Caring Farmers are pioneering their way through the current landscapes, looking for how this principle can be embedded in agriculture. They challenge the status quo by stretching the boundaries of what includes agriculture and who is involved.

4.3 CONCLUSION: FUTURE VISION

We need to shift focus in the Netherlands for farming. An opportunity exists to reintegrate farming in society and create a system that expands its focus for **farming beyond economic production towards its societal relevance.** The farm of the future is a social and nature inclusive system. This vision is the baseline for the design vision and strategy that are discussed in chapter five.

WHY THIS VISION?

Industrial farming as we know it now is unsustainable, financially, socially, and ecologically. This can be concluded from the current position of farmers described in chapter three, the environmental impact that industrial agriculture has, and the polarisation between many farmers and citizens.

A fair price is difficult to realize in a global market.

Farmers demand a fair price for their products. Currently, the price they get paid often does not cover the costs of production. Higher prices are difficult to realize because of international competition. Making Dutch tomatoes more expensive to include environmental costs will result in more import from cheaper countries and threaten the market share of Dutch farmers.

Changing food consumption behaviour is embedded in an emotional and manipulative context.

It is difficult for consumers to make a conscious decision regarding food in the current context where supermarkets are dominant. Anonymous products are offered in a context that is led by price and marketing principles. Furthermore, the relation between sustainable consumption and a sustainable environment in the Netherlands is not direct because of the international im- and export of products. Therefore, the focus of the future vision is not on sustainable consumption but on increasing awareness and involvement for sustainable agriculture in general. Conscious consumption can be a result of a wider involvement and understanding of the impact of food production. As a result, conscious consumption derives from intrinsic motivation, making it easier to change a person's behaviour.

"It is very important that people understand how much effort and energy it takes to produce food and what the real value of this food is."
- De Boer (2020)

Dutch agriculture shapes our landscape and determines biodiversity in the area. It influences our society in different ways. It is important to make Dutch citizens aware of our agricultural land and practices, showing how agriculture practices influences and contributes to their lives and environment. This can result in a more holistic view on agriculture. Consequently, it can bring farmers and citizens closer together, opening a dialogue between the two so that the farm(land) becomes a part of society again. In the future, citizens and farmers will share the responsibility for the environmental and social impact of the agricultural landscape. Therefore, I want to argue that we must find a way to appreciate and value farmers in a different way than solely through paying for the food products they sell. A nature inclusive, sustainable farm can contribute to society in many more ways than how it is valued now.

CHAPTER 05
DESIGN STRATEGY

In the previous chapters, a deeper understanding of the stakeholders and context of the project challenge was created. As a conclusion, a general vision for the future of agriculture was formed at the end of chapter four. In this chapter, this vision is used to set up a framework for designing interventions for Caring Farmers. Firstly, this chapter translates the conclusions of the analysis and general future vision into a specific design vision for this project. The vision is thereafter broken down into a strategy for the organization and design challenge for the second phase of the project. The strategy is supported by a framework of design criteria and wishes concluded from the analysis. The criteria are based on the guidelines created in the previous chapter.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5.1 DESIGN VISION

Based on the mission of Caring Farmers and insights gained from the analysis of the system and stakeholders, the desired future vision and mission for Caring Farmers is formulated. The foundation of the vision is the integration of agriculture and nature and the appreciation of both by society.

VISION

Farms are sustainable agricultural systems that fulfill multiple societal services. The environmental and societal services of farms are valued and paid for by society. In these systems, farmers and consumers are connected and share the responsibility for nutritious and sustainable food production within planetary boundaries.

Farmer

Plays a vital role in food production and nature preservation and the strong link between the two elements.

Consumer

Is aware of the relation between food and their environment and can therefore make conscious consumption decisions.

Caring Farmers

Caring Farmers is a strong network (or movement) of exemplary actors that lead the way towards this vision. The network of farmers, partners and consumers shows the practical translation of the vision for agriculture in the future with the following principles as a baseline:

- people: shared ownership and responsibility for food production
- planet: integrating food production and nature
- profit: food systems that are local, diverse and thus resilient

5.2 DESIGN CHALLENGE

Since this project focuses on the enhancement of the relation between farmer and consumer, the design challenge is based on connecting these stakeholders beyond food production. The challenge is formed by the design vision with support from the conclusions from the future of the agri-food sector.

> How might we make **contributing to nature inclusive farming** more **engaging and tangible** for **environmental conscious consumers**?

- **contributing to nature inclusive farming**

The choice was made to look for a design solution that increases involvement of consumers with the practice of food production instead of the result (the food). This was done because analysis showed that food consumption is embedded in an emotional and manipulative context. The context and lack of understanding prevents consumers from making conscious decisions. It is assumed that by focussing on involving consumers with (the context) of food production, their understanding is deepened, helping them to make conscious consumption decisions in the future.

- **engaging and tangible**

Since trend research showed that consumers want their impact to be tangible, the design solution should aim to make the contribution that users have visible for them. By increasing the feeling of engagement for target users, they are assumed to be more motivated to continue with their contributions to the cause.

- **environmentally conscious consumers**

The design solution is targeted at environmentally conscious consumers. It is assumed that this group is approachable and easy to convince of the cause of Caring Farmers. Increasing their involvement will result in a feeling of ownership over the goal and can result in them spreading the movement in their own communities.

5.3 DESIGN CRITERIA

The outcome of this project should ...

Scope (what?)

- fit the vision to accelerate the transition to nature inclusive agriculture in the Netherlands.
- increase awareness among consumers of environmental services that farms can deliver.
- realize a 'call-to-action' for consumers.
- communicate environmental services (or values) that farms can have to society.
- be applicable to the Caring Farmer organization (not individual farmers)
- facilitate a way of contributing to nature inclusive farms for consumers.
- be economically viable for Caring Farmers.
- create a feeling of union and community among consumers and farmers.
- increase appreciation and understanding for farmers and new methods of farming.
- fit the brand of Caring Farmers.
- Positive voice for change, inspires others by leading the way and giving examples for change opportunities.

Actors (who)

- increase involvement of Caring Consumers with Caring Farmers organisation
- Facilitate Caring Consumers to involve other consumers to join the network.
- engage consumers with farmland and/or food production.
- aim to create empathy between farmer and consumer.
- Build the community of Caring Farmers.

Timing (when?)

- be feasible to implement in the next two years, with the first step(s) for implementation of the design to be taken in 2021.

CHAPTER 06
IDEATION

After having set out a defined design challenge and framework, different ideas were generated to find a fitting solution for the challenge. Different ideation methods were used to come up with ideas and stakeholders were involved during the ideation, this is described in paragraph 6.1. In this stage, it is important to diverge again and to let go of the boundaries from the research context to come up with new ideas. After a wide variety of ideas were generated, these were clustered into different categories to develop several design concepts. Paragraph 6.2 describes how these concepts were created and developed further.

© Caring Farmers

6.1 BRAINSTORMING APPROACH AND METHODS

APPROACH

Different brainstorm methods and tools were used to come up with a great diversity of ideas. Ideas that were generated in the research phase of the project served as a starting point. After this, different 'How might we ... ' questions were formulated (Van Boeijen, Daalhuizen & Zijlstra, 2020). The main design challenge was split into multiple questions framed to inspire new ideas. Starting a question with 'how might we ... ' suggests a range of answers and thus solutions to the question. Furthermore, an analogies ideation tool was used to inspire crossover solutions from other sectors. Innovative brands and elements from other contexts such as schools and restaurants sparked a new way of thinking about the problem (Board of innovation, 2019).

These tools were used in individual ideation sessions and in a session with young designers which were in the target group of the design challenge, assumed to be 'environmental conscious consumers'.

BRAINSTORMING

With the use of 'How might we ...' questions and analogies from other sectors and inspiring companies, ideas were generated and noted down on post-its. These ideas were plotted on a large sheet of paper to create an overview of the ideas. The use of analogies and breaking the design challenge down in smaller problems helped to break out of the context of the design challenge and come up with ideas inspired by other industries. However, the knowledge of underlying structures and problems in the sector prevents the generation of some radical and innovative ideas. Therefore, an ideation session was held with people that had little knowledge of the agri-food sector.

IDEATION SESSION

The ideation session was held with four young, environmentally conscious consumers with a background in social and/or sustainable design. These participants have a creative background making it more likely that they come up with radical or out-of-the-box ideas that they would find interesting themselves. Furthermore, the participants' little knowledge of the agri-food sector. Therefore they were less restricted by rules, regulations and conventional practice from the context of the design challenge. The session was held digitally through Zoom. The application Miro was used as a virtual whiteboard to guide the participants through the session and as a worksheet for them to put down ideas that were generated. A short description of the session is described below. Figure 6.1 displays the instruction steps of the session. The entire script for the ideation session can be found in Appendix C.

Introduction of problem context and client (10 min)

A short presentation was given to the participants about the project. The client, background and problem context were explained in short. After that, participants introduced themselves to each other and were asked to share something about their last experience on a farm. This is done to create an open environment and to let the participants get into the right context (Board of Innovation, 2019). The design challenge was introduced to the participants:
'How might we make contributing to nature inclusive farming more engaging and tangible for environmental conscious consumers'.

Warm up brainstorm (10 min)
Firstly, a classic brainstorming method was used in which participants each try to come up with as many ideas as possible for an 'How might we ... ' statement (Van Boeijen, Daalhuizen & Zijlstra, 2020). Each participant had to write down ideas on post-its for one of the statements for one minute. The template in which the participants worked was already filled with several ideas to serve as inspiration. After a minute of writing down ideas, the participants switched statements and repeated the process, building on the ideas that were already written on post-its.

Idea generation (20 min)
After the individual brainstorm, the group was split up into two teams for the second part of idea generation. In this part, the ideation mash-up from IDEO (2020) was used to facilitate new ways of looking at the problem context. The teams were provided with a worksheet in Miro, showing three rows of categories. Category A contained values of nature inclusive farming, category B contained experiences in other contexts like a museum and school, category C contained experiences from famous brands like Ikea and Nike (see figure 6.3). Participants had to combine values from category A with experiences from category B and C to come up with new and unconventional ideas. The participants worked in teams to facilitate discussion and inspiration between them.

Idea selection (20 min)
With 30 minutes of brainstorming done, many ideas had been generated on post-its. The participants were asked to pick their favourite ideas and make a top-3 out of those. Furthermore, they described one of the ideas in the concept sheet in which they were asked to elaborate on the idea's benefits and challenges. This gave insight into the design qualities that were important or attractive for the participants.

Wrap up (5 min)
To finalize the session, participants shared their favourite idea with the group. They briefly explained why they like the idea, giving insight into what elements of the ideas appeal to them to the others and facilitating a group discussion about the implementation potential for the ideas.

The images in figure 6.1 display the ideas that were generated during the analogies brainstorming of the ideation session. The images on the next page show the chosen ideas of the participants.

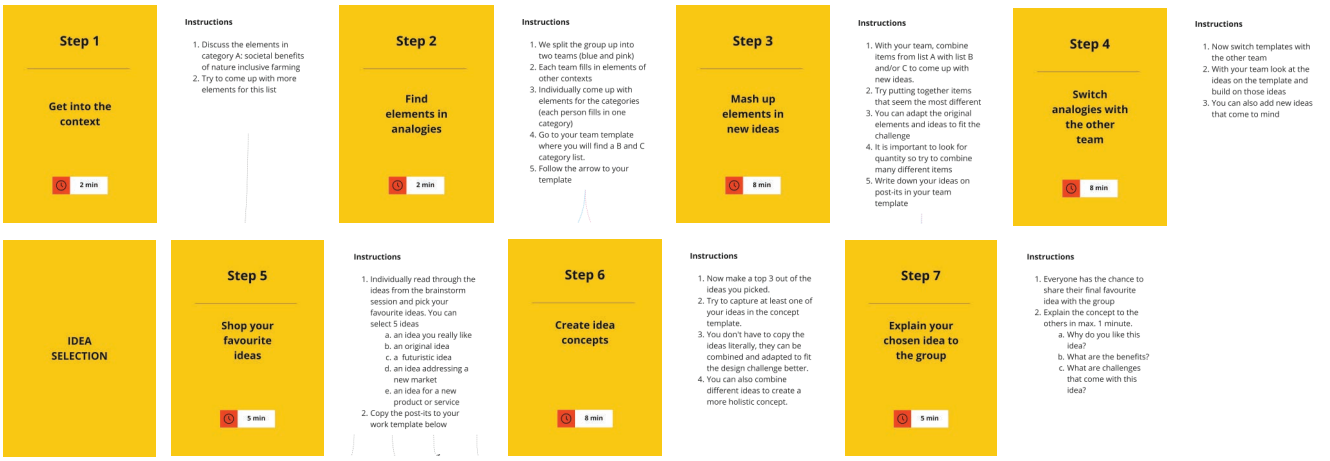


Figure 6.1: ideation session steps

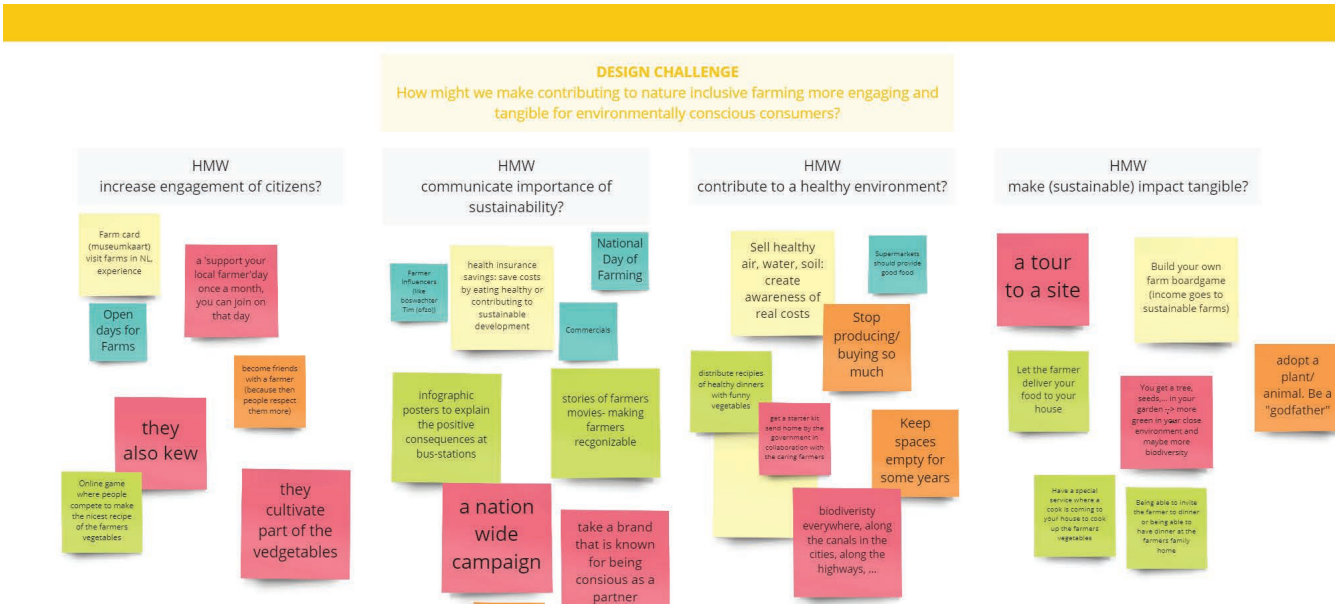


Figure 6.2: ideation session ideas

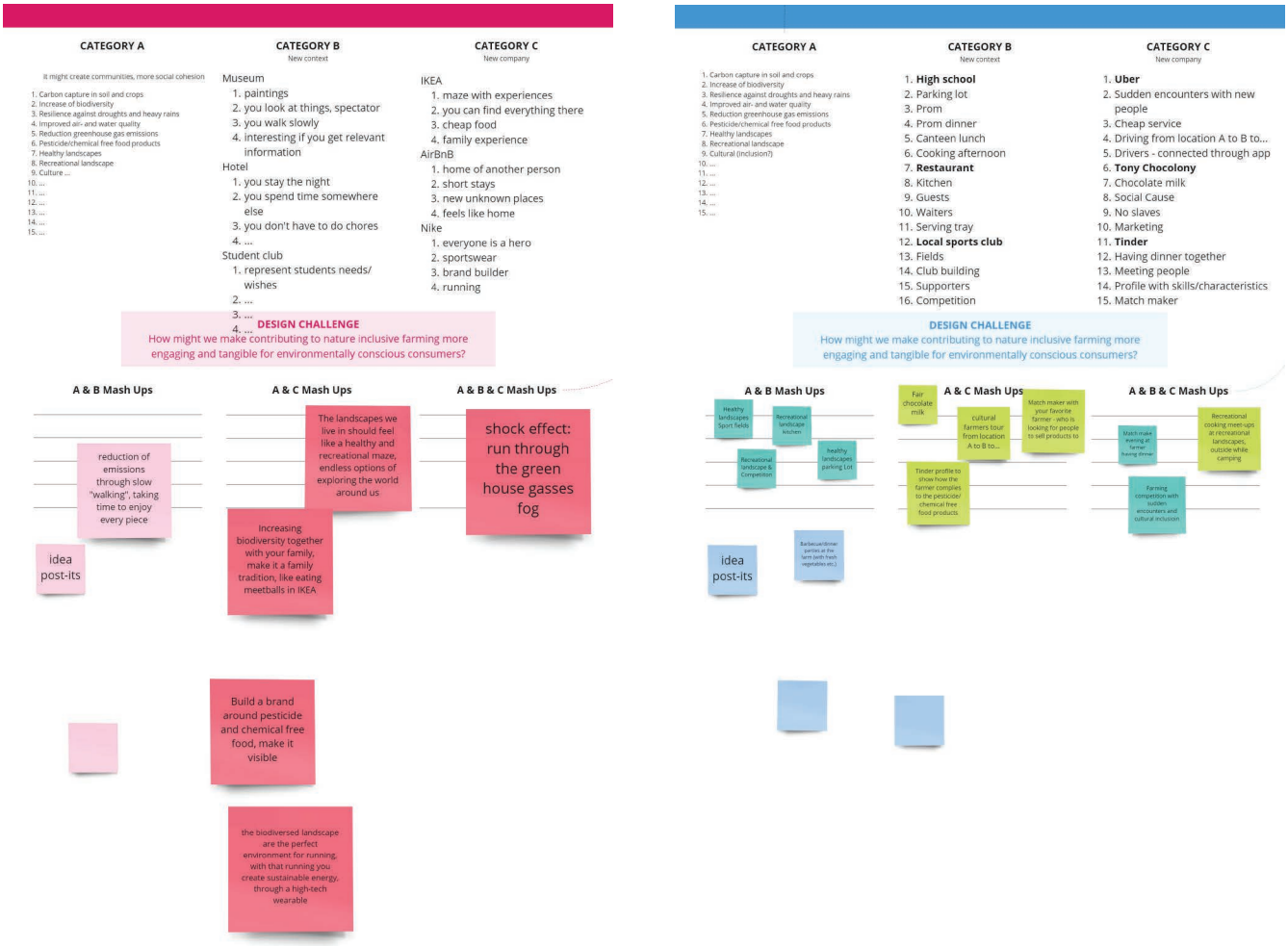
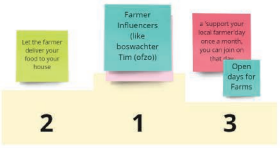


Figure 6.3: ideation mash-up worksheets

My favourite ideas

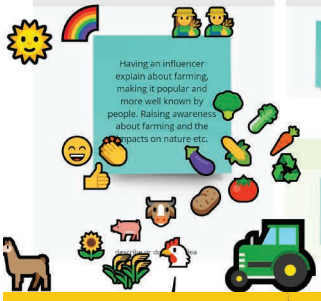
idea 1	idea 2	idea 3	idea 4	idea 5
a 'support your local farmer'day once a month, you can join on that day Open days for Farms	Farmer Influencers (like boswachter Tim (ofzo))	a nation wide campaign	biodiversity everywhere, along the canals in the cities, along the highways, ... adopt a plant/ animal. Be a 'goolfather'	Let the farmer deliver your food to your house

My top 3



Idea concept

What is the idea?



I like this idea because...

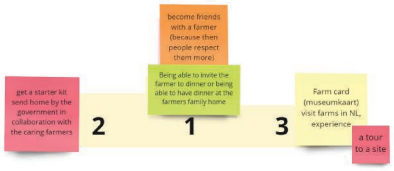
- Influences have a big appeal on the younger generations
- They can make an impact when they grow up and need food
- Older generations are harder to change

Benefits	Challenges
You only need 1 influential person to inspire a lot of people	Finding the right person, someone who appeals to a broad audience.

My favourite ideas

idea 1	idea 2	idea 3	idea 4	idea 5
a 'support your local farmer'day once a month, you can join on that day	become friends with a farmer (because then people respect them more) Being able to invite the farmer to dinner or being able to have dinner at the farmers family home	Farmer Influencers (like boswachter Tim (ofzo))	Farm card (museumkaart) visit farms in NL experience a tour to a site	get a starter kit send home by the government in collaboration with the caring farmers

My top 3



Idea concept

What is the idea?

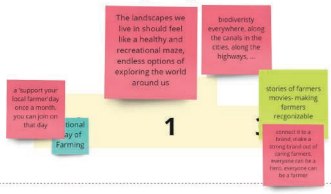
I like this idea because...

Benefits	Challenges
- this threshold to make a connection with a farmer will be much smaller when this is part of a service of a company people feel like they can participate, instead of hearing negative stories on the news	- farmers might not have a lot of time - are people willing to connect with farmers?

My favourite ideas

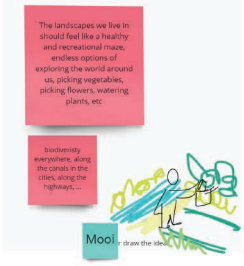
idea 1	idea 2	idea 3	idea 4	idea 5
biodiversity everywhere, along the canals in the cities, along the highways, ... The landscapes we live in should feel like a healthy and recreational maze, endless options of exploring the world around us	a 'support your local farmer'day once a month, you can join on that day tional ay of Farming	stories of farmers movies- making farmers recognizable connect it to a brand, make a strong brand out of caring farmers, everyone can be a hero, everyone can be a farmer	shock effect: run through the green house gasses fog	

My top 3



Idea concept

What is the idea?



I like this idea because...

It is something that we need, show the variety of how the world once looked like and should look like. That it becomes an adventure to live, a maze where we encounter new possibilities around every corner and sometimes maybe get lost in the possibilities. Not only make our living environment healthier but also our world.

Benefits	Challenges
biodiversity around us contributing to a healthier living environment Fresh air and green around us :D	How to sustain it? Who is responsible? What if all the birds kill what we grow?

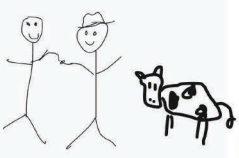
My favourite ideas

idea 1	idea 2	idea 3	idea 4	idea 5
Tinder profile to show how the farmer complies to the pesticide/ chemical free food products	health insurance savings: save costs by eating healthy or contributing to sustainable development	Let the farmer deliver your food to your house	Supermarkets should provide good food	adopt a plant/ animal. Be a 'goolfather'

My top 3

Idea concept

What is the idea?



I like this idea because...

Most people are far away from farms and the lives there (physically and mentally). Being closer to a farmer creates understanding for that life and can create appreciation for the people but also for their products.
Actually living on a farm for a day is additionally an experience for the whole family.

Benefits	Challenges
• creates understanding • can be an experience • kids will love it	• how to get people to do this if they are not interested or no fans of farmers?

6.2 FROM IDEAS TO CONCEPT

CLUSTERING IDEAS

After the individual and group ideation sessions, relevant ideas for the design challenge were mapped on a large sheet of paper. Ideas that were similar to each other or could be combined were clustered into categories (see figure 6.4). These clusters were then used to come up with three concepts directions to develop further. This was done by evaluating the ideas with the client and by using the input from the ideas that participants selected during the ideation session.

FOUR CONCEPTS

From the idea clusters, four concepts were created by combining ideas and developing these further. The input and feedback from other designers and the project client were used in an iterative process to develop the ideas into concepts. A template for the concepts was created in which the ideas, their benefits, challenges, and context are described. This was done to ensure that all concepts had a similar level of elaboration so that they could be assessed properly by stakeholders.

STAKEHOLDER FEEDBACK

In several informal interview sessions, the concepts were evaluated with different stakeholders to select one concept for further development in the project (Van Boeijen, Daalhuizen & Zijlstra, 2020). The project client, a Caring Farmer, and fellow designers provided feedback on the concept templates. Below, the feedback on the design concepts from the sessions is summarized into four points which were used in the development of the final concept which will be discussed in the next chapter.

Let consumers do the work

The design should not result in a lot of extra work for farmers. The benefits of doing extra work needs to be clear for them if you want to get them aboard. Instead, make sure that consumers are the ones that do the extra work.

Use the existing group of followers

There is a large group of consumers (+1000) that have signed up as supporters of Caring Farmers. Partner organisations can provide a larger group of followers. Their campaigns have proven that a larger group of people are motivated to support the organisation with volunteering activities. This group of followers can be utilised more in the future and help to grow the movement of the community.

Facilitate active participation

Instead of focussing on increasing the awareness of consumers, try to take it a step further by actively involving them in agriculture. Many people want to feel useful and create impact. Active participation also helps to create a feeling of ownership and thus increase engagement of consumers.

Make it personal

As described in chapter four, people want their contribution to a cause to be personal. Instead of an anonymous donation, the person's contribution should be personal so that they can see their own impact.

REFLECTION ON DEVELOPING THE FINAL CONCEPT

The ideation methods that were used resulted in a great variety of ideas, so a broad spectrum of potential solutions was explored. This was because consumers, designers, and the project client were involved in the ideation phase who all had a different point of view. The ideas of consumers and designers focused mostly on creating an experience for consumers on the farm. The solutions from Caring Farmers were more practical and fitted in the existing context. An example was the idea of a national Caring Farmer webshop or certification. This variety made it difficult to compare the ideas and decide which ones to develop into concepts. Since the design challenge was abstract, many ideas were suited in some way to this challenge. The design criteria provided some guidance but also left a large space were different ideas fitted. With the perspective of different stakeholders and the complexity of the problem, it was difficult to translate the vision and scattered ideas into one final concept. The multilevel perspective model that was also used in the first phase of the project helped to structure the ideas in relation to how abstract they were. This framework was needed to fit the short- and long-term ideas into one roadmap that works towards the vision of Caring Farmers. In the end, a final concept was developed that included and combined multiple ideas into a strategic roadmap.

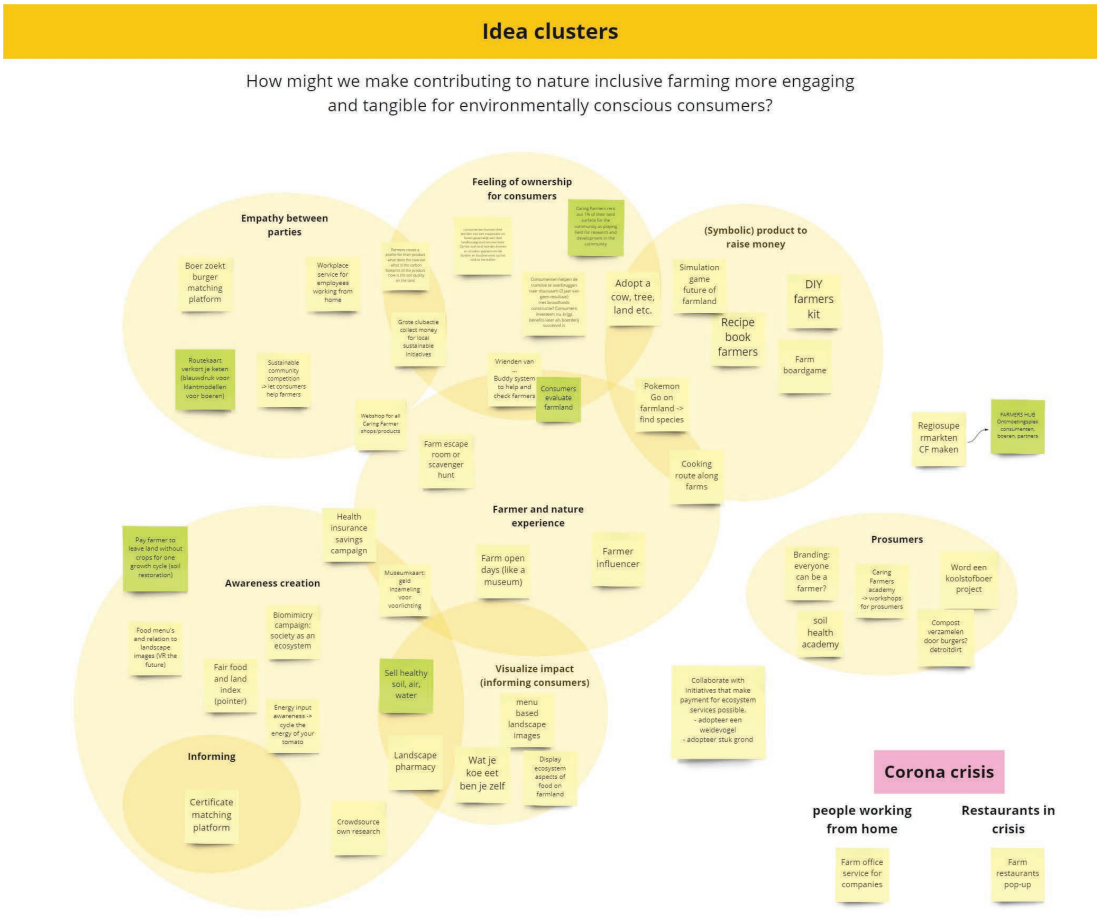


Figure 6.4: Idea clusters

CHAPTER 07
FINAL CONCEPT

From the four concepts that were described in chapter six, a final design concept derived by combining elements from these concepts. This was done with feedback from the stakeholders and by using the framework of design criteria described in chapter five. The result is a design roadmap for the engagement of citizens with agriculture. The roadmap is first discussed in general after which the three horizons will be discussed more elaborately. The chapter finalizes with advice for implementation of the designs in the roadmap.

7.1 SYSTEMIC DESIGN ROADMAP

APPROACH

For the final design, a strategic roadmap for the engagement of citizens in agriculture and food production was developed to create value for citizens of ecosystem services of farmland. The goal of the roadmap is to envision how agriculture can be embedded more in society, in line with the vision 'Re-rooting the Dutch food system' that was discussed earlier in this report. The strategy to work towards this goal is based on increasing the engagement of citizens by involving them with monitoring the transition of the sector. The steps in the strategy are visualised in a roadmap with three horizons. The three horizons serve as steps for the implementation of this vision and strategy (Simonse, 2017).

The design roadmap is integrated with the theory of the multilevel perspective that was also used in the analysis of this report. The MLP overview (described in chapter two) of niche developments in relation to the dominant regime displays how small changes can influence the existing landscape. The multilevel design model (Joore & Brezet, 2014) focuses on the application of design within societal transitions. The model describes different context levels for which a design can be made (see figure 7.1). The distinction of these levels helps to define how the development of new products or services (the product service level) fit into developments on a societal level. The model serves as a framework for designing solutions in the transition landscape. The horizons in the roadmap are linked to the levels in this model. It was chosen to include a timeframe for the horizon roadmap as is customary for design roadmaps. However, the dates of the horizons serve more as an indication. They illustrate a starting point and time-structured strategy to work towards the vision.

INVOLVING CITIZENS IN AGRICULTURE BY MAKING THE LAND ACCESSIBLE

The design roadmap focuses on increasing the involvement of citizens with farmland and food production. This fits the vision that was discussed earlier in the report where agriculture will be integrated in society and fulfill multiple societal services in the future landscape. Trend research shows that the involvement of citizens on farms is growing, with new initiatives that serve different target groups. This concept aims to make agriculture accessible for a larger group of citizens and engage them with the food-production ecosystem. By involving citizens with monitoring ecosystem services on the farms, the societal values that they deliver become clear. Eventually, a societal system can be created where biodiversity preservation, carbon sequestration and other ecosystem services are valued intrinsically and financially.

Horizon 1 - product service system

The first horizon is a product-service design that makes farmland more accessible for citizens. This is done by creating an experience on the farm through a digital platform. Through an application, citizens are invited to visit farms to learn about sustainable agriculture in a playful way.

Horizon 2 - socio-technical system

In the second horizon, the service is expanded with more functionalities to increase the engagement of citizens on the farms. Visitors can help farmers to monitor the environmental impact of farms through citizen data collection projects. This data can be combined with scientific research projects about the effects of sustainable agriculture on the environment and society. By collecting data on a large scale and collaborating with research institutes, a socio-technical system is established. This system monitors the transition towards nature inclusive agriculture and helps to prove and quantify the environmental and societal values of nature inclusive farming methods.

Horizon 3 - societal system

The data that is collected in horizon 2 can trigger changes in policies and help to convince investors. In this horizon, policy is adapted to make sustainable agriculture the established form of farming. In this societal system, the movement of Caring Farmers and engaged consumers inspire other farmers to join the transition too. In this vision, consumers are involved with farms in different ways. For example, as part of a local food system, as a monitoring agent for the environment or simply by visiting a farm in their area occasionally. Agriculture delivers a set of environmental services for society that are valued and monitored by society. Agro-ecosystems are recognised to help fight climate change through carbon capture and biodiversity restoration.

These horizons are summarized in a visual roadmap on the next page.

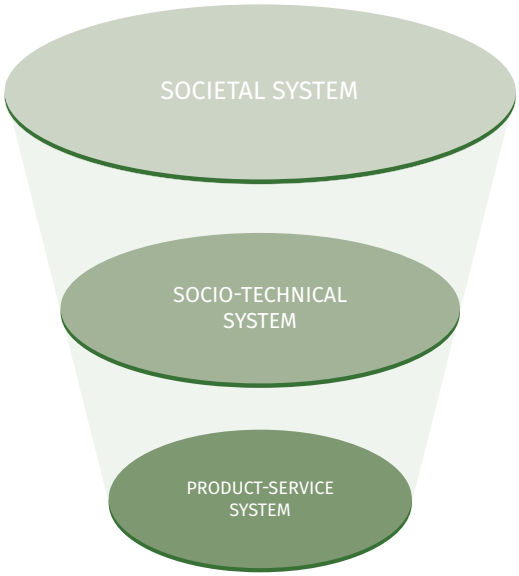


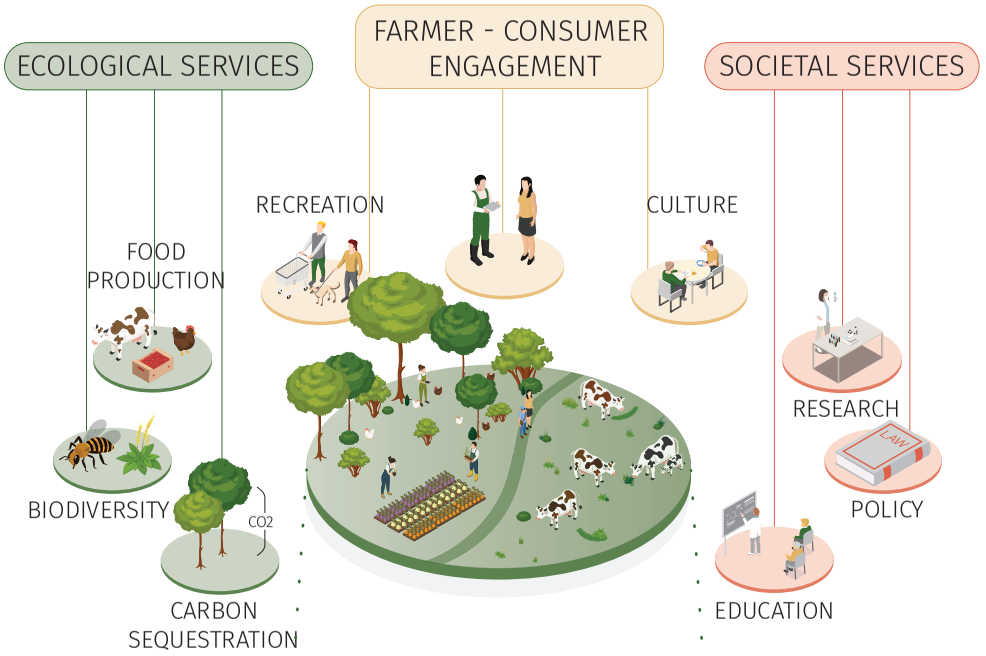
Figure 7.1: The Multilevel Model design (adapted from Joore & Brezet (2015))

Caring Farmers community sets an example for sustainable inclusive food systems of the future

HORIZON 3

SOCIETAL SYSTEM

Sustainable food production is embedded in and valued by society.



HORIZON 2

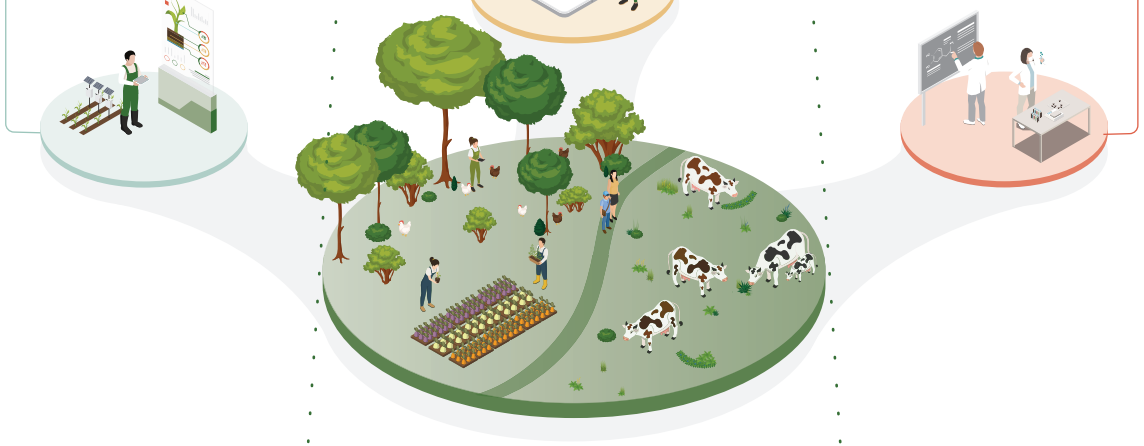
INVOLVEMENT THROUGH CITIZEN DATA COLLECTION

MONITORING IMPACT OF SUSTAINABLE FARMING

RESEARCH EFFECTS OF FARMING METHODS

SOCIO-TECHNICAL SYSTEM

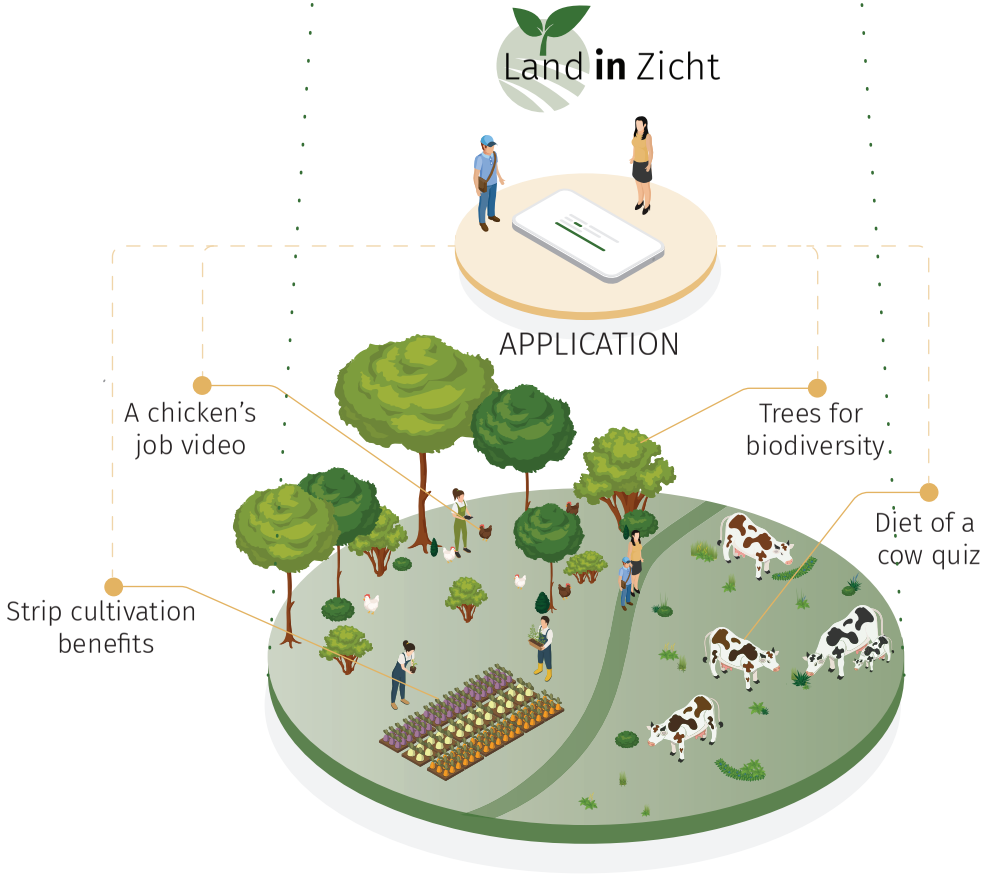
Caring Community works together to make farmland more sustainable.



HORIZON 1

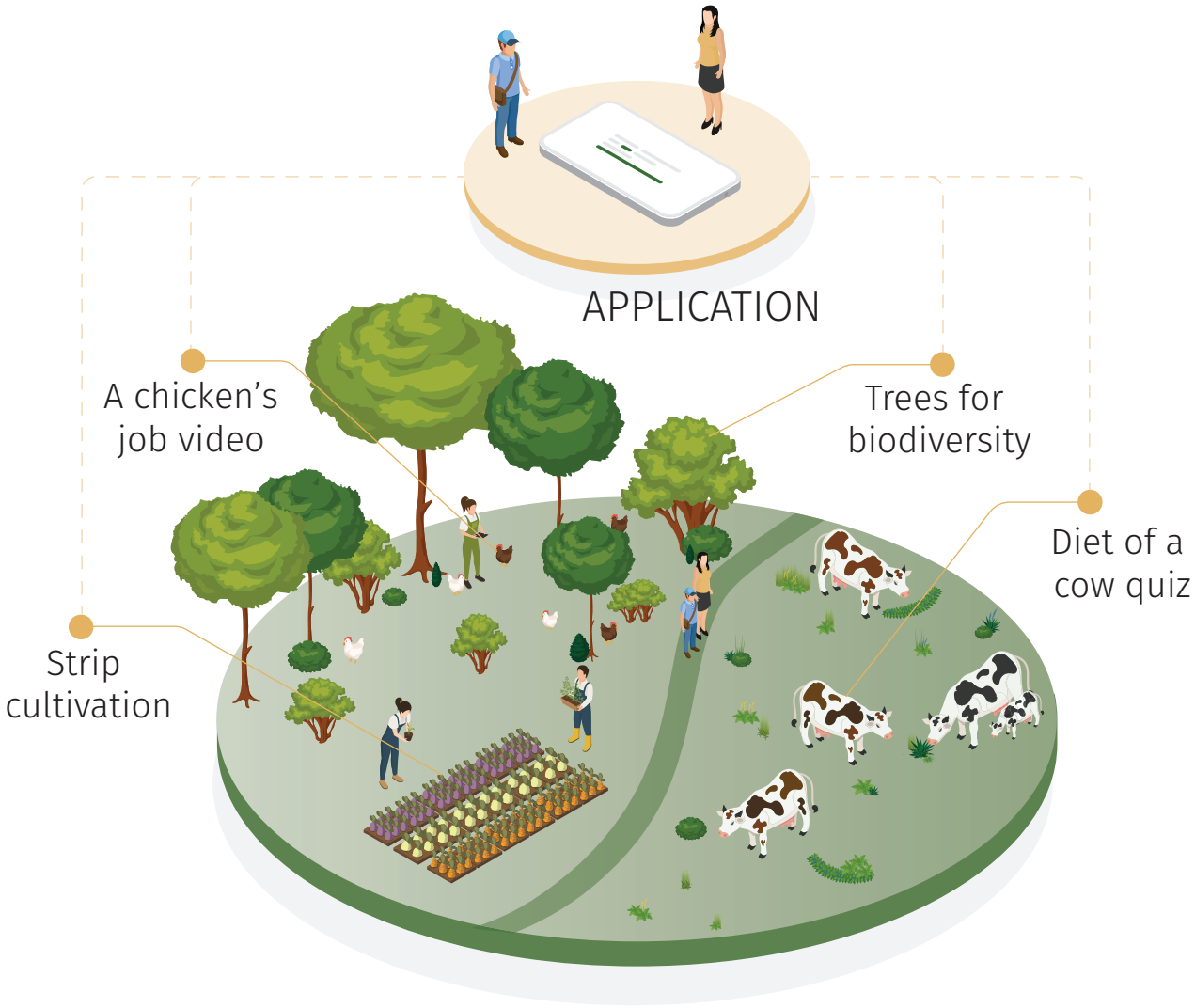
PRODUCT-SERVICE SYSTEM

Citizens learn about sustainable agriculture through App ‘Land in Zicht’.



HORIZON 1

Caring Farms are accessible for consumers to visit and learn about food production of the future.



PRODUCT-SERVICE SYSTEM

The application 'Land In Zicht' makes farms accessible for citizens to visit and experience. 'Land In Zicht' invites citizens to visit Caring Farms to learn about sustainable and nature inclusive agriculture. A museum-like experience is created to increase the involvement of citizens on farms. It makes the countryside more visible for citizens and facilitates the first contact between farmer and consumer.

The app focuses on the three themes of Caring Farmers: animal welfare, nature & biodiversity, and short chains. Visitors are introduced to nature inclusive farming through these themes, for example by learning how biological farming contributes to animal welfare and biodiversity. Each theme has several tags with matching colours to indicate to which theme a certain tag supports.

In the app, it is shown how the farmer is working on animal welfare, nature & biodiversity, and short chains. By clicking on one of the themes, an overview is displayed of the theme (see figure 7.2c). Information is provided on how the farm is working on the theme 'Nature & biodiversity' and the visitor can learn about the impact of measurements like biological production and constructing hedgerows. Furthermore, the ambition of the company to increase their impact is shown. This is in line with the 'Caring Farmers code' that farmers dedicated to, which describes that they will work on making their farm more nature inclusive each year. It serves as a sign of transparency and openness.

Embedding the landscape with information
Citizens are invited to visit farms to learn about sustainable agriculture. They can search for farms in their area or look for farms that are working on one of the themes of Caring Farmers (see figure 7.2b). The farms are equipped as a museum with walking routes, informational signs, and activities for the visitors. The experience makes agriculture visible for citizens and involves them with the transition of agriculture towards sustainability.

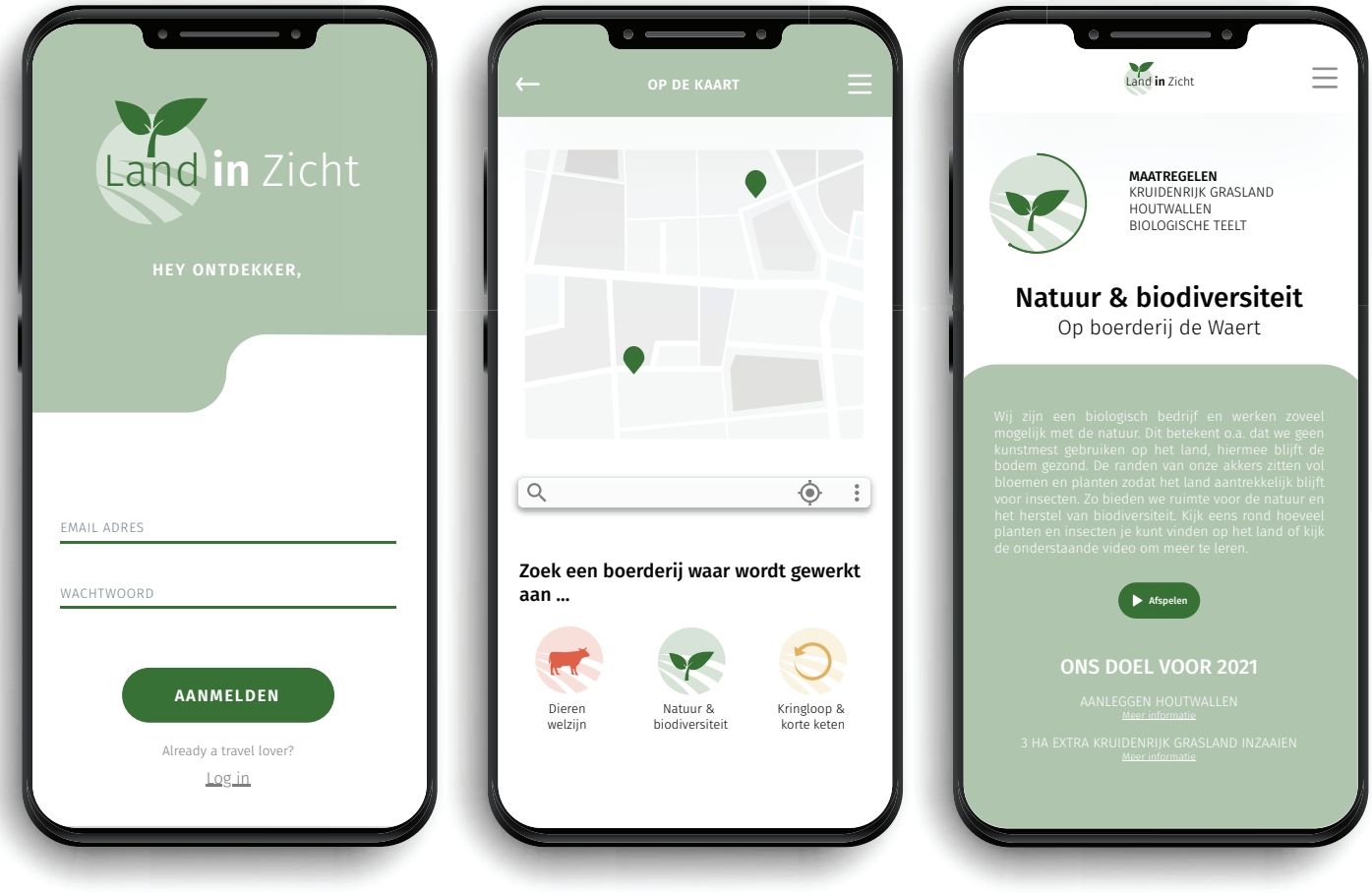


Figure 7.2a,b,c: Screens for the application 'Land In Zicht'

Educational signs linked to the app

On the farm, signs are placed along routes with QR-codes. Visitors can scan the QR-code to see a video or quiz which provides them with information about the background of food production and the challenges and benefits of sustainable agriculture. Visitors learn about agriculture in a playful manner. The app enhances the visit by providing information.

Seeing and learning more about sustainable agriculture

In the app, users can find general profiles of the Caring Farms that can be visited. When visiting the farm, they can receive more information by scanning the signs they find on the field. The contribution of certain animals and plants to the ecosystem is highlighted. Furthermore, users learn about new and unconventional farming methods and why these contribute to ecosystem services like preserving biodiversity and improving the water- and air quality in the area. Users are introduced to new concepts like food forests and herb rich grasslands and have the opportunity to see and experience them. The information is made attractive and accessible, with a focus on differentiating Caring Farms from conventional farms. For example by showing that chickens are not held in a traditional cage but are moved around the farm so that they can be fed from natural resources and help to improve the soil. Visitors are encouraged to look at natural elements and the state of biodiversity on the land. The app helps them to understand how plants, animals and their measurements contribute to a healthy ecosystem and recreational environment.

BIODIVERSITY AND SOIL HEALTH ON MEADOWS

A nature inclusive meadow looks different from conventional meadows because many different species of grasses and herbs are grown on the land. Along a walking path, visitors are triggered to notice this with a sign that aims to spark their curiousity (see figure 7.3). The sign links to the app, where the benefits of this type of meadow are explained to the visitor. Different species are highlighted and the impact of the meadow on them is displayed.

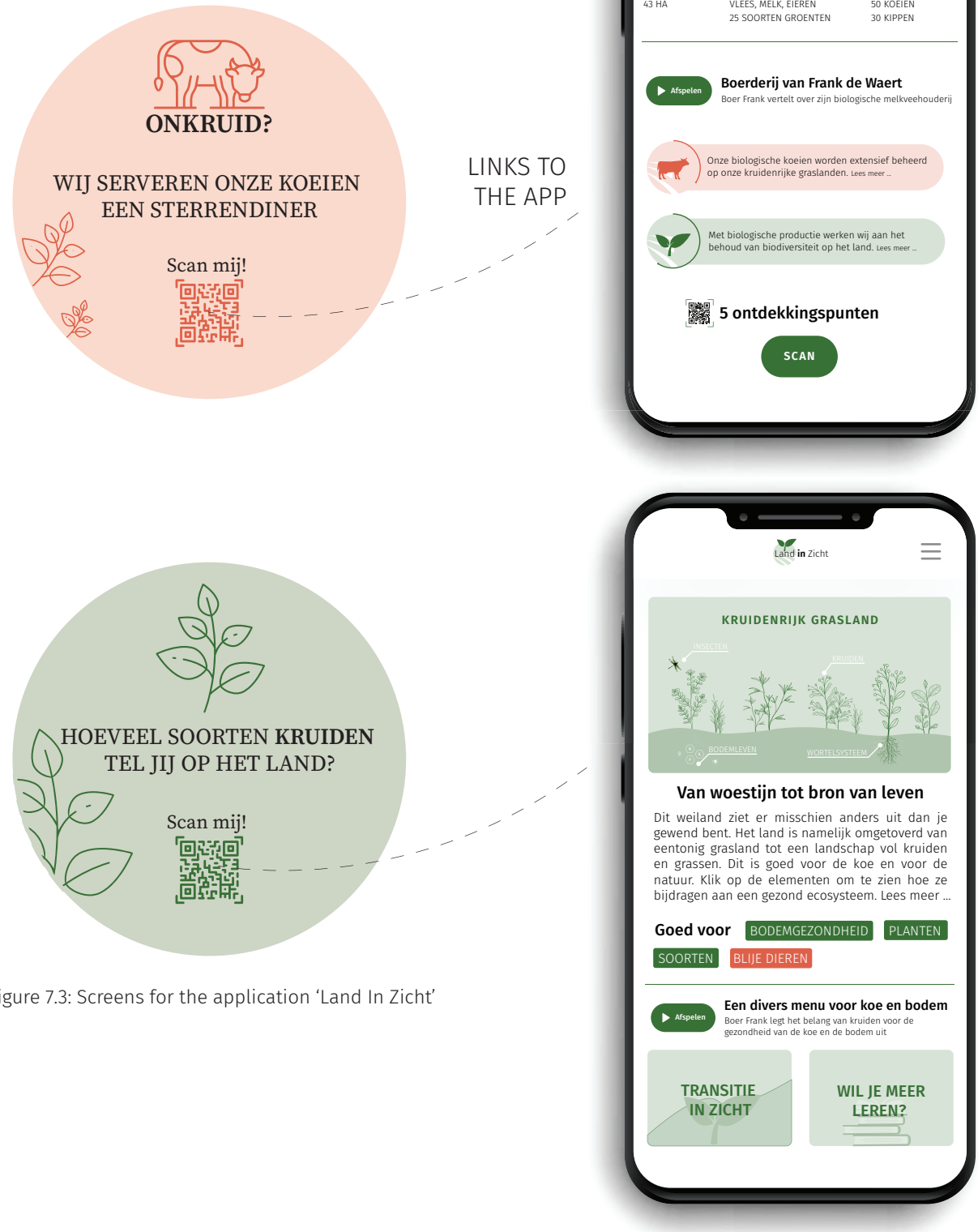


Figure 7.3: Screens for the application ‘Land In Zicht’

A SERVICE FOR CARING FARMERS

Differentiate from conventional farmers

'Land In Zicht' is an educational experience for citizens and a service for Caring Farmers who want to share their story and innovative practices. They differentiate themselves and can display how from conventional farms. This is done not only by showing their progressive farming methods, but also by their open and transparent character in general. 'Land In Zicht' facilitates this for farmers, see figure 7.4. By opening up the farm for visitors, they demonstrate that their business is transparent and consequently trustworthy. It can help to tackle the polarisation between farmers and citizens and create more empathy. In contrast to many traditional farmers who feel misunderstood and as a result display their frustration in farmer protests. The attitude of such farmers is often: 'You have no idea what we do on our farm and how useful we are, you should appreciate us more'. 'Land In Zicht' helps progressive farmers to present a different attitude towards society.

Facilitate contact between farmer and consumer

The design attracts more people to the countryside by creating an experience around it. The link to the app provides citizens with more information of what they see on the farm. This enriches their visit without demanding time from the farmer. It saves time for farmers in sharing their story with citizens while still attracting people to the farm. The visits facilitate the first contact between farmer and consumer, growing empathy between the two actors. It can grow the direct customer base for the farmer and create more support for their farming methods and organic products. Furthermore, it grows the understanding of the context of food production and the impact it has on the environment.

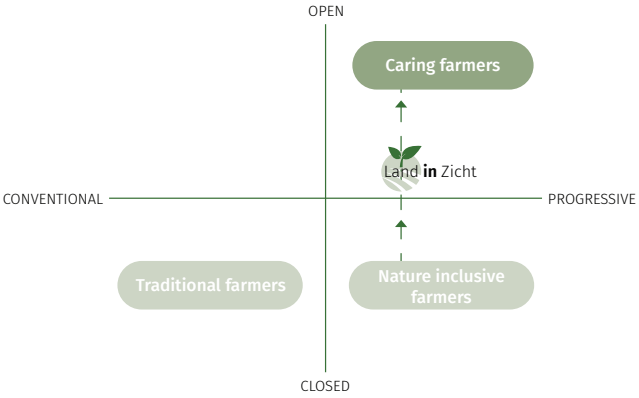


Figure 7.4: Positioning of Caring Farmers in relation to other farmers

The product is adapted to the farm

Currently, many Caring Farmers already attract visitors to their farms (especially in lockdown periods). This demands a lot of time from them without much direct reward. The concept is offered as a time saving service for farmers to attract more people to their farm. Farmers should not feel obliged to open their farm for visitors but have intrinsic motivation to do so, the concept serves them in reaching this goal. The information and involvement can be adapted to the needs of the farmer. They can determine how extensive they want the knowledge to be and where people can walk on the farm.

The farmer can choose how they want to involve visitors on their company:

- Make the farm visible with a general profile of the farm and sign at the entrance of their company.
- Farm tour: visitors can follow a walking track through the farm. Several signs are placed on the track, linked to the app. Visitors learn about their nature inclusive farming methods
- Farm experience: visitors can walk through and experience the farm interactively with the application and by doing activities on the farm. This is the focus of the second horizon of the design.

Target users of the app

The target group of the design are environmental conscious consumers, these people are interested in development of the agri-food system. The contribution of the agri-food sector to climate change is becoming an increasingly popular topic. Many documentaries and news articles discuss the transition and opportunities of nature inclusive agriculture to fight climate change. 'Land In Zicht' offers these people the opportunity to experience the implementation of sustainable agriculture in practice and learn about it in the process. It makes the concept of nature inclusive farming more tangible for people and taps into the trends discussed in chapter four.

Figure 7.5 displays a persona of the target user for 'Land In Zicht', the persona represents an archetypical representation of the target user for the design concept (Pruitt & Adlin, 2006). The app aims to inform and educate parents while providing a playful experience for kids, making them more aware of the landscape and plants within as well.

The existing followers of Caring Farmers consists of approximately 1000 consumers. Furthermore, volunteers from campaigns that the organisation helped to organise result in about 1500 more followers. These can be targeted when the concept is introduced. Word of mouth promotion can help to grow the group of followers for Caring Farmers and users of the app. After that, a wider target audience can be approached through different promotion campaigns.

Figure 7.5: Persona of the target user for Land In Zicht

Laura van Beek

39 YEARS OLD
TWO KIDS (9 AND 11 YEARS OLD)
WORKS 32 HOURS
FLEXITARIAN

ABOUT LAURA

Laura considers herself an **environmentally conscious consumer.** She saves energy in her household and recently installed **solar panels** on the roof. Laura is a **flexitarian** because she wants to reduce her climate impact. After seeing the documentary Kiss the Ground, she realized the impact of the agri-food sector is bigger than she realized and now she **occasionally buys products with certifications** like 'Beter leven' and 'Biologisch'.

Promotion campaigns for sustainable farming linked to ecosystem services

With different campaigns, projects and activities, followers are encouraged to visit the farms in their area and to introduce the concept in their own communities.

Throughout the year, citizens are stimulated with campaigns to visit the farms. The campaigns play into societal events to increase the awareness of the topic and its importance. In figure 7.6, a calendar is displayed with suggestions for several campaigns. By creating content that links these events to sustainable farming, the target audience can be spread, and new target groups could be reached.

In the campaigns, news items or events should be linked to sustainable agriculture and highlight the ecosystem services that are involved. The items should have a positive voice and show the benefits that farming can have on the ecosystem.

Figure 7.6: Promotion calendar for application Land In Zicht

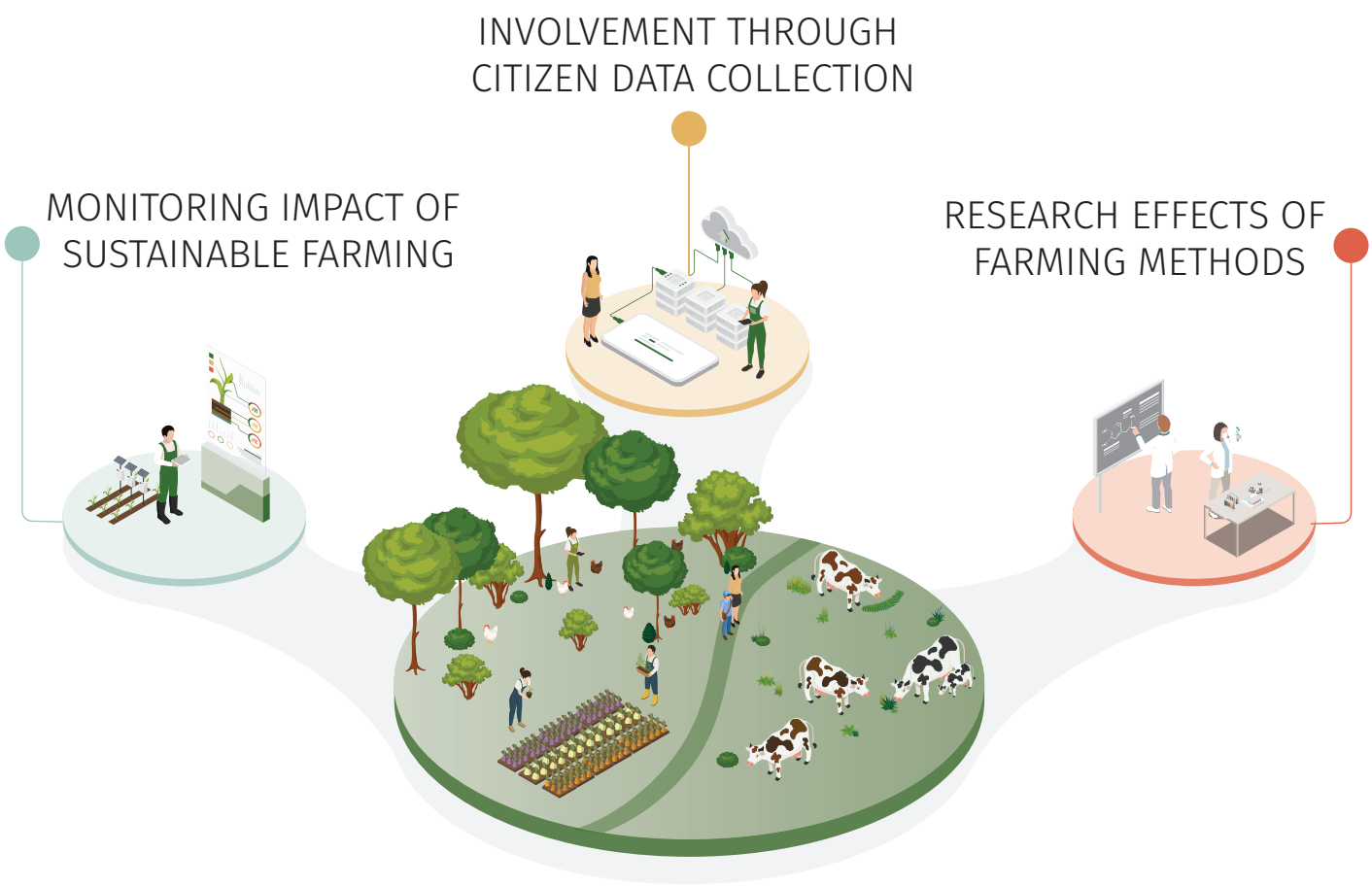
Postcard campaign

Next to the suggested promotions and campaigns to attract visitors to the farm and increase awareness, the community can be encouraged to promote 'Land In Zicht' among their friends and families. This is done with the postcard campaign. Users who visit a farm receive a postcard to send to someone who they would like to inspire about the transition of the agri-food sector, or simply to visit a farm in their area. The postcard in figure 7.7 sparks curiosity to explore the surroundings with 'Land In Zicht'. The recipient of the card can scan the QR-code to find farms in the area.

Figure 7.7: Postcard to promote the application Land in Zicht

HORIZON 2

Increase the engagement of consumers on farms by including citizens in monitoring the transition of the farm landscape.



SOCIO-TECHNICAL SYSTEM

The community of Caring Farmers works together to make farmland more sustainable. The accessible farm experience of the first horizon is embedded in a socio-technical system that aims to accelerate the transition towards nature inclusive farming. This is done by monitoring the impact of sustainable farming on the environment. The engagement of consumers on farms is increased by including citizens in monitoring the transition of the farm landscape through citizen data collection projects.

Farmer - Monitoring impact of sustainable farming
Citizen - Involvement through citizen data collection
Society - Research effects of sustainable farming

The relevance of monitoring

For Caring Farmers to be a key player in the systemic transition of the agriculture sector, it is important to understand the current state and to formalize goals that are concrete. Tangible goals and impact promote involvement of people in the community because it helps them to emphasize with the goal and the community. Moreover, making the goals tangible creates value. By monitoring for example, the state of biodiversity on a farm, farms can be compared to each other and compared over an extended period of time. By seeing the progress of biodiversity, the impact, and thus value, can be quantified. In a monitoring socio-technical system, Caring Farmers makes the impact of activities of the community tangible by setting indicators for change. These indicators are measured and monitored by people in the community and through collaboration with other organisations and research institutes. Collecting data to monitor farmland can be done with a wide range of indicators. Together these indicators form a picture of the state of biodiversity, soil health and environmental effects of the land.

Different monitoring and data collection methods were explored for the project, an analysis of this can be found in Appendix F. Since this project focuses on the engagement of citizens on farmland, the primary focus is on data collection methods that are accessible for citizens to participate in. It helps to build empathy among citizens and is combined with more scientific methods for data collection by collaborating with research institutes. Together, these can create a convincing argument for the adoption of sustainable farming practices. A combination must be found in citizen data collection methods, supported by scientific research.

Benefits for farmers

Farmers gain a deeper understanding of the effects of sustainable farming practices on their land. By seeing the progress of the ecosystem on and around their farm, they gain insight into what works (and what does not) in making their land more nature inclusive. By adopting more sustainable farming methods, farmers often trade higher production volumes for lowering the cost price of production. Unnatural proceedings like tilling and spreading fertilizers are reduced to allow natural elements to develop. This reduces the costs for the farmer. For example, cows can be fed with grasses and herbs grown on the land, instead of having to buy food. So, it is important to monitor the health of the natural ecosystem for the farmer. It increases the farmer's knowledge on the interactions and indicators for biodiversity and soil quality which are also directly related to his production and income.

Benefits of involving citizens in research

In the socio-technical system, data is collected by citizens and farmers that support research on the effects of sustainable agriculture. Through collaboration with research institutes and nature conservation organisations, a community is built that aims to prove the values of sustainable agriculture in society. Citizens feel more engaged because they play an important role in monitoring the transition with the data they collect. Not only does this contribute to the transition as a whole, it creates a connection between the citizens and the farm that they help to monitor. Furthermore, active participation in the transition of the landscape deepens the understanding of citizens about the interaction and effects in agro-ecosystems (Buijs et al., 2019). Another benefit of involving citizens with data collection is that much more data can be gained in different places with lower costs because data is

gathered by volunteers. In chapter eight, the participation of citizens in monitoring the ecosystem is discussed further.

Monitoring biodiversity

Increasing biodiversity is an important goal of nature inclusive farming. Monocultures and chemicals that are common in industrial farming have killed many species and reduced the biodiversity of the landscape. Nature inclusive farming tries to restore this by reducing the use of chemicals and providing space for natural elements to grow. Many different methodologies exist for measuring biodiversity, most of these methods focus on counting the number of species present in a certain area. Counting birds, insects, and plants are quite accessible activities. They are easy to perform with instruction and help educate the data collector about biodiversity. Actively searching for different species makes a person look differently at the landscape and possibly increase their appreciation for a diverse landscape. Research on biodiversity benefits from many people participating in the data collection activities.

Monitoring soil quality

Healthy soil contains a wide variety of nutrients that enable crops to grow without the need of external inputs such as chemical fertilizers. It therefore ensures that agriculture can be practised continuously over the years. Moreover, healthy soil captures carbon and other elements from the air and transforms these into nutrients for plants. Healthy soil is essential for life to grow on but unfortunately, it is still quite uncommon for farmers to research their soil and use its health as an indicator for their farming practices. The fertility and health of the soil can be measured with different indicators, varying in the difficulty of measuring methods.

Figure 7.8: App screens with data collection activities.

IMPLEMENTATION OF THE SOCIO-TECHNICAL SYSTEM

In this horizon, a socio-technical system is established consisting of three elements. The implementation for the three pillars will now be discussed.

CITIZENS: THE PLATFORM IS EXPANDED WITH ACTIVITIES FOR CONSUMERS.

'Land In Zicht' is expanded with data collection activities and projects. When visiting a farm, the user is now encouraged to count species or upload pictures of the landscape to track the development of the landscape (see figure 7.8). It enhances the experience for visitors and lets them assist the farmer in their sustainable transition. The data collection consists of continuous collection activities and recurring monitoring projects.

Technological developments help to make data gathering easier and more reliable, even when performed by inexperienced people (Dehnen-Schmutz et al., 2016) . Cameras and GPS are useful tools on smartphones that can be utilized in the platform. Taking pictures of species that are counted enables other people to verify the data. Using GPS tracking enables data gatherers to repeatedly collect data on the same location over several years.

Continuous monitoring of grasslands

A continuous citizen data collection project is monitoring the amount and variety of plant species on grasslands. Nature inclusive farmers try to create herb rich grasslands for their cattle since it improves their health. Next to that, the different herbs also improve the biodiversity of the landscape and the quality of the soil.

The app enables visitors to count the herbs and grasses on the farm and save this data for the farmer. They can also take pictures of the colourful landscape and upload these on the app. By providing the visitor with background information about the herbs and the impact on the soil health and biodiversity, the visitor actively learns about interactions and elements in the ecosystem. They are encouraged to look differently at the landscape by paying attention to the number of species they can distinguish. It helps to increase understanding and appreciation for biodiversity.

Yearly citizen soil tests

Next to continuous data collection, yearly projects can be done to increase the community engagement. This is suitable to monitor indicators that should be measured repeatedly. For example, soil tests are reliable when performed on the same piece each year. The 'Bodem In Zicht' day is held each year on as many Caring Farms as possible. Measurement locations can be tagged with GPS technology and volunteers are invited to dig up a piece of land to analyse.

An easy method that indicates fertility of the soil is the variety and number of worms present in the soil. Worms need nutrients to survive, they create air holes needed for roots to grow and spread the organic matter within the soil (Lima & Brussaard, 2010). This can be measured by digging up a square of 20 by 20 cm of soil from a piece of land. The worms present in the soil can be counted and the information stored on the platform. By regularly performing these measurements, development of the number of worms present in the soil can indicate its quality. This methodology is not scientifically proven, but it helps farmers and citizens to increase their understanding and can be combined with more scientific methodologies for measuring the soil. In the end, it is about the activity of monitoring and not so much the (scientific) result.

FARMERS: CARING FARMERS MEASURES AND MONITORS IMPACT

Basic information and data from the farms is available online, like the type and size of the farm. Caring Farmers provides opportunities for data collection about biodiversity and soil health for the farms. Farmers can join the monitoring projects to receive insight in the development of biodiversity on their farm. The motivation for farmers must derive from curiosity and interest in the indicators. It should help them to gain insight into the state of biodiversity on their land in comparison to average statistics in the country. It must be avoided that farmers assume a strong feeling of judgement over the numbers.

The system offers farmers the opportunity to formulate their own agricultural research questions related to nature inclusive farming. Within the community, different citizen science projects can then be set up. Besides the focus on biodiversity, a farmer might be interested in gaining more insight about pests on his land and natural pest-management. A project could then be set up to take pictures and identify crops that are damaged by pests in the environment, a similar project has been developed in Australia (DAFWA, 2020). Farmers should be made aware of the advantages that result from opening their land to a larger audience. More eyes and ears are available to observe the changes in the environment.

Collaborative impact

The impact of the entire community is displayed on the platform 'Land In Zicht' to show the growth of the movement, see figure 7.9. Displaying the impact in numbers sends a powerful message to other stakeholders. Moreover, displaying the impact collaboratively prevents individual farmers from feeling like they are being controlled.

Figure 7.9: App screens display the collaborative impact of Caring Farmers

SOCIETY: RESEARCH IN COLLABORATION WITH INSTITUTES

The primary focus of the monitoring system is to increase the engagement of citizens and to assist farmers in the challenges they face when adopting nature inclusive farming methods. However, scientific research can complement the system by generating more academic proof of the effects that these farms have on ecosystem services. This is an essential step to reach the vision of Horizon 3.

Several research institutes are interesting to consider for this collaboration, these are discussed in the implementation roadmap at the end of this chapter. The research agenda will focus on identifying and quantifying the

ecosystem services that farms can deliver to society. Furthermore, they support the citizen science projects by verifying the data that is collected and translating this data into scientific conclusions.

Embedded in society
In the future vision, consumers are highly involved with food-production. Different local food systems serve the needs of citizens. Highly involved prosumers are part of a cooperative farm. Engaged consumers regularly visit farms in their area to shop for special products, have a farm-dinner or help with harvesting crops. Citizens can spend their Sunday afternoon on a farm like they would in a park or museum. With many activities to do such as planting trees, counting animal species or just walking around and enjoying the scenic view.

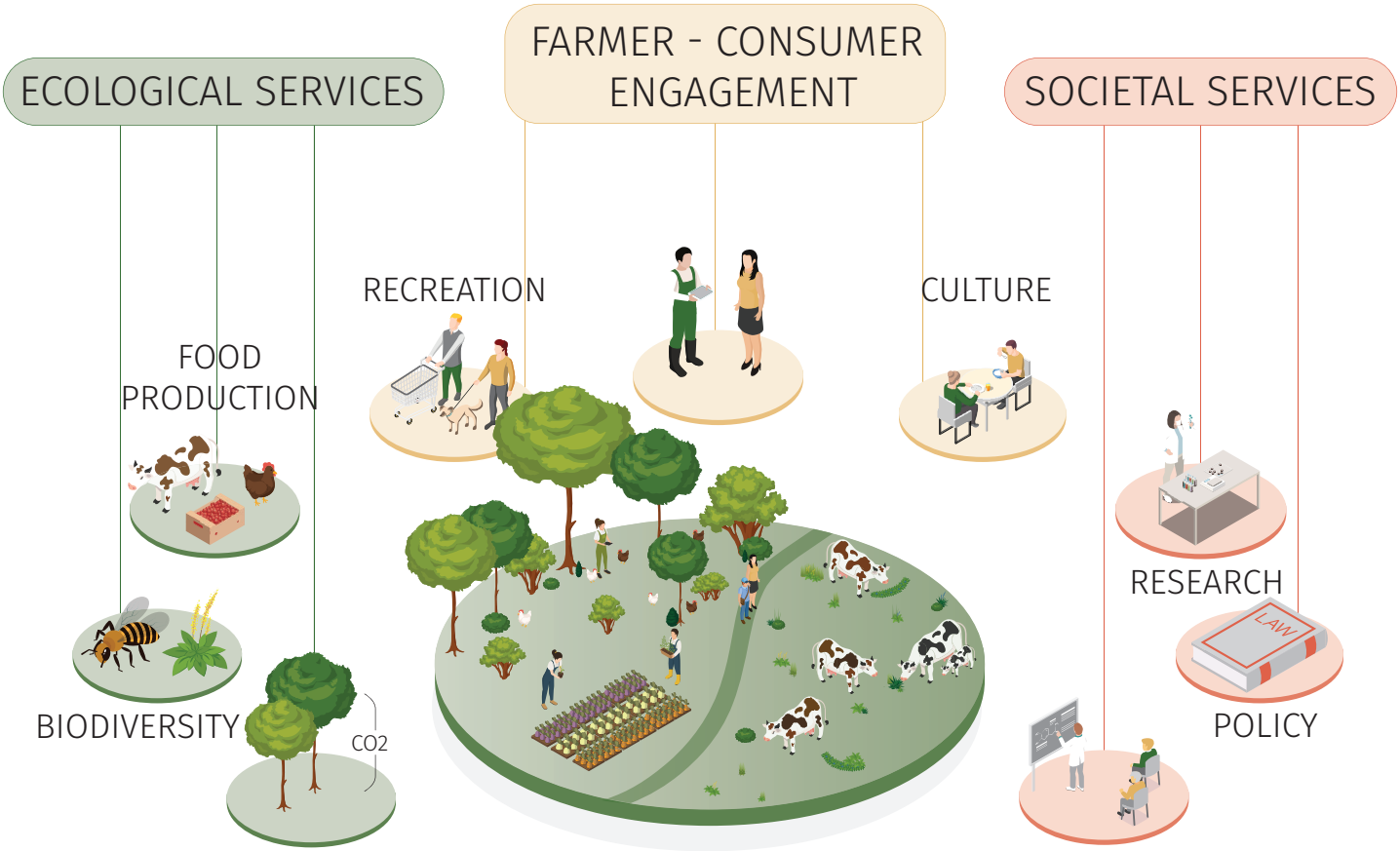
Value for ecosystem services on farmland
The impact of nature inclusive farming practices on biodiversity, soil health and other ecosystem elements is monitored. Results from citizen data collection and scientific research give insight into the effects on sustainability. This helps to prove and potentially quantify the values that nature inclusive farming has on the environment and thus society. Recognizing this value means that a way can be found to compensate farmers for delivering these values to society.

Farms deliver multiple services and values
Nature inclusive farmers are part of the Caring Farmers community. They continuously take steps to make their farms more sustainable by reducing environmental impact and providing space for natural elements to flourish. The farms produce food for both local food systems and the global market. The local food system involves consumers in food-production and creates a direct relation between farmer and consumer. Next to food production, farms deliver ecosystem services such as carbon sequestration and biodiversity preservation for society. Part of their income derives from delivering these services, realizing a fair income that encourages the production of food within ecological boundaries. The farm is an open place where citizens can learn about growing food, the impact of food-production, and relations in our ecosystem.

Inspiring other farmers, policymakers, and investors
Conventional farmers and policymakers are inspired by seeing the impact of the growing Caring Community. The continuous data collection and monitoring of the farms is an important argument in the conversation with these actors to convince them to become more sustainable. Policy encourages nature inclusive farming as a result from the grown movement of farmers, consumers and other actors.

HORIZON 3

Sustainable food production is embedded in society. farmers and consumers co-produce food within ecological boundaries.



SOCIETAL SYSTEM

Caring Farmers sets an example with an open community for the food system of the future.

A system where:

- Sustainable food production is embedded in and valued by society.
- Farmers and consumers co-produce food within ecological boundaries.

Farmers are owners of agricultural companies that deliver multiple services and values for society where citizens are involved in food-production and nature conservation.

Consumers are connected to agriculture and the origin of their food. They value nutritious and sustainably produced products and are involved with the food production system.

DESIGN FOR EMERGENCE: COLLABORATIVE FARMING

The role that Caring Farmers wants to play in the agricultural transition is connecting actors who share the same ideas and goals. Their motto is 'together on the road to nature inclusive circular farming'. A community is being built around these goals in which people learn from and inspire each other.

Caring Farmers wants to involve citizens with this transition. With this concept, farms are open for the public to visit and learn. The design serves as a baseline on which more interventions can be built to increase the involvement of citizens. This is referred to as 'design for emergence'. According to Van Alstyne & Logan (2007): *'Purpose must be the starting point, the motivating factor. Next the materials must be in place, the elements that will go into the design. Then the designer must catalyze the process so that elements of the design self-organize into a pattern that can achieve the purpose or telos of the design'.*

In this case, the purpose is engaging citizens with sustainable food production. The materials consist of a platform and data collection tools that facilitate a connection between farmer and citizen. The use of these tools should emerge over time to serve the needs of the stakeholders. The platform should facilitate other interventions and tools to emerge over time. For example, volunteering options for visitors such as helping with harvests or planting trees and other natural elements on and around the farm can be included on the platform.

Reducing the psychological distance between farmer and consumer.

The design concept encourages people to visit farms as an experience. This facilitates the first contact and can lead to more engagement between the actors. More connection helps to increase knowledge and awareness of the context of food production for consumers.

The emergence of local food systems is encouraged with the concept. There is no agreed definition of a local food system, but it is built on the idea that there is direct contact between food producer and consumer, which is in line with the definition of a short food supply chain (SFSC) according to Marsden et al. (2000). They claim that the power of SFSCs is not in reducing the number of actors in the chain or distance that a product travels, but rather the fact that 'the product reaches the consumer embedded with information'. This is the goal of the design concept presented here.

Consumers realize the time and effort that are needed to produce their potatoes and the trade-offs that must be made for a low (economic) price. Eventually, this can lead to changing consumer attitude and behaviour towards food production and consumption:

- eat more responsibly produced foods
- buy more local products

ENGAGEMENT LEVELS: FROM INFORMING TO ENGAGEMENT AND CO-PRODUCTION

Caring Farmers followers are on different levels on the participation ladder (Harris & Barnes, 2019). The concept in the first horizon mostly serves people on the first level of participation. People in the community who are on higher levels are motivated through campaigns to inspire other people to visit a farm and join the community (see figure 7.12).

Informing and educating

The first horizon mostly focuses on this lower level of participation. People who are interested in the topic but feel distanced from it are encouraged to visit farms and

be educated on the topic. People who live around the farm see the signs and familiarize themselves with the Caring Farmers community and maybe become part of it.

Engaging

The second horizon focuses on increasing the engagement of citizens to realize a higher level of participation. Engagement is reached by creating ownership of the problem and solution, the transition. By making consumers feel ownership over the problem and solution their involvement is increased. An engaged consumer can become an ambassador for the goal, inspiring other people to join the movement too.

Co-production

High engagement of citizens can eventually lead to the emergence of local food systems where consumers co-produce their food with farmers. This is envisioned in the third horizon. Farmers and consumers work together to create a sustainable food system that benefits both.

SOCIAL CONTAGION FOR THE ADOPTION OF INNOVATION

People who are higher on the ladder of participation can inspire people in their area to join the community of Caring Farmers. For the involvement of citizens on farms to become mainstream, more people have to be involved. The innovation diffusion curve (Rogers, 2003) shows how the acceptance of an innovation grows over time. The people who are involved are separated into different groups. This concept focuses on using the high involvement potential of early adopters to create more awareness and eventually acceptance among the early majority.

Social contagion for farmers and investors

The collection of data makes the transition of the sector visible and tangible. This is not only interesting for consumers to feel more involved but also for other farmers. Seeing these farms around them might inspire farmers to also change parts of their business.

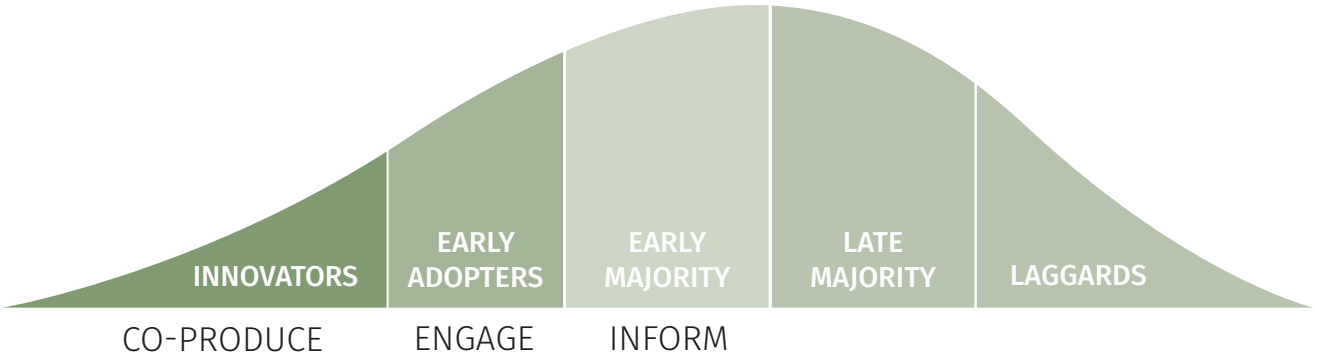


Figure 7.10: The innovation diffusion curve (Rogers, 2003)

Moreover, a large and visible support base for new farming methods can also help to convince investors to invest in the transition of companies. A proof of concept reduces the risks of investing. Figure 7.11 shows how the Caring Farmers movement can spread.

- Caring Farmers inspire other farmers
- Caring Farmers influence policy makers
- Caring Farmers convince investors

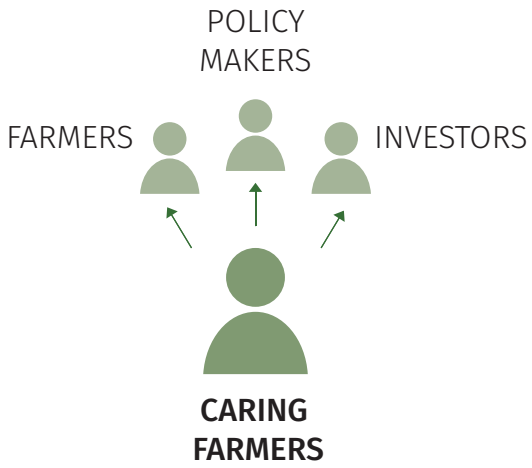


Figure 7.11: Social contagion for farmers and investors

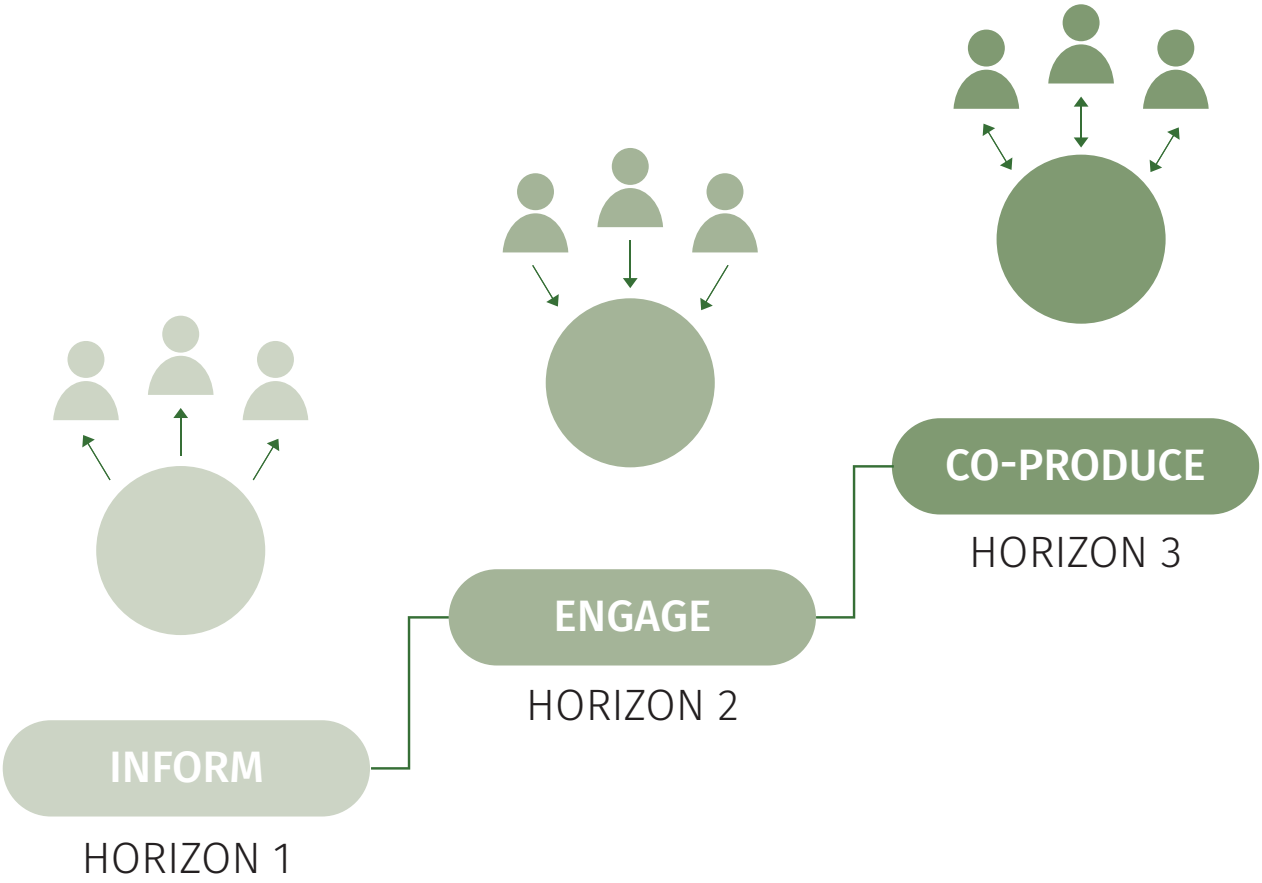


Figure 7.12: The three engagement levels used to involve citizens with agriculture

CHAPTER 08
VALIDATION AND RECOMMENDATION

In the ideation phase, an iterative approach was used while developing the concept for the project. This means that while brainstorming and developing the concept, stakeholders were involved to validate and improve the concept. Next to involving consumers in the design process, a survey was held among supporters of the organization to gain insight into their wishes and values for the design. The insights are presented in this chapter. Two farmers were approached to discuss the design concept and the project client was consulted several times during the creation of the concept. The final design was developed in consultation with the project client. This final design was presented to the project client and their feedback was used to create a roadmap for implementation of the design presented at the end of this chapter.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8.1 VALIDATION WITH STAKEHOLDERS

VALIDATION WITH FARMERS AND EXPERTS ABOUT MONITORING FARMLAND

Two informal meetings were held with farmers to discuss the design concept and practical implementation of it. During the sessions, farmers were asked about the relevance for monitoring for them. The meeting focused on their current monitoring activities and contact with citizens who visit the farm. The design concept was presented to the farmers and they were asked about the opportunities and obstacles they saw for implementing the concept. Furthermore, an expert on monitoring tools that is working for the partner organisation Herenboeren was consulted about the implementation of monitoring tools for volunteers. The monitoring expert advised to set up a workgroup of farmers and citizens to further de-velop the concept. From the meeting, it also became clear that the monitoring goals must be defined before implementing different tools since you can easily get lost in the number and variety of indicators that can be monitored. Their feedback and information was used to improve the concept and to develop the implementation roadmap presented later in this chapter.

The farmer and expert on herb rich grasslands confirmed the value of nature and biodiversity for citizens, saying: 'Farmers that recently started increasing biodiversity on their pas-tures receive many compliments from people in the area about how beautiful the land-scape looks and that it is nice to see the cows walk outside as well'.

The biological farmer mentioned that the entire system of nature inclusive farms must be monitored better in the future instead of focusing on small details in the system. He said 'nitrogen emissions only should not determine whether a farmer is doing good or bad, since these emissions might also be compensated more on his farm than other farms'. This farmer also mentioned the sudden popularity of herb rich grasslands. His company has been biological for over 20 years, with more than 30 species of grasses and herbs growing on his pastures. However, he does not receive the 'compliments' that other farmers receive because the land has been like this for a long time. Being able to quantify and compare the number of species grown on his pasture was therefore an attractive idea for him. Lastly, he mentioned that farmers are not used to looking at the soil in relation to their farming opera-tions. Farmers must be motivated and realize the relevance for them to put energy into monitoring the soil.

CONSUMER VALIDATION SURVEY

To discover more about the supporters of the Caring Farmers organization, a survey was created and sent out to citizens who support the organization, Caring consumers. The goal of the survey was to acquire a better view of the type of people who support the organiza-tion. Questions focused on their motivations to join the organisation, their current level of knowledge, and involvement for initiatives from Caring Farmers. The survey was sent out at the start of the design phase so that the results could be used to narrow down the ideas developed during the ideation phase.

The survey consisted of 12 questions that were created in consultation with the organisa-tion mentor. The format of the questions alternated between multiple choice and open questions. Additionally, ranking questions were added to gain insight into which aspects of nature inclusive farmers the participants found most important. The survey was sent out to approximately 800 people through email, 244 participants responded. Participants could answer the questions online through a webpage or with

a mobile device. Appendix E describes the setup of the survey and contains the entire questionnaire.

INSIGHTS FROM THE SURVEY

The average age of respondents was remarkable, 74% of the participants were above 50 years old. 62% of them are employed or work as entrepreneurs (11% of all participants). 28% of the respondents are retired but many of them still do volunteering work.

Supporters are environmentally responsible consumers

81% of the respondents buy as many products with a BIO (or similar) certification as possible. And 64% tries to buy locally produced products.

Consumers are informed about (nature inclusive) agriculture

Most participants gave an educated answer when asked about a definition of nature inclu-sive farming. Answers were in line with the following definitions:

- Ecologically responsible food production
- Producing with nature instead of against it
- Agriculture with respect for nature. Reducing chemical use and nature dam-age.Attention for biodiversity and animal welfare.

Consumers want to contribute to Caring Farmers

- 38% of respondents would like to volunteer for Caring Farmers projects (like plant-ing trees)
- 33% would like to help farmers in their area to become more nature inclusive.
- More than 80 people left their email address to be involved with similar projects in the future.

Active supporters

Respondents are active in many ways with nature inclusive farming and sustainability. Some of them mentioned producing some of their own products, supporting similar organi-sations like Land Van Ons, or having joined a food production cooperative. Many of them also mentioned that they want to help create more publicity for the goals of Caring Farmers and for conscious consumption. This shows that the supporters are involved with the transition of the sector and try to influence this through different routes. They fit the target group of the second horizon of the design concept that focuses on engaging citizens. Their responses validated that these people are motivated to help farmers with monitoring activi-ties. However, it also indicates that for the first horizon, a broader target audience must be activated. This is further discussed in the implementation roadmap.

PROJECT CLIENT VALIDATION

The design concept was presented to the board of Caring Farmers to receive feedback on the design. The overall response was very positive, the relevance of monitoring was clear to the board and they were enthusiastic about involving volunteers with this activity. The main question to the designer was ‘What is your advice to us as an organisation, more specifically, how should we implement this concept?’ They were interested to know what kind of monitoring projects are easy to execute with citizen-volunteers. Furthermore, they asked to come up with an overview of other organisations that are working on researching and monitoring ecosystem services on farms. As a response to these questions, an im-plementation roadmap was created that should serve as a guideline for Caring Farmers to implement the design concept.

8.2 RECOMMENDATIOS FOR IMPLEMENTATION

The insights that were gained to validate the concept were used to create an implementation roadmap for the design concept. It displays the different steps that must be taken by the organisation when working towards the three horizons of the design roadmap that was presented in chapter seven. The roadmap includes steps for further validation and improvement of the concept.

Over time, the design concept expands from a product service system to a sociotechnical system which should be implemented in a wider societal context. Therefore, it is important to follow guidelines for implementing the concept that take these ambitions into account. The implementation steps towards the horizons will be described and presented in a visual roadmap.

TOWARDS HORIZON 1

In Horizon 1, 'Land In Zicht' is launched which requires some preparation. First, the team must decide whether to include the concept on the existing website or develop an application for 'Land In Zicht' right away. This depends on the amount of funding that can be gathered for the project. It is advised to develop the first version of the concept on the existing website to make it accessible for new visitors since they do not have to download a new app. 'Land In Zicht' can be accessed from the existing website (e.g. www.landinzicht.caringfarmers.nl) and QR codes that link to the website are created easily for placement on the farms. Furthermore, implementation on the internet prevents high investment costs for an application. The first design serves as a Minimal Viable Product (MVP) (Ries, 2011). The first version of the concept can later be extended into a platform application where data is collected and exchanged between different actors.

Web-app 1.0 - Enhance farm experience

The first step is to develop the MVP of the concept with structured and accessible information for consumers about the farms. Content must be gathered from farmers who want to participate in the project about their company. The existing database of stories and information from farmers can be used and expanded. The map with Caring Farmers on the website can be linked to content stories from farmers. Additionally, the map should provide information for users about which farms can be visited when they are interested in a certain subject. For example, by creating tags for the themes (animal welfare, nature, and short chains).

Next to structuring and expanding the online environment, the farms should be equipped with signs that are linked to the online environment. A standard set of signs can be created for the farmers that are interested in joining the project. Different signs should be created that highlight the nature inclusive elements of the farm compared to conventional farms. Suggested themes for the signs are: Herb rich grassland, agroforestry, and towards nature inclusive farming. The farms are also equipped with a general introduction sign which contains the logo of Caring Farmers. This increases visibility of the organisation on the farms. A QR-code on the introduction sign leads visitors to the online environment. To introduce visitors to observing the landscape more actively, data collection about species can be facilitated through an existing website: waarneming.nl. Farmers can save their location as a 'Bioblitz' which enables visitors to save observations on their land. This can serve as a stepping stone towards the second horizon in which visitors are actively involved in monitoring the land.

Inform and involve existing community

Currently, there is little knowledge about the followers of Caring Farmers. From a survey held among Caring Consumers, information was gathered about the drivers and current activities of the followers. It seems like the supporters of Caring Farmers are mostly above 50 years old. With more focus on social media, a younger target audience can be reached as well. Furthermore, supporters from campaigns from partner organisation Urgenda can be approached to sign up as supporters for Caring Farmers. This is a younger target audience with similar views. The sign-up form for consumers should be adjusted to include information about the age, location, and ways that the consumer wants to contribute to the organisation. This way, consumers can be targeted more directly in the future for certain volunteering jobs. This is also important for the implementation of the monitoring system in the second horizon.

A promotion calendar can be created to continuously involve followers with the organisation and to encourage them to visit farms in their area. This calendar was described earlier in this chapter. It familiarizes the followers with monitoring and actively observing the landscape. From these activities, motivated citizens come into sight that can help to develop the monitoring projects for the second horizon.

Set up a workgroup

With involved citizens and farmers, a workgroup should be set up to develop the monitoring system for the second horizon. The followers who responded to the survey can be contacted since they declared that they would like to be involved more. Furthermore, several farmers and scientific experts should be included that are motivated to implement more monitoring tools in collaboration with volunteers. The workgroup can explore research topics that are interesting for farmers and implemented through citizen science projects. The core question should be: How can they benefit from more eyes and ears on their farm?

Create pilot citizen science project

With the workgroup, the first citizen science project can be developed. This pilot project serves a case study where several aspects of the design can be tested. It is advised to execute the project throughout the entire Caring Farmers community and to make it accessible for many people to join. Practical implementation methods can be evaluated as well as the involvement of citizens and farmers. It is important to evaluate who are the users that want to join the project and what motivates them. From this, an engaged group of citizen scientists can evolve. An interesting first project is to perform soil tests. These can be executed quite easily by inexperienced people and help farmers as well as volunteers to learn more about soil health, something that is still quite unfamiliar to both actors. In Appendix F several projects and initiatives are listed that can serve as inspiration for citizen science and can be used by the organisation to develop citizen science projects.

TOWARDS HORIZON 2

In Horizon 2, the product ‘Land In Zicht’ will be embedded in a socio-technical system that focuses on monitoring the transition of farms into nature inclusive agri-food systems. For this, a monitoring platform must be developed from the existing product. By collaborating with research institutes and other organisations, resources can be gathered for measuring and tracking the development of the farms.

Find collaboration partners

A monitoring system is beneficial for other actors besides Caring Farmers. While looking for other parties to collaborate with, it is important to define the role of Caring Farmers in a potential partnership. The community consists of progressive farmers who are willing to change and monitor their landscape, this is an important asset. In combination with a group of engaged citizens who want to help with collecting data, Caring Farmers possesses key resources for the implementation of a monitoring system. Organisations that focus on increasing biodiversity in the Netherlands can be involved to increase the support base and possible funding for the platform. Some organisations and projects exist that are working on similar goals like:

- preserving biodiversity: Deltaplan Biodiversiteitsherstel, Maak Grijs Groener project
- connecting farmers and citizens: Wij.land
- monitoring nature on farms: Biodiversiteitsmonitor Akkerbouw

Caring Farmers has a large network which can be used to connect to these projects. Next to the assets that the community can offer, it is important to keep the long term goals in mind. While the 'Biodiversiteitsmonitor' is developing methods for farmers to monitor their land, the focus of 'Land In Zicht' is on engaging citizens with monitoring the land in order to broaden their view of farms beyond their goal of food production. With citizen involvement, their awareness of ecosystem services grows which is essential in the transition.

It is advised to pitch the project for the foundation 'Deltaplan biodiversiteitsherstel' (2021). This is an existing partnership between nature organisations, farmers, citizens, scientists, banks, policymakers, and companies to restore biodiversity through different projects.

A research institute should be involved to build scientific support for nature inclusive farming methods. They can help set up proper monitoring methods and translate measurements into scientific results. Several institutes can be considered:

- Naturalis Biodiversity Center: This institute is mostly known as a museum, but they also have a large biodiversity database and research department that focuses on preserving biodiversity in the Netherlands. Furthermore, their educational focus fits the goal of 'Land In Zicht' to educate citizens about sustainable farming and they plan to conduct citizen science projects in the future (Naturalis, 2020).
- Louis Bolk Institute: This research institute focuses on sustainable agriculture, nutrition, and health. It has contributed to the 'Biodiversiteitsmonitor' described before and therefore fits with the aim of the project.
- Wageningen University and Research (WUR): This is a prominent research institute for the development of the agri-food sector with many resources to lift the project to a higher level.

Set up KPI's and impact reports for Caring Farms

Together with a research institute, Key Performance Indicators (KPIs) can be developed for the monitoring system. It is advised to focus on KPIs that are integral and look at the system of nature inclusive farming instead of small details. Furthermore, the focus should be on indicators that can be measured through citizen science projects since one of the key goals is to involve citizens. Citizen science is relatively new and

developing rapidly. With the development of smartphones and the internet of things, more advanced data can be collected by citizens with smartphones. The potential of these technologies should be researched. With the KPIs, a template can be created for the yearly impact reports of Caring Farmers.

Develop a Minimal Viable Product (MVP) for monitoring

Before implementing a monitoring system on a large scale, it is advised to develop an MVP for this system as well. The MVP results from the pilot citizen science project that was created in Horizon 1 and uses the KPIs that were developed in collaboration with the research institute. With a motivated group of citizens and farmers, the system can be tested on a few locations. This way, minor mistakes can be fixed without losing support from followers since the people that are involved already feel engaged. The focus of the MVP is on improving the product together with the users.

From mobile website to platform

The second horizon focuses on engaging citizens more with the transition of farmers. The tools that are used should fit this target. A website does not allow for much interaction with users since they mostly receive information which results in a passive attitude. Therefore it is advised to develop a platform application in which the monitoring system can be embedded. This allows citizens to participate more actively since it facilitates the use of cameras, GPS and other software of the users. Insights that were gained from testing the MVP can be used to create a platform that fits the needs of citizens and farmers.

TOWARDS HORIZON 3

The third horizon is the vision for the societal system that Caring Farmers can work towards. In this vision, the ecosystem services are valued and rewarded by society. Therefore it is important that these ecosystem services can be quantified in impact reports and that policy makers become aware of them.

Create impact reports of the farms

With a monitoring system in place, the impact of Caring Farmers can be communicated to the community and a larger audience. The impact report should focus on the ecosystem services that Caring Farmers deliver to society. Services that influence climate change will increasingly become important for society so it is advised to focus the reports on climate impact. Aspects like the preservation of biodiversity, sequestration of carbon and nitrogen in the soils of farmers should be highlighted and if possible quantified in the reports. Furthermore, water storage, water- and air quality and other services that relate to climate change display the contribution that sustainable farms can have to society.

Lobby with policy makers

With impact reports that focus on ecosystem services, a conversation can be initiated with policy makers on how these values can be rewarded. The environmental costs of the effects of industrial agriculture become more evident. They can serve as a baseline for quantifying these values. It would be interesting to take circular economy principles into account when developing a reward system for the services. Looking at farms like systems with a cooperative structure. The government should be inspired by the Caring Farmer communities that redefine the roles and boundaries of agri-food systems to become more sustainable.

IMPLEMENTATION ROADMAP

PRODUCT SERVICE SYSTEM

SOCIO TECH

PRODUCT SERVICE

- Gather content
- Expand farmer map
- Structure online information
- Build application
- Test application

Land **in** Zicht

- Build

WEB APP 1.0

DEVELOP APPLICATION

DEVELOP

CITIZENS

- Content targeted at consumers
- Expand sign-up form website
- Social media promotion calendar
- Introduce concept to community

PILOT CITIZEN SCIENCE PROJECT

GROW SUPPORT BASE

INFORM

FARMERS

INVOLVE FARMER COMMUNITY

- Introduce concept for farmers
- List interested farmers
- Develop farm signs
- Distribute farm signs
- Introduce monitoring tools Bioblitz (waarneming.nl)

WORK GROUP

- form workgroup
- Explore research topics
- Develop pilot project
- Evaluat proj

PARTNER-SHIPS

- TECH DEVELOPER
- NATURE NGO
- RESEARCH INSTITUTE

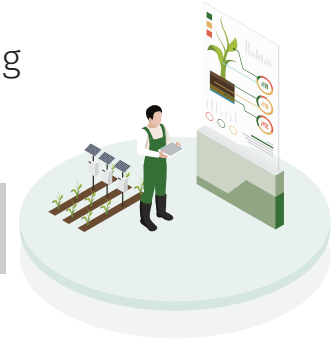
COMMUNITY ENGAGEMENT
PLATFORM DEVELOPMENT
MONITORING SYSTEM
VALUE FOR ECO-SERVICES

NICAL SYSTEM
SOCIETAL SYSTEM

d platform

Create monitoring tools

P PLATFORM
QUANTIFY VALUE



PLATFORM

VALUE
ECO-SERVICES

Communicate Caring Farmers impact

ENGAGE
CO-PRODUCE

MVP MONITORING

Quantify ecosystem services research

ce pilot
ject

Develop KPIs

Create impact report template

POLICY MAKERS

8.3 OTHER RECOMMENDATIONS

Caring Farmers is an organisation that aims to accelerate the transition towards nature inclusive farming. They recognize that this systemic change can only occur through collaboration and behaviour change of multiple stakeholders. Their communication and activities currently focus on farmers and the measurements they can take to improve their business. Contrarily, no communication aimed at behaviour change among citizens exists yet, making citizens passive supporters. The design concept that was developed for this project aims to engage citizens with the organisation and its goals. Additionally, an opportunity exists for Caring Farmers to empower citizens by providing tips and tools for how they can contribute to the cause of Caring Farmers. Tips can focus on consumption choices, ways to support farmers in their area, or how to spread the message of nature inclusive farming in their own communities.

CREATE A 'KENNISDATABANK' ABOUT NATURE INCLUSIVE AGRICULTURE ON THE WEBSITE OF CARING FARMERS.

A knowledge database serves as an online collection of resources that farmers and citizens can access to gain more knowledge about nature inclusive farming. The supporters of Caring Farmers are interested in the subject, they already gained knowledge through several channels but are eager to learn more. The reference to scientific research helps to increase credibility and proof for people who are uncertain about the relevance and effects of nature inclusive farming. An exemplary knowledge database is that of platform TooGoodToGo. This platform aims to reduce food waste. Next to their app, they have a database of knowledge and explainer videos that put their cause of reducing food waste in a broader context.
(See https://toogoodtogo.nl/nl/movement/knowledge).

COLLABORATE WITH ACTORS WHO CAN COMMUNICATE TO WIDER AUDIENCE

From the survey held among Caring Consumers, it became clear that many supporters are unaware of the close partnerships of Caring Farmers with organisations like Herenboeren and Urgenda. In the survey, many people suggested collaborating with these organisations. These partnerships could be utilised more to broaden the support base of Caring Farmers. Furthermore, it is advised to seek new partnerships that communicate to different target groups. Educators can help to inform children about sustainable food production. Chefs and restaurants can passionately communicate the importance (and better taste) of biological and sustainably produced products, using local and seasonal products, and help to inspire citizens to cook vegetarian.

Figure 8.1: TooGoodToGo knowledge database (TooGoodToGo, 2021).

CHAPTER 09
CONCLUSION & DISCUSSION

This report finalizes with a conclusion, discussion, and personal reflection about the project. The outcome of the project; the strategic roadmap, will be evaluated according to the design challenge that was formulated. In the discussion, the methods and approach used in the project are reflected upon and the chapter finalises with a personal reflection on the graduation project.

9.1 CONCLUSION

This master thesis has shown how citizens can be engaged with sustainable food production by empowering them in the transition of the sector. The starting point of this project was to discover how the enhancement of the relation between farmer and consumer could help to accelerate the transition towards a nature inclusive agri-food sector in the Netherlands. Qualitative research confirmed the disconnection between farmers and consumers. The international market in which Dutch farmers operate has elongated the path from farm to fork. As society, we have lost connection to our food and how it is produced. The current agri-food system is therefore environmentally and socially unsustainable. The ecosystem services that farmers can deliver to society should be valued to ensure a fair income for them and for the sector to become more sustainable.

The thesis proposes a three-horizon strategy on how to create value for the ecosystem services that farms can deliver to society. By implementing a system that monitors ecosystem services like biodiversity, soil quality, and carbon sequestration, these values can be quantified. In the first horizon, a product-service system is designed to make farms more accessible for citizens. With an application, citizens can visit farms and learn about sustainable agriculture. The second horizon embeds this application in a platform that enables farmers and citizens to monitor the ecosystem services on farms. Through citizen science projects, visitors help farmers to collect data about these services. This facilitates research about the impact of sustainable farming on the environment so that the vision of the third horizon can be realized. This vision shows a societal system in which farmers and citizens collaboratively work towards a sustainable agri-food sector where ecosystem services are valued and appreciated.

THE INITIAL GOAL OF THE PROJECT WAS TWOFOLD.

The strategy integrates these goals into one strategy.

Accelerating the transition towards a sustainable agri-food sector

It was uncovered that a broader focus for the role of agriculture is necessary to make the sector sustainable. The strategy focuses on creating value for other societal services that farms deliver besides the production of food. This way, farmers can be rewarded for ecosystem services like preserving biodiversity in the future.

This is done through collaborative monitoring projects that help to achieve the second goal.

Enhancing the relation between farmer and citizen

The strategy aims to engage citizens with sustainable food production by letting them fulfill an active monitoring role on farms. This increases the awareness and understanding for the broader context of the production of their food. Furthermore, the design stimulates citizens to visit farms which facilitates contact between farmer and citizen. It aims to make food production less anonymous and shorten the path from farm to fork.

CONTRIBUTION TO DESIGN PRACTICE

The context of this systemic design project was the large societal transition of the agri-food sector. Systemic design methods were used to contribute to societal change. Different levels of abstraction were included in one design strategy. The design integrates roadmapping methodology with the multilevel perspective model, a transition framework. This embeds the theory of design roadmapping that focuses primarily on company implementation into a wider societal view. The roadmap shows a strategy that embeds a product-service system in a societal context to contribute to the desired transition.

CONTRIBUTION TO THE AGRI-FOOD SECTOR

Although this project was executed for Caring Farmers, the result proposes a way to embed agriculture more in society, which is also relevant for other stakeholders in the sector. The agriculture sector is technically extremely innovative but it can benefit from more creative views on the business dynamics and their integration with society. Despite its interactions with other parts of society, the sector and people within still operate quite individually. Since the environmental impact of the agri-food system came to light to a larger audience, the sector has been stirred up with innovative views on its role in society. Providing alternative ownership models and functionalities of farms. This project adds a new (and hopefully inspirational) view on the role of agriculture in the Netherlands by looking beyond the need for fair food prices. It provides a vision where the appreciation for the work of farmers is divided into multiple services instead of embedded in the price of a carton of milk.

9.2 DISCUSSION

RESEARCH LIMITATIONS

Stakeholder involvement
Due to the Covid-19 crisis, there was a lockdown during the largest part of this graduation project. Therefore, it was difficult to approach stakeholders for interviews, co-creation sessions and validation meetings. Most of these sessions were done online which made it difficult to interact directly with the participants. The sessions are shorter and (according to me) more superficial. Furthermore, the participants were mostly people that could be reached through my personal network and the network of Caring Farmers. Some sessions, like a co-creation session with farmers, could not be executed because not enough participants could be gathered. Therefore, the scope is somewhat limited and some of the participants were biased.

Designer bias
The design outcome of this project shows a potential strategy for Caring Farmers and vision for the future. The outcome was developed according to the view and goal of the organisation. Although arguments and findings were confirmed with literature, the result is just one of the possible solutions to a complicated challenge.

Qualitative research
For this project, qualitative research methods were used, meaning that a small number of participants were interviewed to gain rich information about their values and perception of the context. The results cannot be used for academic conclusions but served as a guideline for the design process. The validation of the insights from this research was sought in literature which confirmed findings in most cases.

The farmers that were interviewed are not representative for the general farming community in the Netherlands. For further research about the obstacles of transforming the sector, a different participant sample that is more representative for the entire community could be beneficial

Validation
The design outcome of this project was validated with several stakeholders. However, these people were biased and therefore judged the concept (subjectively) positive. Furthermore, the concept was not tested with the target group due to time constraints. Before implementing the design, it should be validated and tested more thoroughly with the potential users.

9.3 PERSONAL REFLECTION

This graduation project has been an extremely challenging and educational experience for me. After months of working individually, doubting myself, dealing with a lockdown, and the general challenges that come with a graduation project, I can genuinely say that I'm proud of the progress I have made. The reward is a thesis, a diploma, and a lot of lessons learnt.

When searching for my graduation project, I was triggered by the complexity and environmental impact of the agri-food system. It felt quite unusual to do a project for this industry but I was eager to learn more and see how design could contribute to this field. I definitely achieved my goal of learning more about this industry and its complexity. However, as an idealistic person, I also felt personally involved and wanted to find a way to solve all the problems of the sector in my design project. I think this ambition can be both a strength and weakness since it is impossible to solve world problems in one master thesis.

During the project, I struggled most with translating a broad range of ideas into one final concept, wanting to design and solve everything. With help from my coaches, I was able to scope those ambitions down and focus on designing one of the possible solutions to a complicated set of challenges. This also taught me to trust my gut feeling as a designer better. At times, I felt insecure about my project and my abilities to get to a rewarding result. The lack of confirmation from peers or fellow group members made it more difficult to make decisions. Being forced to make these decisions individually taught me to trust my own skills more, which have surprised me several times during the project.

Graduating during the Covid-19 crisis provided an extra challenge for me. I realized that the informal feedback moments with peers are very useful during the design process, these were now more difficult to find. Furthermore, there was no social supervision that usually motivated me during projects. On top of that (or maybe as a result of) I had to take a short break before my initial greenlight meeting because I felt mentally drained (also due to other personal issues). Taking a break helped me to reset and restructure my working days. This taught me to work more according to a schedule instead of from energy and productivity peaks. I found help in structuring my days and weeks with detailed schedules in which not only the tasks but also breaks I had to take were noted. I did not expect myself to benefit from planning my days as much as I did.

So to summarize, this graduation project familiarized myself with characteristics I didn't know I had and taught me valuable (design) skills. It was a rollercoaster of ups and downs but I am happy it ended on a high note. And in the low times, I learned to listen to my mother's words: 'Als het niet kan zoals het moet, dan moet het maar zoals het kan'.

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