

Appendix A - Interview Guides

INTERVIEW GUIDE CARING FARMERS (the interviews will be in dutch)

Carlijn Geerse

Research topic:

Hoofd onderzoeksvraag:

Hoe beïnvloeden korte ketens de relatie tussen boer en consument?

Checklist for start:

- Bring the recorder
- Ask for permission to record the interview and use quotes in research
- Tell that the interview is anonymous

Introductory script

Voor mijn master strategisch product ontwerpen aan de TU Delft doe ik een afstudeeronderzoek naar korte ketens en hoe deze de relatie tussen producent en consument kunnen beïnvloeden. Momenteel ben ik bezig met oriënterend onderzoek. Over 5 weken zal ik met dit onderzoek oplossingsrichtingen definiëren om mee te gaan ontwerpen. De opdracht voer ik dus uit voor de Caring Farmers, ik hoop voor jullie met nieuwe inzichten te komen voor het werken naar korte ketens. Jullie bedrijf is denk ik een mooi voorbeeld waar veel andere boeren nog van kunnen leren. Ik ben vooral benieuwd naar hoe jullie hier zijn gekomen en wat je daarvan hebt geleerd.

Introductory questions:

- Kun je wat vertellen over jezelf en je bedrijf?
- Hoe lang heb je je bedrijf?

Subtopic 1: Bedrijf - korte keten

Opening question:

- Hoe ben je met dit bedrijf begonnen, waarom op een andere manier dan het gangbare 'boeren'?
- Hoe is het idee ontstaan voor ...?
 - Wie kwam hiermee? Met welke motivatie?

Follow-ups:

- Hoelang heeft het geduurd om het huidige bedrijfssysteem op te zetten?
- Wat waren de grootste obstakels om dit systeem op te zetten?
 - Marketing, financiën, logistiek?
- Terugkijkend op het opstarten van dit systeem, wat zou je jezelf toen als advies geven?

Subtopic 2: Consument

Opening question:

- Wat is momenteel je relatie met je klant? Wie zie je als klant?
- Ben je hier tevreden over? Waarom wel/niet?

Follow-ups:

- Wat zijn reacties van klanten in uw winkel?
- Hoe zie je de relatie met de consument op dit moment?
 - Is dit positief/negatief? Wat kan hier de oorzaak van zijn?
- Naar wat voor relatie zou u willen streven in de toekomst?
- Je produceert ook voor biologische supermarkten zoals ekoplaza, heb je met hen een andere relatie dan met reguliere supermarkt afnemers?
- Wat zijn volgens jou de baten voor de klant om bij jou af te nemen ipv bij de supermarkt?
 - Heeft de consument hier ook op **langere termijn** baten bij? (Gezondheid, kwaliteit bodem, waterzuivering)

Subtopic 3: Boeren

Opening question:

- Waar spendeer je als boeren ondernemer het liefst je tijd aan?

Follow-ups:

- Zie je jezelf als reguliere boer? Wat onderscheidt je van andere boeren?
- Ken je veel 'conventionele' boeren? Hoe reageren zij op jouw visie en manier van aanpak?
 - Wat was de reactie van je concollega's toen je dingen 'anders' ging doen?

Subtopic 4: Caring Farmers

Opening question:

- Wat was je motivatie om je aan te sluiten bij de Caring Farmers?

Follow-ups:

- Wat levert de Caring Farmers je tot nu toe op?
- Wat is volgens jou de kracht van de CF?
 - Hoe kan deze worden benut in de toekomst?
- Wat verwacht/hoop je van CF in de toekomst?

Subtopic 5: Visie 2030

Opening question:

- Een deel van de visie van Caring Farmers is het streven naar 'korte ketens', wat houdt dit volgens jou in?
 - fysiek kort? of producten met informatie?

Follow-ups:

- Is dit volgens jou belangrijk, waarom?
 - Wat is hiervan de kracht?
- Wat zijn de belangrijkste stappen die moeten worden gezet om dit te bereiken?
- Je beschreef al kort je plannen voor de toekomst, wat is je visie voor je bedrijf?

INTERVIEW GUIDE CONSUMERS (the interviews will be in dutch)

Carlijn Geerse

Research topic:

Hoofd onderzoeksvraag:

Hoe beïnvloeden korte ketens de relatie tussen boer en consument?

- Wat is de motivatie/reden voor consumenten om zich bij de Caring Farmers aan te sluiten?
- Hoe zijn consumenten momenteel betrokken bij de organisatie?
- Hoe zou de consument betrokken willen zijn bij de organisatie?

Checklist for start:

- Bring a recorder
- Ask for permission to record the interview and use quotes in research
- Explain that the interview is anonymous

Introductory script

Voor mijn master strategisch product ontwerpen aan de TU Delft doe ik een afstudeeronderzoek naar korte ketens en hoe deze de relatie tussen producent en consument kunnen beïnvloeden. Momenteel ben ik bezig met oriënterend onderzoek. Over 5 weken zal ik met dit onderzoek oplossingsrichtingen definiëren om mee te gaan ontwerpen. De opdracht voer ik dus uit voor de Caring Farmers, een tijdje geleden heeft u zich ingeschreven bij de Caring Farmers. Ik ben benieuwd hoe u bij de organisatie terecht bent gekomen en hoe u hierbij betrokken bent. Daar zou ik dus graag een aantal vragen over stellen.

Introductory questions

- Vind u het goed als ik dit gesprek opneem? De resultaten van het onderzoek zal ik anoniem verwerken.
- Kunt u kort iets meer over zichzelf vertellen?
 - Uw beroep, achtergrond etc.

Subtopic 1: Interesse Caring Farmers

Opening question:

- Hoe bent u bij de organisatie Caring Farmers terecht gekomen?

Follow-ups:

- Waarom heeft u zich als supporter ingeschreven?
 - Wat was de motivatie voor u?
- Heeft u een beeld van waar de organisatie nu mee bezig is?
- Kunt u een voorbeeld geven van een initiatief dat u aanspreekt?
 - Waarom spreekt het u aan?
 - Waarom vindt u dit belangrijk?
- Kunt u een voorbeeld geven van een initiatief dat u juist niet aanspreekt?
 - Waarom niet?

Subtopic 2: Betrokkenheid Caring Farmers

Opening question:

- Hoe bent u momenteel betrokken bij de Caring Farmers?
 - Bent u hier tevreden over?

Follow-ups:

- Wat was uw verwachting van het inschrijven bij de Caring Farmers?
- Wat levert de Caring Farmers u tot nu toe op?
- Wat is volgens u de kracht van de CF?
 - Hoe kan dit worden benut in de toekomst?
- Wat verwacht/hoopt u van CF in de toekomst?

Subtopic 3: Verbinding boeren

Opening question:

- Wanneer was de laatste keer dat u contact had met een boer?
 - Wat was de reden van dit contact?
 - Hoe verliep dit?

Follow-ups/probes:

- Waar komt uw interesse voor boeren(land) vandaan?
- Wat is uw ervaring met boeren? (gebaseerd op introductie)

Subtopic 4: Bijdrage leveren

Opening question:

- Wat kan Caring Farmers bijdragen voor u?

Follow-ups/probes:

- Wat zou u willen bijdragen aan de organisatie?
- Op wat voor manier zou u betrokken willen zijn bij de organisatie?
 - Financiële bijdrage
 - Bijdragen van uw tijd
 - Bijdragen van kennis

Appendix B - Consumption behaviour background information

Buying habits of consumers have always been a great mystery, especially when it comes to sustainability. What determines decisions and how can these be influenced? Board of Innovation (2020) describes that the two most important drivers for consumers to buy a certain product are:

- convenience: people choose the fastest and easiest option. Recipe boxes in supermarkets, buying a new product over having to repair something
- reputation: people identify themselves with the products they buy.

Convenience

For food consumption, the first driver is extremely important. This explains the growth and success of supermarkets over the years. A high range of food products have become available for people in one place throughout the year. Within supermarkets, convenience options are exploited even further with pre-cut food and meal boxes that aim to take away the burden (and autonomy) of consumers.

Convenience and a lack of time are reasons why dutch people are cooking less in the last years (Temminghoff & Van Helden, 2016). While at the same time, half of the population would like to increase their cooking skills. People who perceive themselves as a bad cook are more inclined to buy pre-cooked meals than the ones who rate their cooking skills as 7/10.

Reputation

The second driver has a more complicated relation to food consumption. Food is a fast consumer good which makes the reputation of purchase decisions less visible. The places we buy our food relates to this driver, some people have a strong preference for a certain supermarket.

However, in the last few years food is increasingly being exposed to our vanity and hunger for confirmation. New restaurant concepts and instagrammable food plates are examples of how food has become a bigger part of our identity towards the outside world. Food and eating are now an experience, related to our perceived identity and reputation. Some foods have a certain reputation and thus relate to our identity. Other foods have a great PR problem.

Food consumption is led by habits

Most people have a small list of recipes and foods they prepare, products they buy and places they buy these products. The routine makes for a fast process which has to be executed multiple times a week. This means that our food consumption is often led by habit and routine instead of conscious decisions. These decisions are embedded in our (social) environment and cultural meaning of food, making the habits a social routine (Shove et al, 2012).

High frequency, low impact

- frequency is high
(feeling of) impact is low

Consumption linked to identity

Reputation as a motivation for consumption is not just for the outside world but refers to a person's identity as well. This can either work for or against sustainable consumption. A person might make an unsustainable purchase decision because they identify themselves with the product. In this case 'protecting one's self-concept is more proximate than protecting the planet' (Van Dam & Fischer, 2015). Contrarily, a person with a so-called sustainable identity is intrinsically motivated to buy sustainably because it confirms their identity.

The gap between farmer and consumer:

Farmers feel undervalued. They are asked to take environmental (external) effects into account in their business but they are still competing on an international market with other farmers that don't take these externalities into account.

One of the obstacles they identify is the lack of willingness among consumers to pay a higher price for their food products. They want society to value their products better and pay a 'fair price'. A fair price takes the costs of making the product into account and is cost driven instead of market driven (or value driven?).

At the same time, paying this high price is difficult for consumers because:

- anonymous chain makes it difficult to understand the differences between products
- the costs are not economically valued in our society, so paying for them economically is unnatural

Appendix C - Brainstorm

Design challenge:

how might we make contributing to nature inclusive farming more engaging and tangible for environmentally conscious consumers?

How might we ... questions

- Connect communities and/or people?
- Communicate the importance of biodiversity?
- Get people to visit farms?
- Get people to the countryside?
- Reinforce relations?
- Increase involvement?
- Make sustainable impact tangible?
- Increase involvement of citizens on farmland?
- Make people pay for a healthy environment?
- Create a feeling of ownership?
- Connect people to nature?

Analogy challenges

Company inspiration:

- Tony Chocolonely
- Tesla
- Ikea
- Nike
- Google
- AirBnB
- Uber
- Triodos Bank
- Tinder

Sectors:

- your local sportsclub
- school
- museum
- hotel
- restaurant

Ideation session script

Goal of session:

Come up with ideas for the design challenge:

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

Participants (4):

- Marie van den Bergh (social design alumnus)
- Lisa Martin (circular design lab, whatsapp)
- Femke Maas (circular design lab, whatsapp)
- David Thé (social design graduate student)

Set up

1. Introduction [5 min]

Plan (1 hour session)

- introduction of problem context and client (5 min)
- participants introduction (5 min)
- warm up brainstorm (5 min)
- idea generation (20 min)
- idea selection (20 min)
- wrap up (5 min)

Explanation problem and context

Problem context: transition of the dutch agri-food sector to be nature-inclusive and circular in 2030.

The current food system is highly unsustainable. Production, transportation, and inefficient use of nutrition have resulted in a highly polluting system. The dutch government wants to transition our agro-food sector towards a circular and nature-inclusive one in 2030. This transition needs to happen across the entire food system through collaboration between different stakeholders.

'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)

This project focuses on the relation between farmer and consumer.

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. Many farmers want to innovate and adopt more sustainable agriculture practices but struggle to take the next step because investments are too high and the price they receive for their product is too low to make it a sustainable product.

Consumers

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. We have created an instant gratification society. However, trends show that citizens are looking for ways to reconnect, not only to food but to nature in general.

In the media, the nitrogen crisis and farmers protests define our view of farmers.

The client of my project is the organization Caring Farmers. This is a growing group of (now) 200 farmers that aim for nature inclusive farming in 2030.

What is nature inclusive farming:

- Working with nature instead of against it
- Extensive instead of intensive -> room for nature to flourish
- Polycultures instead of monocultures

Values for society:

- Lower (or no) use of chemical fertilizers and pesticides resulting in improvement of air- and water quality and reduction of greenhouse gas emissions (mostly from fertilizers)
- Polycultures and room for nature increases biodiversity of plants, insects, and bird species
- Reduction of greenhouse gas emissions because food has to travel shorter distances
- Human health in general: natural landscape for recreation etc.
- Healthy soil: with current farming methods, land depletion is growing every year. 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).

Explanation Caring Farmers

Caring Farmers is a foundation that wants to accelerate the transition towards nature inclusive circular agriculture in the Netherlands. Members of the foundation are farmers, supply chain partners and consumers.

Caring Farmers is a young community that is still exploring and growing its activities. 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 collaborate 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.

[Question] Does anyone know or have an example of a new/innovative/sustainable farming model?

Examples:

- Herenboeren (community supported agriculture)
- Food forests
- Natuurderij: combination of agriculture and nature preservation
- Farmer subscription for seasonal and local products

Many other farmers are in the community who are in different stages of transitioning to a nature inclusive farm. However, farmers need a bigger support base and demand from citizens/consumers to accelerate this transition. Find a way on how Caring Consumers (aangesloten bij de organisatie) can become a part of the CF community to increase their engagement.

2. Introduction participants [5 min]

Participants can introduce themselves to each other and get into an open mindset for idea generation and sharing.

Steps

1. Participants introduce themselves by saying their name, age, background and what they are currently working on.
2. They also share something about what they remember from their last visit to a farm or a natural landscape.

3. Brainstorm introduction [5 min]

Instruction

Golden rules of brainstorm:

1. there are no bad ideas
2. Build on ideas of others: Yes, and instead of Yes, but...
3. Encourage (impossible) wild ideas
4. Defer judgement
5. Quantity over quality

How might we questions (HMW):

- make (sustainable) impact tangible?
- let people contribute to a healthy environment?
- increase engagement over an issue?
- increase engagement of citizens in farm landscapes?
- communicate the importance of biodiversity (or sustainable farming)?
- reinforce relations between parties

Steps

1. Participants each start with 1 HMW-question and tries to come up with as many ideas a possible for the question (1 min)
2. After 1 min, participants go to the next HMW question and builds on the ideas of the previous participant (4 min)

4. Brainstorm with analogies from other sectors [20 min]

After having written down first initial ideas, the session continues with an analogies brainstorm session. First, the frame of the design challenge is explained. The general steps for the brainstorm are discussed.

Frame of design challenge:

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

Categories:

- A: societal benefits of nature inclusive farming
- B1: Visitor engagement in a museum
- B2: Products and services in a hospital
- C1: IKEA products and services
- C2: Uber experience elements

Other B categories are: restaurant, hospital, school, hotel, sports club

Other C categories are: Tony Chocolony, Nike, AirBnB, Tinder, Triodos Bank

Steps:

1. Come up with as many elements as possible for category A with the entire group of people (2 min)
2. The group is now split up in two pairs. Now individually, come up with as many elements as possible for the second category. One person for category B, the other for category C (2 min)
3. The teams now combine items from list A and list B or C (or both) to develop new ideas. Try putting together items that seem the most different, and see if you can communicate the value of your inventions in ways that are relevant to your challenge, adapting the original idea as necessary. It is important to look for quantity, so try to combine many different items and come up with (seemingly) radical and strange ideas. (8 min)

4. Teams will now switch their ideas and categories. The team can look at the ideas that the other team came up with and build on those ideas and/or come up with new ones. (8 min).

5. Idea selection and conceptualization [20 min]

With many ideas on the board, it is now time to select the best ones and to develop these a little further. Participants are reminded about the design challenge at hand.

Frame of design challenge:

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

Steps:

1. Each participant silently reads through the ideas from the brainstorm session and picks their favourite ideas. Participants can select 5 ideas and put them in their shopping cart. (5 min)
 - a. an idea they really like
 - b. an original idea
 - c. an idea that can be implemented in 5 years
 - d. an idea addressing a new market
 - e. an idea for a new product or service
2. Participants now make the top 3 out of the ideas they picked. In this stage, ideas can be clustered and adapted as well, the ideas do not have to be copied literally. At least one of the ideas is worked out in the concept template (8 min)
3. There is room for the participants to share their idea with the rest of the group. In max. 1 min they can explain the concept to the others and why they like the idea. (5 min)
4. The end of the idea selection stage leaves room for some discussion about the ideas that have been developed. (2 min)

6. Wrap up [5 min]

The session is finalized with a short group discussion about the participant's ideas and thoughts on the problem and subject.

Steps

Thank you for participating in this ideation session, it was very helpful for my research. I hope you enjoyed it and maybe got a little inspired as well? I would appreciate it if you wrote down some feedback on a post-it (I like ..., I wish ...). If you want to get in touch or talk further about the subject you can send me an email at carlijngeerse@hotmail.com

If you want to be updated about the project, leave your email here ...

Appendix D - Design concepts

Data collection NIL

What is it?

Idea description

Database to measure and evaluate environmental elements on farmland.

Volunteers can help by doing measurements about biodiversity, soil quality, etc. as a fun and educational activity

- Consumers pay a symbolic amount for the measurements. Helps to collect funding for scientific research.

Input from volunteers throughout NL helps to map the state of farmland

- Visualize growth of the movement to inspire other consumers and farmers to join

Variants

Blockchain tech, tracking consumer scans product and can see environmental information about the farm where they bought the product. Linked to sensors on the farm: - soil quality, biodiversity on the farm, chem. fertilizers used.

Soil compost project: collect food waste from consumers for composting, which enhances soil quality <https://soilfood.fi/en/>

-> include competition element

Empower citizens/consumers in transition towards nature inclusive agriculture by letting them help in collecting data. Learning and shaping the future of agriculture together

Why it's good

Benefits

- Consumers (volunteers) feel empowered because they help evaluate the transition
- Create awareness of importance of environmental elements and lack of knowledge and research
- Let consumers contribute to the lobby for policy makers to value ecosystem services that they deliver. Payment for ecosystem services is difficult to realize through consumers directly, but they are concerned with it. Enable and empower consumers to motivate policy makers.

Organisation / context fit

Why it fits the organisation and context future vision

- Hyper transparency: communicates that we still have to work on becoming nature inclusive
- Data collection helps to create monitoring tools for evaluating health of farmland. So it contributes to the transition on a larger scale

Collaborate with other parties



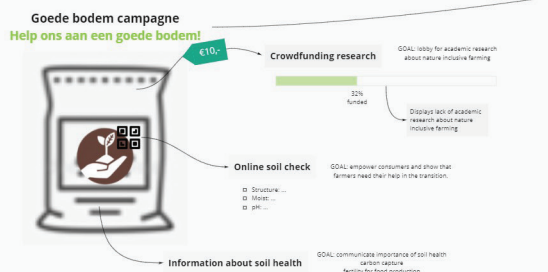
www.pes.nl
Payments for Ecosystem Services

www.natuurgedreven.nl
Natuurgedreven - WINK | Informatie over en inspiratie voor natuurgedreven voedselproductie

wijeland

Scenario

How it works



Phase 2:

Mapping the biodiversity on farmland by consumers

- Caring consumers can visit farms
- During farm visits, the consumer looks for plant- and animal species on the land
 - Fun way of educating about nature and biodiversity
 - consumers help to collect data about biodiversity on farmland
- Collaborate with Wij.land: landschap van ons allemaal
- empower consumers
 - inspelen op transparency trend: open en eerlijk over het landschap en feit dat er nog veel nodig is om natuurinclusiever te worden.

Challenges

Barriers for implementation

- Difficult to facilitate reliable data collection
 - Data collection more symbolic and used in lobby with policy makers and

Farm restaurant hubs

What is it?

Idea description

1. Hollandse bodem diner

'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)

2. Local farm shop(s)

Restaurants are extended as farmshops where products from the surrounding farms are sold. CF Volunteers maintain the supermarket.

3. Local farm hub(s)

The farm shop turns into a hub where different activities can take place. Citizen volunteers maintain the hub and organize workshops, dinners and sports activities. The hub serves as a meeting place where farmer and citizen connect with the (food)ecosystem services as a focus point.

Scenario

How it works

Pop-up dinners on farms with menu from (unknown) products from the area.

- Healthy Dutch soil dinner: displays biodiversity on the farmland and the products grown there
- Education about local food and relation to the landscape, people see how it grows

Why it's good

Benefits

- literally bring people to farm
- collaborate with restaurant chefs
 - can communicate their passion for food
- Emphasize the connection between food and production (landscape)
- Create hubs where citizens, farmers and other actors come together

Organisation / context fit

Why it fits the organisation and context future vision

- experience economy: offer an educational dinner experience (increasingly popular)
- creates small communities with farmers and consumers
- offer vulnerable chefs a new business model
- Fits future vision where farms serve as a system providing multiple eco/social services
- Interesting for retired people, serves as purposeful daytime activity

Challenges

Barriers for implementation

- Takes time to organize dinners in the starting phase (this should eventually be done by volunteers)
- Farm shop should not compete with farmer's own farmshop (sell 10% of product through hub)
- Connect different farms in areas with each other and with local consumers

Transition crowdfunding

What is it?

Idea description

Crowdsource platform for nature inclusive transition projects with environmental returns.

Collecting money for small projects from farmers. People can donate money or their time to help with tangible goals (plant 1 hA of plants/grassland)

ROI is expressed in environmental services and/or as product voucher for products from the farm

Map out all initiatives that have been realized to display the impact of the community and inspire other consumers and farmers to join the transition.

Variants

Consumenten helpen de transitie te overbruggen naar duurzaam (3 jaar van geen resultaat) met broedfonds constructie? Consument investeert nu, krijgt benefits later als boerderij succesvol is

Crowdsource per farm OR use economy of scale. Crowdsource for specific NIL measurements, farmers can join with their land. Consumers can contribute financially

Vision: CF facilitates funding for NIL transition projects. The organization is a source of knowledge and inspiration for consumers and farmers

Why it's good

Benefits

- the impact of the contribution is tangible: people know exactly what their money is spent on
- The investment connects farmer and consumer
- Investment creates feeling of ownership for consumer
- Large transition is divided into small parts, growth of transition is made visible

Creates awareness of (payment for) environmental services

Organisation / context fit

Why it fits the organisation and context future vision

- People want to see direct impact of their efforts
- Currently, ROI of NIL projects is unclear which makes investors hesitant.
 - ROI expressed in environmental services is important for target user
- Farmers (and large investors) want insurance from consumers for investment. This concept can help ensure future customers for farmers



Scenario

How it works

Bio transition project



Needed €5000

Contribute

Plan: from monoculture to polyculture farm
Size: 10 hA
Time: 3 years transition

Returns

- biodiversity increase
- carbon capture
- clean water

make my loan a
10% discount voucher

Challenges

Barriers for implementation

- Individual projects so it does not necessarily fit Caring Farmers as organization
- Does it connect farmer and consumer in the right way?
- Many resources needed to set up the platform
- How can you reach (new) people to become investor or supporter?
- Can you create proof for future customers to convince banks? (interview Johannes)

Farmland ecosystem

What is it?

Idea description

1. Gamification of data collection about biodiversity on farmland

- Volunteers can help by doing measurements about biodiversity, soil quality, etc. as a fun and educational activity
- Consumers pay a symbolic amount for the measurements. Helps to collect funding for scientific research.

2. Grow the bioscore of your local farm

Database to measure and evaluate environmental elements on farmland.

- Ecosystem elements and their influences on each other are displayed to increase awareness.

See the farm ecosystem through an app (AR).

- Volunteers can help to increase the biodiversity on farms by planting/sowing

3. A map of farm ecosystems in NL

- Input from volunteers throughout NL helps to map the state of farmland
- Visualize growth of the movement to inspire other consumers and farmers to join

Empower citizens/consumers in transition towards nature inclusive agriculture by letting them help in collecting data.
Learning and shaping the future of agriculture together

Why it's good

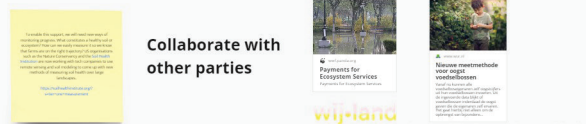
Benefits

- Consumers (volunteers) feel empowered because they help evaluate the transition
- Create awareness of importance of environmental elements and lack of knowledge and research
- Let consumers contribute to the lobby for policy makers to value ecosystem services that they deliver. Payment for ecosystem services is difficult to realize through consumers directly, but they are concerned with it. Enable and empower consumers to motivate policy makers.

Organisation / context fit

Why it fits the organisation and context future vision

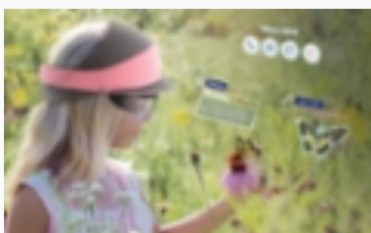
- Hyper transparency: communicates that we still have to work on becoming nature inclusive
- Data collection helps to create monitoring tools for evaluating health of farmland. So it contributes to the transition on a larger scale
- Creates bridge between food production and biodiversity (nature preservation)
- Facilitates collaboration with nature organisations to reach a wider target audience



Scenario

How it works

1. Visit a farm, scan QR-code on phone to start
2. With your phone, scan different species of plants and insects that you see on the farm
 - a. Get informed about the plant's role in the ecosystem
 - b. Determine the biodiversity score on the farmland



Challenges

Barriers for implementation

- Difficult to facilitate reliable data collection
 - Data collection more symbolic and used in lobby with policy makers?
- No reliable large scale monitoring method yet
 - collaborate with researchers and new initiatives
- Need investment to set up database and measuring tools

Appendix E - Consumer survey set up

Research questions for the survey:

- What are motivations for consumers to join Caring Farmers?
- How are consumers currently involved with the organisation?
- How do consumers want to be involved with the organisation in the future?
- What is the current level of knowledge about nature inclusive farming among consumers?
 - And why is it important to them?

The survey was sent out by email to 800 participants with the following introduction:

Beste Caring Consument,

In het afgelopen jaar heeft u zich via onze website aangemeld als partner van Caring Farmers, ontzettend bedankt hiervoor! Wij geloven dat we met boeren, consumenten, wetenschappers en ketenpartners samen de transitie naar natuurinclusieve kringlooplandbouw kunnen versnellen.

Op dit moment zijn er al meer dan 200 boeren en 1000 consumenten aangesloten. Er worden themabijeenkomsten georganiseerd, adviezen voor de overheid geformuleerd en we krijgen steeds meer media-aandacht met duurzame initiatieven van en voor boeren.

Echter willen we u als consument en/of ketenpartner ook meer bij Caring Farmers betrekken. Want ook uw hulp is nodig om natuurinclusieve kringlooplandbouw te realiseren. Momenteel is student Carlijn Geerse bezig met een afstudeerproject over dit thema en samen hebben we een korte vragenlijst samengesteld.

We zijn erg benieuwd waarom u zich bij ons heeft aangesloten, waarom u natuurinclusieve landbouw belangrijk vindt, maar vooral ook naar hoe u bij Caring Farmers betrokken zou willen worden in de toekomst. U kunt de vragenlijst via de volgende link invullen:

Hartelijk dank!

Caring Farmers - enquête

Introductie Hartelijk dank voor het invullen van deze enquête! Het beantwoorden van de vragen zal minder dan vijf minuten van uw tijd in beslag nemen en uw antwoorden worden anoniem verwerkt. De algemene resultaten van de enquête zullen we met u delen via de nieuwsbrief.

Q1 In welke leeftijdscategorie valt u?

- ☐ 19 jaar of jonger (1)
- ☐ 20-29 (2)
- ☐ 30-39 (3)
- ☐ 40-49 (4)
- ☐ 50-59 (5)
- ☐ 60 of ouder (6)

Q2 Welke van de volgende categorieën omschrijft het beste uw arbeidssituatie?

- ☐ Baan, 1-31 uur per week werkzaam (1)
- ☐ Baan, 32 uur of meer per week werkzaam (2)
- ☐ Geen baan, werkzoekend (3)
- ☐ Geen baan, niet werkzoekend (4)
- ☐ Gepensioneerd (5)
- ☐ Anders, namelijk ... (6) _____

Q3 Hoe kent u Caring Farmers?

- ☐ Vrienden/familie (1)
- ☐ Nieuws (2)
- ☐ Social media (6)
- ☐ TV reclame (3)
- ☐ Via een van de aangesloten boeren (4)
- ☐ Anders, namelijk ... (5) _____

Q4 Waar moeten boeren aan voldoen om zich aan te sluiten bij Caring Farmers?

- ☐ Natuurinclusieve kringlooplandbouw bedrijven (4)
- ☐ Biologisch zijn (3)
- ☐ Gesloten kringloop in het bedrijf hebben (8)
- ☐ Bereidheid om stappen te zetten naar natuurinclusieve kringlooplandbouw (2)

Q5 Hoe houdt u zich momenteel bezig met het thema natuurinclusieve kringlooplandbouw?

Bij deze vraag kunt u meerdere antwoorden invullen

- ☐ Ik koop zoveel mogelijk producten die biologisch(dynamisch-) zijn geproduceerd
 - ☐ Ik koop zoveel mogelijk producten die lokaal zijn geproduceerd
 - ☐ Ik koop zoveel mogelijk producten die het Beter Leven keurmerk (2 of 3) sterren hebben
 - ☐ Ik eet vegetarisch
 - ☐ Ik eet veganistisch
 - ☐ Ik draag financieel bij aan een natuurorganisatie
 - ☐ Ik draag financieel bij aan een boerenorganisatie
 - ☐ Ik ben zelf bezig met duurzame voedselproductie
 - ☐ Ik ben aangesloten bij een boerengemeenschap
 - ☐ Ik houd me hier niet mee bezig
 - ☐ Anders, namelijk ...
-

Q6 Wat houdt natuurinclusieve kringlooplandbouw volgens u in?

Page Break

Q7 Natuurinclusieve kringlooplandbouw volgens Caring Farmers

Een vorm van landbouw die met de natuur werkt in plaats van tegen de natuur in. Die geen gebruik maakt van kunstmest en andere chemicaliën. Waarbij de dieren gezond zijn en buiten scharrelen. Met veel contact tussen boer en klant en aandacht voor lokale voedselsystemen. Caring Farmers streven ernaar de negatieve impact van voedselproductie op biodiversiteit, natuur en klimaat te verkleinen en een positieve impact op de mens en zijn omgeving te realiseren.

Q8 Natuurinclusieve kringlooplandbouw is een begrip dat meerdere thema's omvat. Hoe belangrijk vindt u de onderstaande thema's?

	Helemaal niet belangrijk (1)	Niet zo belangrijk (2)	Enigszins belangrijk (3)	Belangrijk (4)	Ze er belangrijk (5)
Verbetering van dierenwelzijn (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Toename van biodiversiteit in Nederland (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creëren van lokale voedselketens (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verlagen van uitstoot van broeikasgas sen in de landbouw (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Herstel van bodemkwaliteit (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Productie van gezonde producten (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q9 Waar wilt u dat Caring Farmers zich vooral voor inzet?

Plaats de onderstaande elementen op volgorde van meest (bovenaan) naar minst (onderaan) belangrijk, u kunt de elementen verslepen om de volgorde te veranderen.

- _____ Pleiten voor duurzame beleidsvorming in de landbouw
- _____ Boeren inspireren en informeren over de transitie naar natuurinclusieve kringlooplandbouw
- _____ Consumenten informeren over het belang van natuurinclusieve kringlooplandbouw
- _____ Consumenten praktische tips geven over duurzaam eten en boodschappen doen
- _____ Het realiseren van een eerlijke prijs voor de producten van boeren
- _____ Meer (media) aandacht voor innovatieve en natuurinclusieve boeren
- _____ Een betere (financiële) positie voor de duurzame boer in Nederland
- _____ Anders, namelijk ...

Q10 Wij willen graag samen met u de Nederlandse landbouw verbeteren. Wat kan Caring Farmers hierin voor u betekenen?

Plaats de onderstaande elementen op volgorde van meest (bovenaan) naar minst (onderaan) belangrijk, u kunt de elementen verslepen om de volgorde te veranderen.

- _____ Mij in contact brengen met boeren in de regio
- _____ Mij voorlichten over hoe ik natuurinclusieve landbouw kan ondersteunen (bijvoorbeeld met mijn koopgedrag)
- _____ Mij betrekken bij campagnes en acties
- _____ Anders, namelijk ...

Q11 Op wat voor manier zou u willen bijdragen aan Caring Farmers?

Bij deze vraag kunt u meerdere antwoorden invullen

- ☐ Ik bied graag financiële steun aan campagnes en projecten van Caring Farmers
 - ☐ Ik wil boeren in mijn omgeving helpen om natuurinclusief te worden
 - ☐ Ik denk graag mee met Caring Farmers over hoe we de sector kunnen verbeteren
 - ☐ Ik zet mij graag in als vrijwilliger voor projecten, zoals het oogsten/planten van bomen
 - ☐ Ik heb geen behoefte om bij te dragen aan Caring Farmers
 - ☐ Anders, namelijk ...
-

Page Break

Q12

Heeft u tot slot nog ideeën of opmerkingen voor Caring Farmers?

Q13 Als u graag verder mee zou willen denken over de ontwikkeling en activiteiten van Caring Farmers kunt u hieronder uw emailadres achterlaten.

Appendix F - Monitoring resources and inspiration

Monitoring with citizen data collection

The underlying goal of collecting data is two-fold, which each goal requiring a different approach to how data is collected:

1. Monitoring is essential for the transition of agriculture towards more sustainable methods since **it provides evidence of the effects** that it has on the environment. Creating reliable evidence is important to convince other stakeholders, which means that data collection methods must be validated and monitored. This makes it less accessible for citizens to execute.
2. **Engaging citizens with farmland and its ecosystem services.** By actively participating in monitoring biodiversity and soil health, a person creates a deeper understanding of the problem and a feeling of involvement to solve this problem. To engage citizens, collecting data must be easy and accessible for them. However, accessible methodologies sometimes make it difficult to generate reliable scientific data.

What to monitor?

Together with the project client and a meeting with an expert with a biological background, it was decided to focus the monitoring and data collection activities on biodiversity and soil health. Both are important elements that give insight into the environmental health of the landscape. They are also interesting elements for many citizens, although they are complex concepts to grasp completely, the number of species present in the landscape is an understandable indicator of biodiversity. Soil health was chosen because some indicators such as the number of worms in the soil are easy to measure for citizens with little background knowledge. Furthermore, the importance of healthy soil has gained interest among citizens because of documentaries such as 'Kiss the Ground' in which the soil is explained to play an important role in fighting climate change.

Some examples of citizen data collection projects are:

- MyPestGuide: application to identify and report pests on plants in Australia
<https://www.agric.wa.gov.au/pests-weeds-diseases/mypestguide>
- Watermonsters project. Taking water samples from small water bodies throughout the Netherlands.
<https://www.natuurenmilieu.nl/themas/voedsel/projecten-voedsel/waterkwaliteit-biodiversiteit/watermonsters/>
- Species counting days
 - nationale tuinvogeltelling
<https://www.vogelbescherming.nl/tuinvogeltelling>
 - nationale bijentelling
<https://www.nationalebijentelling.nl/>
 - Waterdiertjes
<https://www.waterdiertjes.nl/#/info>
- Waag Hollandse luchten
<https://waag.org/nl/article/sensoren-hollandse-luchten-online-regio-ijmond>
- GrowApp: displaying seasonal changes of plants in trees with pictures
<https://www.growapp.today/#/>

- Zooniverse: a large platform where people can help retrieving and verifying data
<https://www.zooniverse.org/>
- Waarneming.nl is a growing database for the identification of species
<https://waarneming.nl/>

The WUR report about citizen science is a useful resource for developing citizen science projects:

<https://www.wur.nl/nl/Dossiers/dossier/Citizen-science-burgerwetenschap.htm>

The following article describes the use of smartphones for agricultural citizen science projects in Australia:

Dehnen-Schmutz, K., Foster, G.L., Owen, L. et al. (2016). Exploring the role of smartphone technology for citizen science in agriculture. *Agron. Sustain. Dev.* 36, 25.

Other initiatives that aim to make monitoring farms more accessible are:

- **Vidacycle soilmentor.** This company has created an application that helps small scale farmers to monitor their farms.
<https://soils.vidacycle.com/>
- Biodiversiteitsmonitor melkveehouderij
<http://biodiversiteitsmonitormelkveehouderij.nl/>
- Biodiversiteitsmonitor akkerbouw
<https://www.wur.nl/nl/Onderzoek-Resultaten/Onderzoeksprojecten-LNV/Expertisegebieden/kennisonline/Biodiversiteitsmonitor-Akkerbouw-in-theorie-en-praktijk.htm>
- **Goedbodembeheer** describes several soil tests that are easy to perform
<https://www.goedbodembeheer.nl/graaft-een-kuil>

Appendix G - Herb rich grasslands background information

Benefits of herb rich grasslands

A great variety and the amount of herbs and grasses are an indicator for several aspects concerning biodiversity and sustainability of the land:

Making herb rich grassland the new standard

These herb rich grasslands are beneficial for the land, farmer, and nature. The variety of herbs and grasses are an important and visible indicator of the biodiversity and soil quality. Building a database with this information over the years shows the development and gives insight into the effects on the environment by linking it with other data about biodiversity and soil quality.

Soil health

The amount and variety of different grasses and herbs on a piece of land is an important indicator of the soil health on the land. The different types of plants have varying root systems that penetrate the soil on a different level. Furthermore, the plants need different nutrients from the soil.

Birds and insects

The herbs attract more and larger insects. Insects are important for pollination and they are the food source for birds. So herb rich grasslands are important for the survival of birds, especially chicks (<1 year).

Cow

The cow benefits from a varied diet. Imagine that you have to eat oatmeal 3 times a day for the rest of your life. On a herb rich grassland, the cow can pick his meal from a diverse menu. A diverse composition of grassland provides many nutrients and minerals for the cow, which means that less artificial supplements must be added.

Appendix I - Validation meetings questions

Interview biological farmer in Rotterdam

- Op wat voor manier wordt het land nu gemonitord?
 - Bodemmetingen?
 - Wordt dit al gedaan op het bedrijf? Hoe?
 - Kruidenrijk grasland aanwezig?
 - Hoe hier metingen uitvoeren?
- Op uw website staat dat er rondleidingen op het bedrijf worden gedaan. Wat is de focus van deze rondleidingen? Waar reageren mensen op?
- Wat zijn de gedachten over vrijwilligers die helpen om de staat van het landschap in kaart te brengen?
 - **Wat is uw ervaring met vrijwilligers op het land?**
- Wat voor data of bewijs zou kunnen helpen om beleidsmakers en investeerders te overtuigen van het belang van natuurinclusieve landbouw? (bijvoorbeeld: bereidheid van consumenten, verbetering van bodemgesteldheid, (ecologische) terugverdientijd overgangsinvestering?)
- Uitleg: Citizen data collection, projecten waarbij burgers helpen met het verzamelen van data voor wetenschappelijk onderzoek.

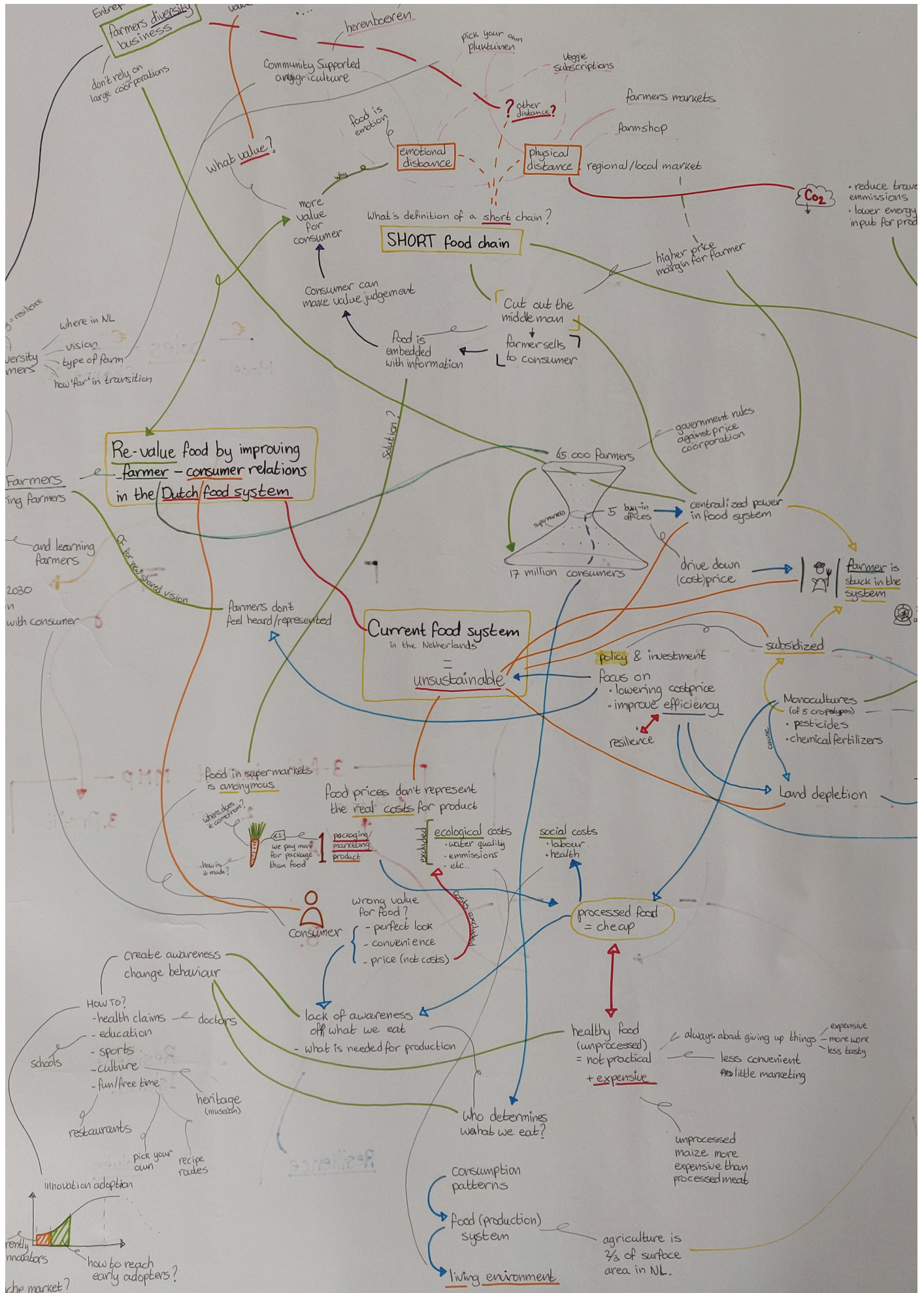
Interview monitoring project implementation expert

- Lijst indicatoren, is er al een plan opgesteld voor het evalueren van biodiversiteit en bodemgesteldheid?
- Heeft u hierover ook al contact gehad met onderzoeksinstellingen?
- Heeft u een idee over hoe leden of vrijwilligers hiervoor ingezet kunnen worden?
- Verschilt per indicator hoe frequent deze gemeten moeten worden?

Interview farmer and expert on herb rich grasslands

- Van kruidenrijke graslanden het 'nieuwe normaal' maken, wat denk je dat hierin de **grootste obstakels** zijn?
- 100% grasgevoerde producten zijn gezonder voor consumenten, hoe overtuig je hen hiervan?
 - antibioticavrij, groene woestijn?
 - Lokaal voedsel voor jou, en voor de koe (niet krachtvoer importeren)?
- Wat zijn de huidige onderzoeksresultaten van onderzoek naar kruidenrijk grasland? (papers te lezen?)
- Hanteren jullie momenteel al **monitor methodes** om de ontwikkeling op het grasland te monitoren?
 - Biodiversiteit?
 - stikstofopname in de bodem?
- Als je tellingen zou doen van gras, klaver, en kruidensoorten, hoe systematisch moet dit worden uitgevoerd?
 - regelmatig?
 - op zelfde stuk grond?
 - soorten en aantallen belangrijk?
- Kun je deze resultaten linken aan (kwantitatieve) indicatoren voor biodiversiteit of stikstofopslag bijvoorbeeld?

Appendix J - Giga Map



IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

! USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy". Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !



family name _____
initials _____ given name _____
student number _____
street & no. _____
zipcode & city _____
country _____
phone _____
email _____

Your master programme (only select the options that apply to you):

IDE master(s): ☐ IPD ☐ Dfl ☐ SPD

2nd non-IDE master: _____

individual programme: _____ - - _____ (give date of approval)

honours programme: ☐ _____

specialisation / annotation: ☐ _____

☐ _____

☐ _____

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair _____ dept. / section: _____

** mentor _____ dept. / section: _____

2nd mentor _____

organisation: _____

city: _____ country: _____

comments
(optional)

⋮

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..



Second mentor only applies in case the assignment is hosted by an external organisation.



Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair _____ date ____ - ____ - ____ signature _____

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: _____ EC

Of which, taking the conditional requirements into account, can be part of the exam programme _____ EC

List of electives obtained before the third semester without approval of the BoE

☐ YES all 1st year master courses passed

☐ NO missing 1st year master courses are:

name _____ date ____ - ____ - ____ signature _____

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: ☐ APPROVED ☐ NOT APPROVED

Procedure: ☐ APPROVED ☐ NOT APPROVED

comments

name _____ date ____ - ____ - ____ signature _____

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date - - - - end date

space available for images / figures on next page

introduction (continued): space for images

image / figure 1: _____

image / figure 2: _____

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date - - - - end date

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, Stick to no more than five ambitions.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.