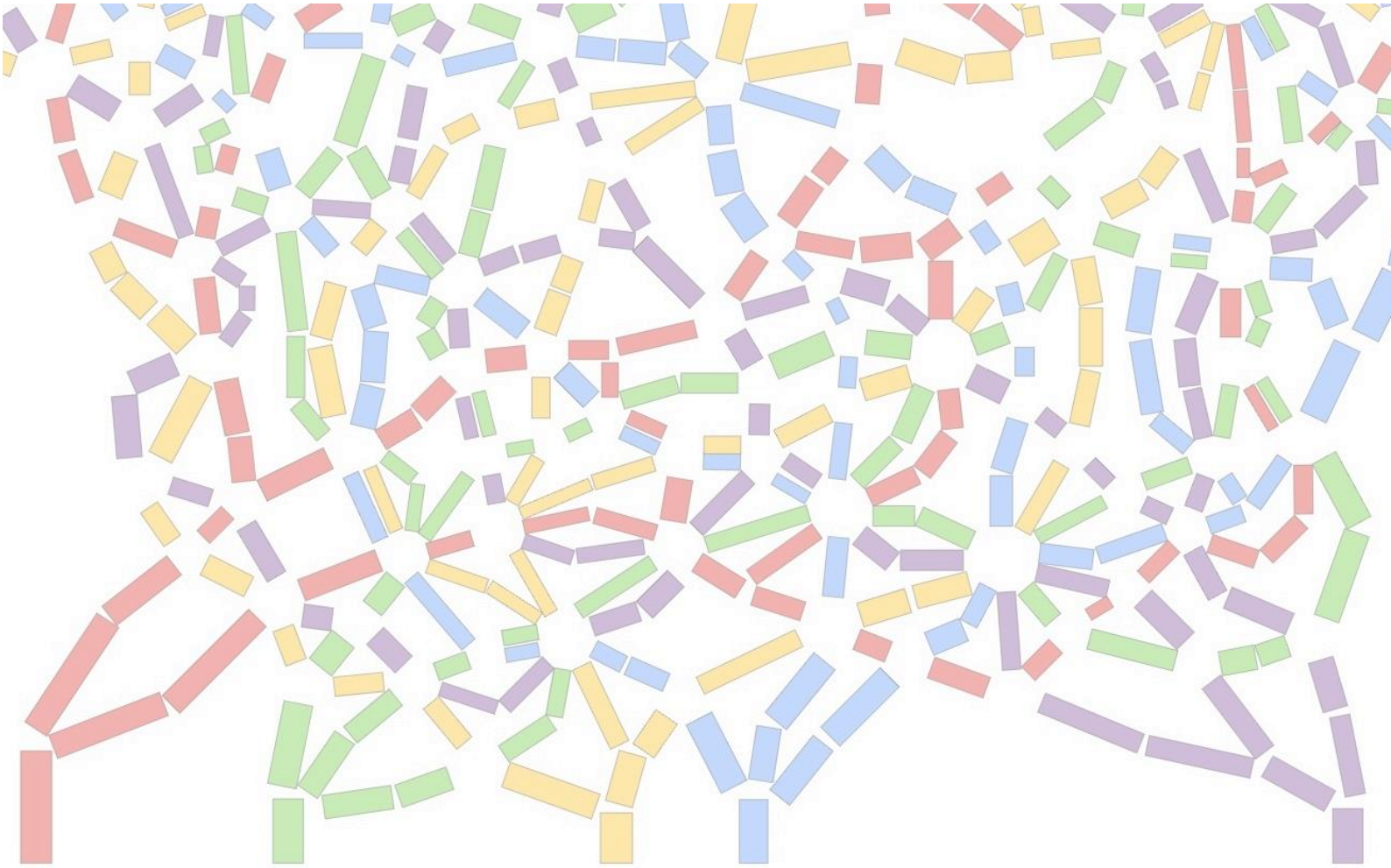

Collaboration through a game

A design-based research on the controversy in the case of peat meadow areas in the Netherlands.

26-08-2021

Julia van Liemt

MSc Industrial Ecology
MSc Science Communication

TU Delft

Universiteit Leiden

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Master thesis
MSc Industrial Ecology & MSc Science Communication
Double degree

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Contents

Preface

You are about to read the research that I performed for my master thesis about peat meadow areas in the Netherlands. I designed a serious game that could stimulate the different stakeholder groups that are involved in this controversy to work together.

First, let me introduce myself. I am Julia and I started with the BSc Bouwkunde at the TU Delft in 2014. When I graduated from the bachelor three years later, I knew that I did not want to proceed in the world of architecture. For the choice for a master programme, my interest in sustainability led me to the MSc Industrial Ecology and my enjoyable time at the minor programme of Communication Design for Innovation led me to the MSc Science Communication. I decided to do both master programmes double degree.

This was the perfect choice for me. I enjoyed working together with students with completely different backgrounds (from psychology to aerospace engineering) and designing strategies and tools for sustainability and communication issues.

This all led to the thesis that you have in front of you, in which both masters are completely integrated in one large research. It was interesting to focus on a more social side of sustainability, since I am convinced that a sustainable world starts with the people living here and their behaviour. I also loved to be able to put my creativity in the design of a serious game. This all led to an end product of which I am proud and with which I end seven years of studying.

During the 1.5 years of working on this thesis, there were many people who helped me to make this study as strong as possible. I want to start by thanking Caroline and Udo for their engaging support as my first supervisors and their energy to make this the best thesis that I could write. Éva and Linda also contributed much support and useful feedback in my research as being my second supervisors. Then, I want to thank Melina for reading through all 160 pages of my thesis improving my English grammar. I am also thankful for all interviewees for giving me so much information on the case. Furthermore, I want to thank Alice, Myrthe, Roos-Marijn, Matthijs, Silke, Esther, Mees, Vera, Arjan and Paul for playing the final version of my serious game with so much passion. Of course, the brainstorms and test sessions helped me to increase the game, so I owe Lisa, Emiel, Emmy, Emma, Ela, Vera, Julia and Daan a great word of thanks as well. The other test sessions were also quite useful and were only a success because of the enthusiastic players, so thank you Mirja, Roos, Sophie, Karlijn, Sabine, Rosa, Sven, Ricardo, Pien, Judith, Anouk, Larissa and Sophie. Thanks also for being able to test my game during the skills day of Science Communication. Last but not least, I want to thank Hein, Esther, Sophie and Koen for supporting me during all of my studies.

Julia van Liemt

Delft
26th of August, 2021

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Summary

Research problem

Case study

A fair part of the surface of the Netherlands consists of **peat grounds**. This is a soft and wet soil type that originates from river deposit which was left behind during the early history of the Netherlands (Rijsdijk, 2013; Wong, Batjes, & De Jager, 2007). A large part of these grounds is used for livestock farming. However, the peat needs to be dried to prevent cows and other cattle from sinking with their hooves into the soft, wet peat.

This drying starts a process called **oxidation**. Bacteria that were (inactively) hidden in the water of the peat soil, become active and react with the oxygen and the warmth that are exposed because of the draining. This reaction with oxygen in the air and warm sunlight results in the forming of CO2 and some methane gas, which are added to the atmosphere. Because of these reactions, empty spaces are formed in the ground and **subsidence** occurs (Van Den Akker, Hendriks, Hoving, & Pleijter, 2010; Voorwinde et. al., 2019). Since this contributes considerably to the CO2 emissions in the Netherlands, it requires solutions to stop the oxidation process and the subsequent subsidence.

Focus of this research

Searching for this solution leads to the problem statement of this thesis. **It seems impossible to find a solution for this problem with which every stakeholder can agree**, even though various solutions have already been proposed, varying from stopping to slowing down the subsidence in many different ways.

Five main stakeholder groups are identified in this research: the research organisations, the agricultural stakeholders, the water management organisations, the nature preservation organisations, and the administrative bodies. These parties all have their own worldview and their own ideas about the situation. This forms a **controversy**, which contains many different elements and different actors, in which the different stakeholder groups disagree on different elements (Venturini, 2010).

Goal of this research

This controversy slows down the process of stopping the oxidation of the peat meadow grounds. Therefore, the end goal of this research is on the one hand for the different stakeholder groups to gain **insight in the motives of the viewpoints** of the counteracting parties. On the other hand, a new base for these stakeholder groups should be formed in which a productive **situation for (renewed) collaboration** is created, which can lead to more effective conversations on the future solutions in peat meadow areas**.**

To be more exact, this means that the aim is to stimulate the creation of an environment in which a decision on the peat meadow discussion could be made and in which all contestants would be able to agree with that decision.

Research questions

This research focuses on making the contestants take a step back. In the situation of a controversy, asking the stakeholders to collaborate in an effective way is not easy. Therefore, the focus does not lie on finding a solution, but on creating a collaborative situation in which the stakeholders understand each other's viewpoints and their motives. For the stakeholders to be ready for such a collaboration, they first need to learn what the worldviews of other stakeholders look like. This is a form of single loop learning, which is a way of learning in which one adapts to certain standards. However, more importantly, the stakeholders should try to understand why people have different perspectives and be able to accept these differences. This is a form of double loop learning, in which people learn to question the standards of a situation (based on Argyris (1977)).

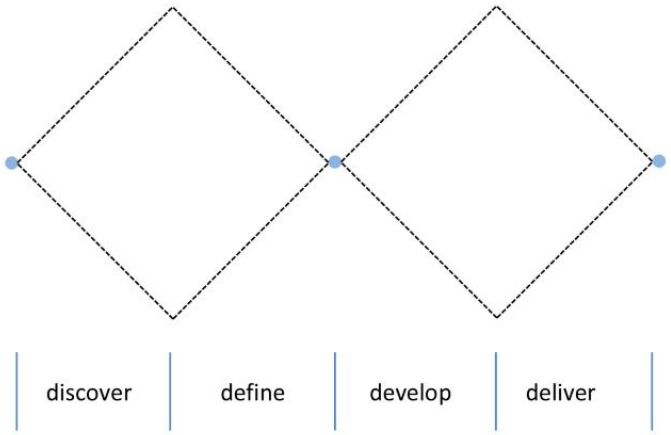
This leads to the main research question that will be answered in this research:
"To what extent can parties with different epistemic outlooks in the societal controversy of peat meadow areas in the Netherlands, come closer to effective collaboration by using a serious game as a participatory tool that stimulates double loop learning?"

To structure the research further, the following sub questions are posed:

- *What does the controversy of the peat meadow discussion look like?*
- *What do the epistemic outlooks that the different stakeholder groups have, look like?*
- *When analysing the controversy of the peat meadow areas, what elements of collaboration could be applied to create a situation in which effective collaboration could take place?*
- *What participatory intervention tool can be chosen to organise a situation in which the different stakeholder groups can achieve double loop learning?*
- *How can a design of a participatory serious game be made that could create a situation in which the different stakeholder groups could achieve a more effective collaboration?*
- *To what extent does the design of the participatory serious game create a situation in which the different stakeholder groups can achieve double loop learning?*

Approach

This study is approached using the methodology concept of **Design-based Research** as explained by Wang & Hannafin (2005). In this type of research, research and design are integrated and have an interactive and iterative character. One form to explain and guide a design-based research, is with the double diamond as shown in the picture on the right. This is the approach that is used to structure the overall research.



The double diamond starts with a diverging movement in which information, understanding, and ideas are collected ('**discover**'), then it converges towards a specific focus ('**define**'). After that, it makes the divergent motion again to collect input which can help to improve the focus point ('**develop**') and it ends with a converging process in which the design is developed and made concrete in the end ('**deliver**') (British Design Council, 2019; van der Sanden & de Vries, 2016).

Conclusions

Conclusions to the sub questions

By carrying out interviews with experience experts, a desk-research, and a literature study on the controversy, five main stakeholder groups and the **epistemic outlooks** of these five groups were defined in Chapter 2. Below, the perspectives that were found per stakeholder group in this study are summarised:

- The research organisations
    - This is a more neutral group of stakeholders without high personal interests in the case. They are focusing on finding effective solutions for the oxidation and the subsidence and contribute the largest number of (new) solutions to the discussion.
- The agricultural stakeholders
    - This group has the highest personal stakes, since their farms are situated on the peat grounds (and are dependent on it), so any solution will have an effect on their way of working. They mention mostly socially related and money related problems and feel that they will have to pay for the costs of the solutions.
- The water management organisations
    - This group of stakeholders takes a more practical look at the case. Their stakes are focused on maintaining the water quality and using the available water in an effective way. If one of these elements are jeopardised by a solution, they will see problems.
- The nature preservation organisations

    - The world view of this group is focused on maintaining the quality of nature and ecology. They are prepared to stop the oxidation and subsidence at all costs, since the biodiversity is at stake and the emissions harm the environment.
- The administrative bodies
    - This group does not have much personal stake with the grounds themselves but is driven by the climate agreement to reduce emissions. They are prepared to take drastic measures to achieve these goals, although they are looking for ways to keep solutions as economical as possible.

To create a situation in which stakeholders can work together towards a solution instead of just focusing on their own priorities, the stakeholders should **take a step back** and build trust on other levels with the different stakeholder groups. This should help them to open up to insights that other stakeholders may have, which could lead to a situation in which they could work together.

Therefore, literature on (effective) collaboration was studied, with which **collaboration requirements** were defined. From these, **focus points** for the design of a participatory tool were derived. With this as a foundation, the participatory tool was chosen: **a serious game**. (Chapter 3).

When the choice for a serious game was made, the **design** for the digital boardgame was developed (Chapter 5). The focus points formed the base of a morphological chart which was filled with ideas from brainstorms with different groups of people. This **morphological chart** was the inspiration for different game ideas of which the board game in which all five players should finish in the same round matched most of the focus points.

This idea was further developed into the final design of '**Samen door het veen**' (translation: Together through the peat). The game contains minigames when routes of different players cross, secret tasks which focus on building a more personal relationship and meadow cards which give unexpected twists to the game and stimulate social talks during the game. Each element that was put into the game, is in some way or the other connected to the collaboration literature that was found in Chapter 3. For a **manual** of how to play the game, see Chapter 4.

Because of the Covid-19 pandemic, all of the elements of this research were done online, and the game is completely digital. This also affected the target group of the game. Instead of using actual stakeholders of the case, **students** of relevant studies were chosen to play the game. For instance, students from the study Water Management would play the game taking the role of the water management organisations and students of the study Livestock Farming would represent the agricultural sector. In this way, the players had some affection with the case study, and to a certain extent they would have these different epistemic outlooks as described above.

With two different groups of students, the final design of the game was played in two separate sessions. These sessions were both evaluated with **evaluation forms** that the students filled out (Chapter 6).

Final conclusion

As these results showed that the players built more trust during the game and gained more insight into the perspective of other players, the game seems to achieve its goals quite well. Furthermore, both single and double loop learning could be found to a certain extent. For the final conclusion, however, it is hard to say if the game did actually lead to a more effective collaboration, since more research and a follow-up session would be needed for that to be assessed. Nevertheless, the game is fun to play and it has quite some **potential for stimulating double loop learning and creating a situation in which more effective collaboration could take place** (Chapter 7).

1. Introduction

This first chapter of this thesis introduces the **case of peat meadow areas** and its controversy. After that, the outline of this research will be sketched with the **research questions** that lead the report. Also, the relevance of the research will be mentioned.

1.1 Peat grounds in the Netherlands

The Netherlands is famous for being a small and particularly flat country with a lot of pasture with cows and other cattle. Most people also know that almost two thirds of the country is situated below sea level and only protected by dunes and dikes. The low ground level is caused partly because of the settlement of the peat, which is a wet and soft soil type that comes from river deposit in the history of the Netherlands (Rijsdijk, 2013; Wong et al., 2007). Peat grounds lead to more problems than settlement.

Two third of the living surface in the Netherlands is used for agriculture purposes (CLO, 2019). This means that there are a lot of farmlands across the country. The soil type of an area determines what kind of farming can be done. For instance, arable farming requires more fertile grounds, since crops like potatoes should grow fast and large for more profit. Fertile soil in the Netherlands mostly consists of clay grounds, of which most can be found close to the coasts of this country (CLO, 2019). From northeast to the southwest, however, a strip of mostly peat ground covers the Netherlands. This is shown in the map of Figure 1.1. The soil here is less fertile and is therefore not used for arable farming, but more for dairy farming (CLO, 2019). Peat meadow ground, however, is quite humid and soft, which forms a problem here. Take a cow, for example, which is a large and heavy animal, but all its weight is carried by four small legs with hooves. If such an animal would stand on untouched peat meadow grounds, it would sink and it would not be able to walk. To solve this problem, the peat grounds were drained from water, so that the soil would dry out and harden. Now it was possible for the cattle to walk on the lands and dairy farming could be executed here.

Figure 1.1: Map of peat meadow grounds in the Netherlands. The green coloured areas represent peat grounds. Source: Wesselingh (n.d.)

Draining these grounds to enable cattle to graze the peat meadow grounds or use it for other purposes is quite an old-fashioned solution, which is used since the 11th century (Brouns et al., 2014). Before that, all these areas were swamps that were not inhabited. Although making the soil usable sounds like a positive thing for the country, the drainage has had multiple negative effects as well, which are now uncovered clearly. The first effect is a chemical reaction of peat with oxygen and heat. By draining the peat, the soil comes in direct contact with oxygen in the air and warm sunlight. Bacteria that were hidden in the peat under water, become active and react with the oxygen and the warmth. This results in the forming of CO2 and some methane,

which are added to the atmosphere. This problem is larger than most people realise; all peat meadow areas in the Netherlands together, emit 2.5-4.0 % of the total greenhouse gases in the country (Van Den Akker, Hendriks, Hoving, & Pleijter, 2010; Voorwinde et. al., 2019). It also results in subsidence, since parts of the ground have now been transformed into gases. Up to 85% of the peat layer can be lost in oxidation, which causes the largest part of the subsidence (Brouns et al., 2014; Hendriks & Van Den Akker, 2018; Van Den Akker et al., 2010). Add up to this information that dairy farmers drained the peat further each time the subsidence was affecting the lands and making the soil too wet for the cattle; this caused the land to oxidate even more over all these years. The effects of climate change do also increase the speed of the oxidation process, since the summers become dryer. This has as an effect that the water level drops even further under the surface in the summers, which creates even more room for oxidation in the deeper layers of the ground. This becomes an endless downward trend (Figure 1.2) with the peat oxidation emitting even more greenhouse gases and therefore enhancing the effects of climate change, which in turn increases the amount of hot summers, etc. (Brouns et al., 2014; Hendriks & Van Den Akker, 2018).

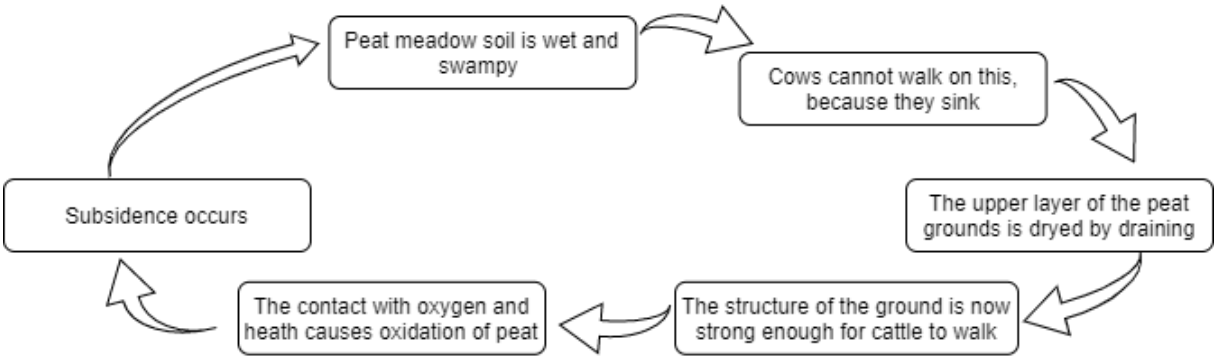


Figure 1.2: The downward trend of subsidence of peat soil. (Source: made by author)

Another effect of draining the peat, is that the layers of the soil below (which consist of more humid peat) are settling. Since the lands are now no longer uninhabited swamps but are used for farming and cattle grazing, more weight is compressing these lowers layers. This effect of compression also contributes to the subsidence of peat meadow areas (Brouns et al., 2014; Heselmans, 2017; "Homepage Slappe Bodem," 2020). Both of these effects are shown in Figure 1.3.

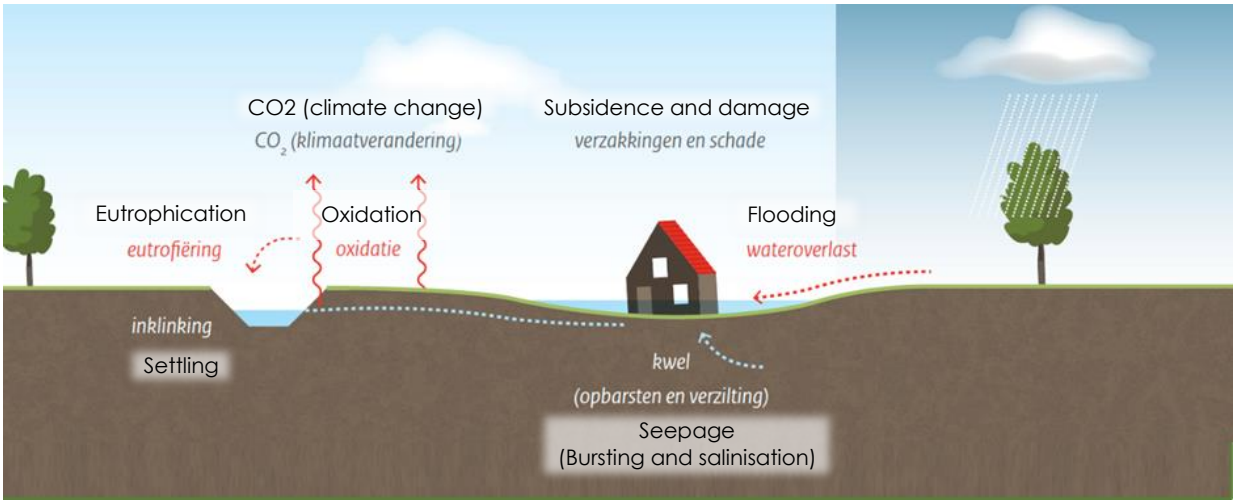


Figure 1.3: Oxidation of peat on the left and settlement because of the weight of the house on the right, two different effects of peat grounds. Source: PBL (2015, p. 43) the English terms are added by the author.

According to different sources, the total subsidence is 0.9-2.5 cm per year on average in the Netherlands (Brouns et al., 2014; Hendriks & Van Den Akker, 2018; Kwakernaak, 2015; Van Den Akker et al., 2010; Van den Born, Talsma, & Schouwenaars, 2018). Because of this drastic subsidence over all these years, Kwakernaak (2015) states that most of the peat layers are so thin nowadays, that one can hardly refer to them as peat grounds anymore. Before peat was cultivated by peat cutting and drying the grounds for cattle, the soil would consist of up to 50% of peat; currently, only 8% of the soil is peat. Therefore, Kwakernaak (2015) poses the question if maintaining the peat grounds should be the prior use of the water in the Netherlands. Since sweet water is becoming scarcer and since we hardly have any peat left, would it not be an option to use the water for shipping in the rivers, cooling of energy plants or irrigation of agricultural crops?

Brouns et al. (2014), however, mention that with continuing the current practices of land use, will already lead to a complete disappearance of the peat ground in 200 to 500 years. And although this might be inevitable anyway, multiple serious effects are mentioned as a result of this complete oxidation:

- "Damage to building foundations"
- "Desiccation of nature reserves"
- "Emission of greenhouse gases"
- "Increasing costs for water management and infrastructural maintenance"
- "Deterioration of surface water quality"
- "Loss of characteristic landscape"

(Brouns et al., 2014, p. 361)

These are serious effects, which should be tried to be minimised or be prevented at all. That is why multiple solutions are already researched by different research departments or organisations. The most popular solution so far is the application of pressure drainage. This is the evolved version of under water drainage; the idea is to

place pipes under the surface of the meadows from ditch to ditch to wet the grass closer to the surface. The extra application of pressure drainage is that you can manually steer the water level under the meadows. This reduces the subsidence of the grounds to approximately half the speed, since the water can be held at a level of approximately 20-30 cm under the surface instead of the average 100 cm, which leaves less room for oxidation (Hendriks & Van Den Akker, 2018; Heselmans, 2017; Innovatie Programma Veen (IPV), 2019; Nationaal Kennisprogramma Bodemdaling, 2018; Van Den Akker et al., 2010; Van den Born et al., 2016, 2018). Although this seems to be a good solution, it had some major disadvantages as well, of which the high investment costs are forming the biggest obstacle.

Another frequently mentioned alternative, is the replacement of dairy farms by the cultivation of wet crops. By wet crops are meant products like cattail, cranberry, sphagnum and azolla, which grow with a completely drowned surface (Veenweiden Innovatiecentrum (VIC), 2016). The advantage of this, is that the subsidence would be stopped, since the peat has no contact with the air anymore. However, there are some drawbacks to this solution as well. It now seems to become clear that flooding all the fields would increase the emissions of methane, instead of stopping it (Bestman et al., 2019; Innovatie Programma Veen (IPV), 2020). Next to this, more obvious disadvantages like the required abandonment of dairy farming and a change of landscape are holding back multiple stakeholders as well.

Just like the mentioned solutions of pressure drainage and wet crops, multiple other solutions are researched by research organisations like the 'Veenweide innovatiecentrum' (VIC), 'Innovatieprogramma Veen' (IPV) or the platform 'Slappe Bodem' (Innovatie Programma Veen (IPV), 2020; "Projecten slappe bodem," n.d.; Veenweiden Innovatiecentrum (VIC), n.d.). Apart from the fact that the effectiveness of certain solutions highly depends on the region where the peat areas are, it seems either way that there is no solution yet that can be accepted by every stakeholder.

1.2 Controversy

Multiple stakeholder workshops and other conversations with stakeholders and decision makers have been organised already in search of appropriate solutions. For instance, Brouns et al. (2014) mention a workshop in which stakeholders were situated around a so called 'touch table' in which interactive maps were simulated in which they could visualise different solutions they were mentioned in the session. Also, more classical area planning processes are organised, for instance by regional water authorities. In these more classical settings, one party leads the session -for instance by coming up with a plan or a scenario- and invited stakeholders can give their opinions, solutions and objections (interview with Marieke Desmense, 13-11-20). HDSR (n.d.) shows another original way of bringing stakeholders together and look for a collaboration towards the right solutions in their peat meadow area. On this web page is described how 'Hoogheemraadschap De Stichtste Rijnlanden' in cooperation with other parties, designed a serious game to make this work. This is an original method that seems to draw people out of their comfort zone and pushes them to a whole new

form of thinking and discussing. As can be read in the sub heading 'This research', a serious game will be designed for this research as well, therefore the RE:PEAT game will be discussed further in Chapter 3.1.4.

Although multiple ways of stakeholder involvement are organised and experimented with and although some solutions are already implemented on certain places, one general solution that every stakeholder can agree with is hard to find. Each solution can have disadvantage for one or more stakeholders and the effects and practicality of solutions depend on which specific area the plans are focused. (Regional) authorities like 'Planbureau voor de leefomgeving (PBL)' are forced into a difficult combination of goals. On one hand it is necessary to reduce of stop the subsidence, but on the other hand the traditional landowners and culture of the peat meadows (mostly farmers) are wanted to be kept working in some sort of way. A lot more challenges out of different corners draw the attention and necessity of the authorities (Hendriks & Van Den Akker, 2018; PBL, 2015).

Because of this situation in which one general solution cannot be found and where the emotions can run high in the debates on these lands, it forms a complex situation which is not easy to handle. Each stakeholder has a different opinion, and it is hard to accept that other stakeholders think differently and see other problems; we can call this a controversy. Controversies are simply described by Venturini (2010, p. 261): "controversies are situations where actors disagree (or better, agree on their disagreement)". He describes it as a situation between the point in time where actors cannot ignore each other's arguments anymore and between the point where the actors make a compromise to agree as far as possible (Venturini, 2010). More information on controversies can be found in Chapter 2.1.

1.3 This research

This research focuses on letting the contestants take a step back. In the situation of a controversy, asking the stakeholders to collaborate in an effective way is not easy. Therefore, the focus does not lie in finding a solution, but in creating a collaborative situation in which the stakeholders understand each other's viewpoints and their motives. For the stakeholders to be ready for such a collaboration, they first need to learn what the worldviews of other stakeholders look like. This is a form of single loop learning, which is a way of learning to adapt to certain standards. However, more importantly, the stakeholders should try to understand why people have different perspective and to be able to accept these differences. This is a form of double loop learning, in which people learn to question the standards of a situation (based on Argyris (1977)).

This leads then to the main research question of this research:
To what extent can parties with different epistemic outlooks in the societal controversy of peat meadow areas in the Netherlands, come closer to effective collaboration by using a serious game as a participatory tool that stimulates double loop learning?

To structure the research further, the following sub questions are posed:

- *What does the controversy of the peat meadow discussion look like?*
- *What do the epistemic outlooks that the different stakeholder groups have, look like?*
- *When analysing the controversy of the peat meadow areas, what elements of collaboration could be applied to create a situation in which effective collaboration could take place?*
- *What participatory intervention tool can be chosen to organise a situation in which the different stakeholder groups can achieve double loop learning?*
- *How can a design of a participatory serious game be made that could create a situation in which the different stakeholder groups could achieve a more effective collaboration?*
- *To what extent does the design of the participatory serious game create a situation in which the different stakeholder groups can achieve double loop learning?*

The sub questions are all building up to gather all pieces of information that is needed for this research. So, to answer the main research question, first the controversy of peat meadow areas will be studied with a literature study, a desk-research, and via interviews with stakeholders. Then, literature on collaboration is used to find grounds on which a better understanding of each other can be formed. In an attempt to bring the stakeholder groups closer together, an intervention will be organised. The form of this intervention is decided to be a serious game which will be designed for this research; these games have the potential of stimulating learning in a different way (Blunt, 2009). Medema, Furber, Adamowski, Zhou, & Mayer (2016) mention that serious games could indeed be a tool that could help in strengthening the relationships between stakeholders and that could lead more communication between the different groups.

The conversations in the search for solutions for the peat meadow case are not very effective nowadays. Most stakeholders already attended multiple of these discussions, which were all built up in about the same way, which makes the situation right now quite stuck in the same position. A serious game would put the stakeholders in a completely new environment with other impressions and experiences, which might take them back to a place where more learning is provoked and where communication on other levels can be stimulated.

Some criteria were set to assess whether a certain case study would be suitable for this research.

A fitting case study would…

- …expose at least two groups of people which act based on different world views.
- …take into account the use of different facts and values to support certain claims.
- …be a discussion on a situation or project that has a certain impact on climate change.
- …involve a tangible process which makes it possible to keep this research feasible in practice.

The case of the peat meadow areas does fit those criteria, since it involves stakeholders that want to maintain the meadows for cattle grazing and stakeholders that want to change this situation -drastic or not- to keep it from further subsidence. However, most research is not completed yet. This means that during the conversations on solutions, ideal solutions might not have been found yet, or may later appear to have critical setbacks. Since these continuing studies are sometimes done on the same topic in different settings by scientists with different relations and interest, it might also be the case that different values and starting points might be taken into account per research.

The case also fits the criterium of having impact on climate change, since the dried peat meadow emits quite some methane and CO2 because of the reaction between the bacteria in the ground with the oxygen and heath in the air (Van Den Akker, Hendriks, Hoving, & Pleijter, 2010; Voorwinde et. al., 2019).

This set-up and boundaries turn this research into a new insight for the existing literature, the so-called knowledge gap. It brings three elements together (1) by discovering the different world views in the peat-meadow case and (2) researching how this information can be deployed to have a chance of mutual understanding and collaboration, which leads to (3) a serious game with the stakeholder groups to bring them closer together. There is one approach used in this research that ties these three elements together, which will now be explained.

1.4 Approach

For the different elements of this research to come together, the approach of Design-Based Research is used to structure this research. Design-based research is explained by Wang & Hannafin (2005) with the following definition: "*Design-based research is a research methodology aimed to improve educational practices through systematic, flexible, and iterative review, analysis, design, development, and implementation, based upon collaboration among researchers and practitioners in real-world settings, and leading to design principles or theories.*"(Wang & Hannafin, 2005, p.2). So, in this concept, research and design are integrated. It is a more interactive way of research and involves multiple iterations in the development of the study and the design. Since this research includes a direct connection the real world with the controversy in the peat meadow areas in which participation and collaboration with the stakeholders is needed, and since there is aimed for a design of a participatory tool in which effective

collaboration can be stimulated, the concept of design-based research supports this study as an overall approach quite well.

This type of research is taught in the master programme of Science Communication, so executing this was already known to me. Van der Sanden & de Vries (2016) have written a book in which a form of design-based research is explained based on the explanation by the British Design Council as described by the study of Stickdorn & Schneider (British Design Council, 2019).

This form of design-based research can be depicted with a double diamond which shows rather clearly what this process looks like (Figure 1.4). It starts with a diverging movement in which information, understanding, and ideas are collected ('discover'), then it converges towards a specific focus ('define'). After that, it makes the diverging movement again to collect input which can help to improve the focus point ('develop') and it ends with a converging movement in which the design is developed and made concrete in the end ('deliver') (British Design Council, 2019; van der Sanden & de Vries, 2016).

These four steps will all be followed throughout this research. The research on the controversy of peat meadow areas will form the 'discover' part, in which the situation of peat meadow areas in the Netherlands as a whole will be explored. Then, by defining the different epistemic outlooks and the tool that would fit the case, the second step of 'define' will be passed. After that, the diverging movement of the 'develop' phase is started when all ideas for a serious game are created and collected. By choosing the direction of the game and developing the design towards the final design of the serious game, the 'deliver' phase is executed.

At the start of each chapter, a depiction will be shown about the phase of this double diamond that is treated in that certain chapter. In Figure 1.4, the depiction of the diamond shows that this chapter comprises a small part of the 'discover' phase (shown with the green lines). This originates in the fact that the information on the case study that is mentioned in this introduction chapter, is already part of the 'discover' phase of this study. The rest of the 'discover' phase will be covered in Chapter 2.

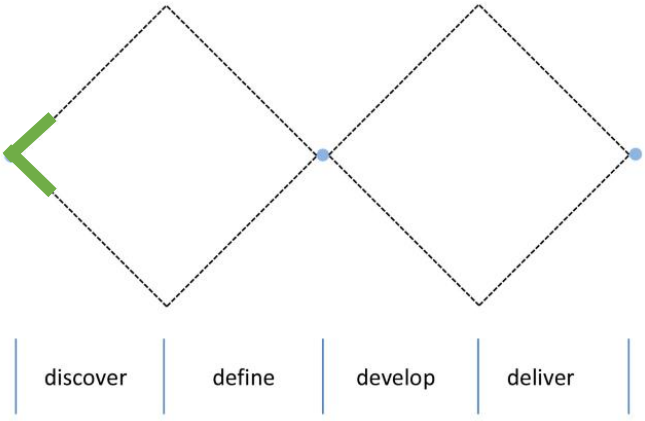


Figure 1.4: The double diamond of a design process. The contribution of this introduction chapter to the research is depicted in the beginning of the 'discover' phase with the green lines. Source: van der Sanden & de Vries (2016, p. 137)

1.5 Relevance

This study should also fit in relevance for both of the masters Industrial Ecology and Science Communication. In the field of Industrial Ecology, sustainability is looked at from three different perspectives; an environmental perspective is the first, which aims at conserving the planet better than we are doing at the moment. Besides this, to make sustainable solutions work in our society, it is also necessary to consider the economical and the social perspective of implementing sustainable solutions, which are the other two perspectives that can be taken in the field of Industrial Ecology (Hauff & Wilderer, 2008). The subject of this research does use the social perspective in the research field of Industrial Ecology, since the conversation and relationships between stakeholders are central here. The subject of the oxidation of peat, which is a contribution to the Dutch emissions of greenhouse gases, does indeed fit the classifications of sustainability for Industrial Ecology.

There is also clear relevance for the Science Communication master. Working towards a goal of some form of collaboration does fit in the SEC research line of collaboration and co-creation. This research can therefore be of added value for this department, since it will be studied whether this design of the serious game does indeed bring enough insights in each other's world view to be able to work together in some form of collaboration towards a solution.

The societal relevance of this research can be found in finding a practical solution for the peat meadow areas to which everyone is able to agree. Smoothening the discussion by giving insight in each other's different worldviews could lead to a certain collaboration in which a strong solution could be found. Also, building this type of collaboration with different parties within a controversy is an interesting gain for communication research.

1.6 Outline of this thesis

Since this thesis was written for two master programs, the study is quite extensive and includes multiple different phases. Using a standard report structure with only one literature chapter, one methodology chapter etcetera, would therefore be hard to follow, since it would include different literature studies in one chapter and different methodologies in one chapter etcetera. Therefore, it was chosen to divide this thesis in five main parts (Chapter 2, 3, 4, 5 and 6). Each part has its own literature study, its own methodology etcetera. In this way, the information you need for reading that part of the study is found closer by. The seventh chapter will summarise all different sub questions and will finally answer the main research question of this research. It will also include a critical reflection on the different elements of the study and the choices that were made. Some chapters might be more extensive than others, but every chapter was a crucial part in this thesis and contributed to the end result.

In the research flow diagram shown in Figure 1.5, the structure of this research is visualised. In this figure, it is described how the sub parts of this research build up on each other in a research flow diagram (the dark green blocks). The blue elements describe methods that were used for that part of the research or for retrieving a specific part of information. The lighter green blocks show the input for that part of the

research. As can be seen, all parts are connected and built-up on each other. Furthermore, some information of the light green blocks formed input for multiple phases of the study.

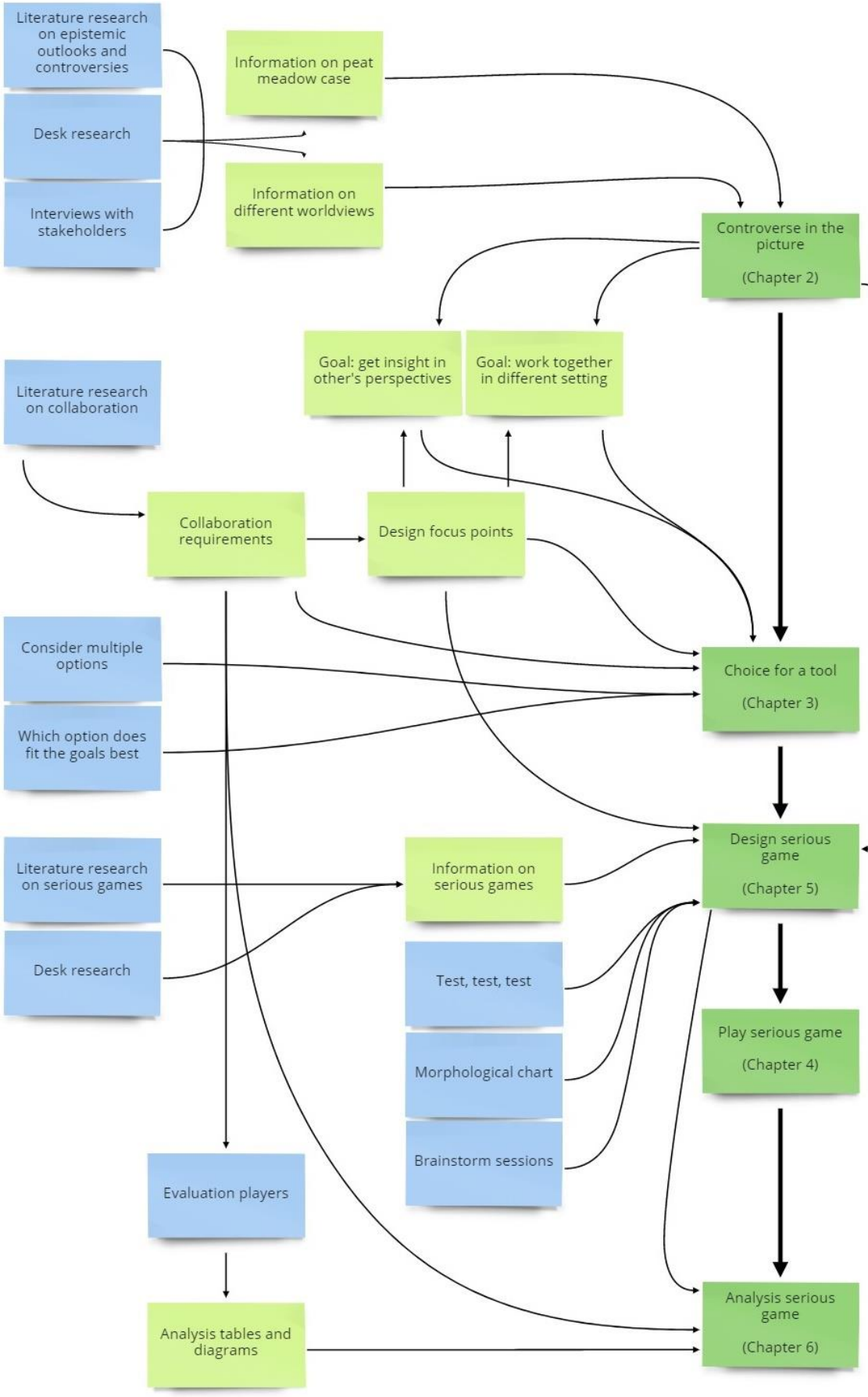


Figure 1.5: The research flow diagram of this thesis. With the dark green blocks as sub parts of this research, the light green blocks as input for these sub parts, and the blue blocks as methodologies that were used. (Source: made by author)

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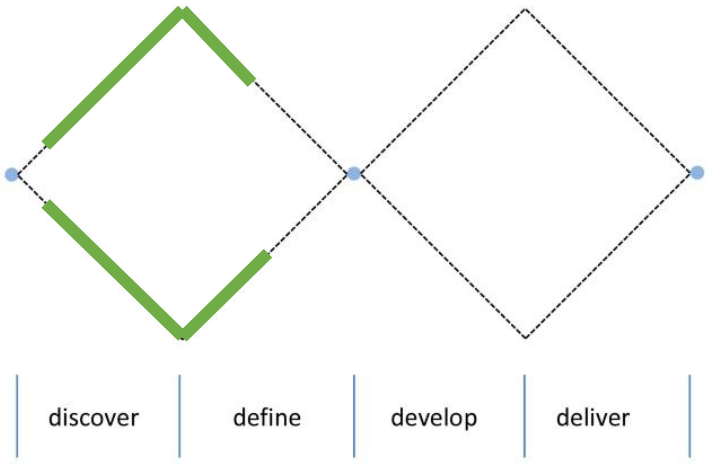
2. Controversy

In the first part of this thesis, the controversy of peat meadow areas in the Netherlands is introduced. To start this part, a literature research was done on the notion of **controversies** as a whole. In this way, controversies can be recognised and analysed according to the standard notions in this thesis.

Then, a literature study and a desk-research on **peat meadow areas** in the Netherlands were done, to gather more general knowledge on the situation.

To gather more details, more stakeholder views and more specific knowledge, **(experience) experts were interviewed**. This led to new insights and to a more complete picture of the peat meadow areas in the Netherlands. This forms the end of the 'discover' phase in the picture below. By defining different stakeholder groups and their worldviews in the analysis of this information, the 'define' phase starts.

This complete picture and its first analysis end this chapter of the thesis and will then be assumed as basic knowledge for the following parts.



2.1 Theory - controversy

As was shown in the introduction, the situation of peat meadow areas can be described as a controversy, which is a situation between the point in time when actors cannot ignore each other's arguments anymore and between the point where the actors make a compromise to agree as much as possible (Venturini, 2010). In this chapter, the literature study on controversies and the specific case of peat meadow areas is described. At the end of this chapter (2.1) in Table 1, a brief summary of the discussed theoretical elements is given.

2.1.1 Design-based research - Discover and define

The 'discover' part of the double diamond as introduced in Chapter 1.1.4, is the first step of the design-based approach, when as much information as possible is collected on the situation and conversations with people who are related to the case are held (British Design Council, 2019; van der Sanden & de Vries, 2016). In the introduction, this discovering process has already been started when information on the problems with oxidation of peat were studied. In this chapter, more information on the case will be collected via different interviews, a desk-research, and a literature study.

The next step of the double diamond is the 'define' phase, what type of problem do you have and who and what is involved? This phase gives you the possibility to approach the case with a different angle (British Design Council, 2019; van der Sanden & de Vries, 2016).

As can be seen on the title page of this chapter (3), the define stage will only be partially completed in this chapter. After as much information as possible is collected (end of the discover part), all stakeholders and their epistemic outlooks will be analysed (start of the define part). This leads to a definition of the specific characteristics of this case and influences the last part of the definition phase, where the angle and design brief for the case will be defined and a fitting tool can be chosen (Chapter 3).

2.1.2 Frictions in controversies

With major sustainability discussions like this, protests come along quite often; in this case, the farmers are the most familiar face of this protesting group, since it is their activity that creates the situation of subsidence. Also, the nature preservation group can be seen as a protesting group. According to Spruit (n.d., p.2), this opposing group can adopt different forms. It can, for instance, originate as citizen initiatives and petitions, activist and anti-wind advocacy groups and governmental activism.

These controversies are mostly seen as a difficult situation which slows things down without being of additional value (Cuppen, 2018). To avoid dissatisfaction among the public about these plans, multiple projects try to involve the public more in the decision process nowadays according to Taebi (2017). However, this does has not brought satisfying results yet. Reasons for this are given by Taebi (2017); in this paper, it

is stated that on the one hand project managers are involving the public too late, which gives the protesters little influence on the actual evolvement of the project. There are parties on the other hand, which try to prevent the controversies, but in these cases only social acceptance (getting a new technology accepted by a community) is taken into account, whereas ethical acceptability (reflection with the moral issues on a new technology after its introduction) is not looked in to at all. Using the combination of these two perspectives in a good way could bring much better results when the satisfaction of all involved stakeholders is concerned. (Taebi, 2017).

Cuppen (2018) argues that conflicts in this kind of considerable sustainable projects, should not be seen as a difficult element which you need to manage correctly, but as self-organised participation. When listening well enough to these controversies, it can be used as a way to let people identify with the project and as useful input for the project itself (Cuppen, 2018).

This is a new field in the Industrial Ecology on which more research is needed on how to find the sweet spot between the execution of a sustainable plan and the using of controversies as input for that plan. Right now, it is proven that thorough and continuous inclusion of all values of the conflicting groups would be the best way to implement new technologies and projects without having too much resistance (Taebi et al., 2014). Still, this raises a lot of questions, because some groups include more people than other groups and some groups shout harder than other groups, which makes it hard to determine what has to be taken into account and what does not. Another element that makes the authenticity of the claims hard to distinguish, according to Spruit (n.d.), is that the claims that both proponents and opponents make in such discussions, are different from claims made in science. What is meant by this, is that scientists often do research to try to find out how reality works, which originates from a truth-finding goal. In these kind of discussions, however, people only look for claims with a justifying goal to support their own statements (Spruit, n.d.).

The debate on controversies is also addressed by Pesch et. al. (2017). In their paper is stated that controversies are processes of 'overflowing', a term which describes that the feeling of injustice growing within the informal trajectory about a project exceeds the limits and flows back to the formal trajectory. Pesch et al. (2017) describe three main differences between the group that will execute the, in this case, new standards of the peat meadow areas in the Netherlands (formal trajectory) and the group that advocates for values that are in their opinion not heard by the formal trajectory (informal trajectory). These three differences are the following: 1) there is a difference in value expression between both groups; 2) both groups have a different starting point in the discussion; 3) both groups believe in a different democratic principle.

The people following the informal trajectory, use a value expression in which a narrative rationality is central. This means that the people in this group think and speak using stories coming with emotions and beliefs. Culture, morality and social interaction are the underlying base for this way of communicating (Eden, 1996). The people communicating through the formal trajectory, use a judicial rationality; their argumentation is based on facts and legitimacy. These two ways of communicating

seem to be conflicting, since the groups speak a different language (Pesch et al., 2017; Sarewitz, 2004). Roeser & Pesch (2016) cover this conflict in their paper as well; here is claimed that emotions could serve to assess the ethical aspects of such innovations and should therefore not be ignored. They propose a new form of participatory risk assessments in which emotions play a significant role in the debate. The form of such a debate could be based on value-sensitive design or constructive technology assessment (CTA) to include the emotional factor in the design of these projects. It is described by Pesch (2015) that the bridging events in such a CTA can enforce the designer to include the emotional value in the project. If emotional arguments, mostly coming from perceived risks in the short term and personal future, are taken seriously and adjustments on emotional aspects are made in the project, people are more willing to accept the outcome and thus less controversies will arise (Lorenzoni & Pidgeon, 2006; Roeser & Pesch, 2016).

Fløttum et. al. (2014) research in their linguistic study how people describe the future in the perspective of climate change. This is an area that is missing in the debate of controversies. As Fløttum et al. (2014) explain, people do either describe a negative scenario or a positive and ideal future. This distinction determines whether the motivation to act in a more sustainable way increases or decreases (Moser & Dilling, 2012). Most people realise that this discussion is a social dilemma, in which collective effort is demanded to achieve the ideal future; but despite this realisation, the effort that the individuals should make to achieve this goal, remains a major barrier (Capstick, 2013; Wolf & Moser, 2011). Nicholson-Cole (2005) proposes that visualising the future by scientists, media or other sources, could help to relate climate related problems better to the future of an individual. This might lead to a more active attitude towards a sustainable lifestyle. However, the way that the future is depicted now, is not considered attractive enough to only have a positive influence on people's behaviour (Nicholson-Cole, 2005).

2.1.3 Epistemic cultures

Discussions in controversies are also described by Spruit (n.d.) in a controversy about the noise of windmills. In such discussions, some elements do have a quite technical nature in which the specifications of the wind turbines itself are questioned. However, in the same discussion also claims of credibility come forward. Spruit (n.d.) handles these different elements of the discussions by using the frame of epistemic cultures. Epistemic cultures are explained in Spruit (n.d.) as 'cultures that create and warrant knowledge'. The opposing group(s) often do(es) not protest because of a lack of knowledge about the subject. Their argumentation should be seen as value-based, which is entangled with fact-based arguments; this unstructured combination makes it a wicked problem. In this paper, the framework of Knorr Cetina (1999) is used to analyse this behaviour (Spruit, n.d.).

Knorr Cetina (1999) deals with processes of discussions in which multiple groups make different claims by appointing four main 'machineries': the symbolic machinery (standard signs/habits like jargon), the empirical machinery (what kind of research is

done and in what way), the social machinery (who produce their knowledge) and the power machinery (what do the power distances look like).

Spruit (n.d.) explains these machineries with her own interpretation and uses them to describe the discussion on noise of the N33 windmill farm in the Netherlands. When looking at the symbolic machinery, she finds that the proponents of such a farm mostly use formal means with technical language to express their opinions. The opponents, on the other hand, use both formal and informal means to ventilate their opinion, they tend to also use more technical language to express themselves in a more official way. However, the argumentation of the protesters is more emotionally and personally grounded. Counterarguments can be focused on the background of the proponents and not on the content of their claims. Where opponents tend to use technical language to level with the arguments of the proponents, the proponents also tend to adopt the more personal means of communication from the opponents (Spruit, n.d.).

In the empirical machinery, this research shows that both groups frame the found information completely different. The proponents talk about a spatial planning project which is supported by models and calculations, whereas the opponents see the whole project as an experiment. It is also striking that the methods and information sources of the opponents are openly ventilated and clearly traceable, whereas those of the proponents are quite hard to distinguish. This difference entails a situation of contradicting claims of how the hazards should be calculated (Spruit, n.d.).

In the social machinery, Spruit (n.d.) finds that the calculations of the proponents are made by experts who were also involved in the calculations of earlier windmill farms. The opponents found experts via their network of action groups raised by earlier protesters against windmills in other projects.

The power machinery is less suited to find differences, although it is possible to find power distances in the other machineries. For instance, the symbolic machinery shows that the proponents might be higher in hierarchy than the opponents, since the opponents tend to use more technical language to express themselves towards the proponents. On the other hand, standing together in rejecting the claims of the counteracting group, makes the power distances even larger, since a group tends to lean closer and closer towards their own claims instead. Power distance is also about the access that a group has to power. This is shown at the end of the discussion when the decision is made, it is seen that the proponents might have better access to power, since they won most frequently. Indeed, although the national government took the claims of the opponents into account by moving the farm further away from the villages, the wind turbines became more powerful and the farm became bigger (Spruit, n.d.).

Table 1: A brief summary of the literature that was discussed in this chapter.

Paper	A brief summary of the literature in this chapter
Taebi (2017)	• Involvement of public is too late • Ethical acceptability is not taken into account
Taebi et al. (2014)	• Thorough inclusion of values is needed to decrease controversies
Pesch et al. (2017)	• Difference in value expression between formal and informal trajectories
Roeser & Pesch (2016)	• Emotions can judge the ethical aspects of innovations better than a rational perspective
Fløttum et al. (2014)	• People describe the future in many different ways: often dividable in bright or doomed
Moser & Dilling (2012)	• The perspective on the future determines whether people want to act on it or not
Capstick (2013)	• Collective effort is demanded to reach the ideal future, but individual effort is hard to bring
Nicholson-Cole (2005)	• Visualisations of the future by scientists, media or other sources influences people's sustainable behaviour
Spruit (n.d.)	• The argumentation of a protesting group (an epistemic culture) should be seen as value-based, which is entangled with fact-based arguments • A social discussion can be described by using the framework of four main machineries of Knorr Cetina (1999) • Epistemic cultures are: 'cultures that create and warrant knowledge', every group has their own knowledge base and therefore uses different frames when looking at a controversy.
British Design Council (2019) & van der Sanden & de Vries (2016)	• In the discover part of the double diamond of the Design-based Research, information is collected and conversations with stakeholders are executed. • In the define phase, your angle of approaching the situation is formed.

2.2 Methodology - controversy

In this part of the research, an approach of multiple qualitative methods was used to answer the two following sub-questions:

- *What does the controversy of the peat meadow discussion look like?*
- *What do the epistemic outlooks that the different stakeholder groups have, look like?*

To answer these questions and to secure a good base of knowledge, a literature research was done on controversies and peat meadow areas to cover the knowledge needed for the first part of this thesis. Also, a desk-research was performed to map all details of the discussions on peat meadow areas in the Netherlands so far. To understand the deeper line of reasoning of the different groups, interviews were conducted with some representatives of the stakeholder groups and more overall experts of the situation.

This study takes place in unusual times; with the coronavirus paralysing the activities of normal lives, this research was executed not exactly how it was proposed at first. Fortunately, the literature study and the interviews could be conducted online as well, which did not limit the research here. Having the interviews online, may even have increased the number of people that could be interviewed in a period of time, since the time for traveling was non-existent.

2.2.1 Literature review

To start this thesis, the subject of peat meadow areas and controversies had to be explored. First, existing literature on controversies was sought for to be able to answer the first sub-question. This was necessary to gather sufficient understanding of controversies in general.

Some of this literature was then found via Scopus mostly with terms like: 'controversies and climate change', 'public perspective on future climate' and by snowballing (searching literature in the literature references from another paper). However, most literature on this subject was found via multiple teachers in Industrial Ecology. For instance, during our conversations on this thesis, multiple papers on controversies and social conflicts were shared, which I could use and which I also used to find new information via snowballing.

When the case study was defined, existing literature on the topic of peat meadow areas was consulted. This was needed to be able to describe the controversy on this specific topic and, therefore, to be able to answer the first research question completely. Some information on the second research question was found here as well, since some literature touches upon the different perspectives.

Most of this literature was searched on Scopus. However, since this subject is not very well-known internationally, which consequentially means that there is a small number of papers to find on this subject, therefore grey (mostly Dutch) literature was used as well. For finding these pieces, Google Scholar was used as well. The key words that were used to find literature on peat meadow areas in the Netherlands are: 'peat meadow area Netherlands', 'bodemdaling veen klei', 'veenweidegebieden

Nederland' and variations on these terms. Also snowballing from the collected papers led to new useful literature. Appendix A shows which literature was conducted and how it was retrieved.

2.2.2 Desk-research

As was mentioned in the literature review, the subject of peat meadow areas is not quite a broad research area. Therefore, a desk-research on this topic was done as well. To be able to answer the first and a part of the second sub-question, this was needed, because it added new and detailed information to the literature.

This analysis involved searching on Google with (mostly Dutch) terms like: 'veenweidegebieden Nederland', 'bodemdaling veengebied, 'onderzoek veenweidegebieden'. Then, via websites that were consulted, articles that were read, news articles that were found, snowballing occurred here as well, in the sense that new search terms were found via the new information. Also, via some interviewees, more information and website URLs were shared, which slowly completed the picture of peat meadow areas in the Netherlands. Most information and interesting links were found on the websites of Veenweide Innovatie Centrum (VIC), Slappe Bodem, Stichting Toegepast Onderzoek Waterschappen (STOWA) and Innovatie Programma Veen (IPV). However, the most detailed and interesting information came from the interviews.

2.2.3 Interviews

Since this subject is quite specific as mentioned before, it was of added value to gather information on the peat meadow case via experts as well. And not only general information was collected in these interviews (first research question). For the insight of the different perspectives on this case, the information that (experience) experts and actual stakeholders have, was crucial to be able to answer the second research question as well.

This is an exploratory, qualitative research, which means that the development of the research and choices for further steps were not all fixed beforehand. The interviews that were conducted at a later stage of the research, could therefore include more detailed questions, since collected information of former parts of the research could raise new questions and rephrase old ones. The answers that were given during the interview could also lead to extra questions that were not prepared beforehand. However, for some crucial elements, it was important to gather multiple insights on the same questions. Therefore, a standard format of questions was created as a base for all interviews (Appendix B). To keep the options open to ask extra (in-depth) questions, the interviews in this research can be defined as semi-structured.

In total, ten (experience) experts were interviewed. The people that were interviewed are shown below (in order of interviews done). For each interviewee, his or her function and company is shown. The in which how people were found is also noted per person.

- Erik Jansen
    - Advisor at Veenweide innovatie centrum (VIC)
        - Contact found on the website of the VIC when reading on the project of 'Sturen met water'
- Roel van Gerwen
    - Programme manager Herbestemming Het Huys ten Donck and Innovatie Programma Veen (IPV), Projectleider Natuurlijke Zaken
        - Contact found when reading about 'Innovatie programma Veen' on the website of 'Slappe Bodem'
- Ron Janssen
    - Associate professor environmental management, decision support, spatial analysis, multicriteria analysis at the VU (Vrije Universiteit Amsterdam)
        - Contact found in a document on 'Veenweidevisie Friesland' on the website of IPV
- Edo Gies
    - Researcher and consultant in regional development and spatial use at Wageningen Environmental Research (WENR)
        - Contact found in a document on 'Vormgeven aan sturen met water' on the website of the VIC
- Jos Verhoeven
    - Professor Biology - Environmental Biology - Ecology and Biodiversity at the UU (Universiteit Utrecht)
        - Contact found in a document on 'Veenweidevisie Friesland' on the website of IPV and recommended by Ron Janssen
- Ad van Rees
    - Board of Deltamilk and dairy farmer on peat meadow area
        - Recommended by Edo Gies
- Soet Huijbregts
    - Senior policy advisor and environment manager at Delfland water board
        - Contact found via general contact email of Delfland water board
- Daan Henkens
    - Policy advisor on groundwater, subsoil and (water) soil at UvW (Unie van Waterschappen)
        - Recommended by Soet Huijbregts
- Nanette Elfring
    - Via APPM (project management consultancy firm) now working on a project for the Rijnland water board on a peat meadow area
        - Contact found via general contact email of Rijnland water board and Marieke Desmense
- Marieke Desmense
    - Project and environment manager at Rijnland water board
        - Contact found via general contact email of Rijnland water board

Between half of May and half of November 2020, the interviews took place. The pace was quite low, because of medical set backs on my part. Another interesting note to make, is that none of the interviews took place in a physical situation because of the situation of the Covid-19 pandemic. Therefore, multiple online platforms were used to attend the interviews. Skype was used mostly, but also Teams and Zoom were platforms that were used to perform the interviews. Some interviews were done by a regular phone call, which has a less personal touch, since you cannot look each other in the eyes. However, for some of the interviewees that was the preference.

Most interviews took between 30 and 45 minutes, and all of the interviews were recorded after permission was granted. The recording was made to be able to check everything that was said afterwards and not to share it with others; in this way it was possible to use all relevant information in a detailed way. Via Skype, Teams and Zoom, the recordings were made via the platforms itself, which was quite easy. The phone calls were recorded by the built-in recorder on my laptop, while calling the interviewees on speaker.

Afterwards, these interviews were summarised. To be sure that the information was interpreted and summarised the right way by me, these summaries were then shared with the interviewees and (after some modifications) approved by them as well. However, it has to be explicitly mentioned that the wording and interpretation are still my own. Therefore, it might be the case that not everything mentioned in the summaries does exactly conform with the wording or meaning that the interviewees intended. The summaries can be found in Appendix C.

The interviewees were also asked whether their names could be mentioned in this thesis. Fortunately, every interviewee did agree with this.

2.2.4 Validation

After the analyses (see 'Results- controversy') were made based on the literature and the interviews, a validation of these results was needed as well. Therefore, two of the interviewees were selected to validate the results that were gathered. These interviewees were Erik Jansen en Daan Henkens, since they both conveyed the notion of a more overall knowledge about the peat meadow case.

In these conversations, some of the diagrams of the analysis were presented and discussed, once via screensharing in Zoom and once via email and a phone call (while we both were scrolling through the same document).

After these conversations, some modifications in the diagrams were made according to the comments of the validations. In this way, the diagrams that are presented in the results, will roughly describe the situation as it is. Roughly, because the validation made clear that it still depends on interpretation here. So, these two interviewees might have analysed different aspects than those that were done here. However, it was possible to agree for most part to this interpretation as well.

2.3 Results – controversy

2.3.1 The interviews

As was explained in the methodology chapter (2.2), the first interviews were done in May 2020. At this point, the subject of peat meadow areas had only just been chosen, which explains that my knowledge on this subject was quite limited then. Therefore, the first few interviewees were more general experts on this subject. The subjects and questions that were dealt with, were quite general.

These interviews gave insight in the distinction between subsidence due to oxidation of peat ground (which is explained in the 'General introduction' of this thesis) versus subsidence due to the spongy characteristics of peat. This last type of subsidence mostly occurs in urban areas, where the weight of the buildings settles the ground. Also, knowledge was gathered on the different solutions that were already designed and being tested right now which will on the one hand reduce the subsidence in these areas and at the other hand mitigate the effects of these solutions. More major input that was gathered in these first few interviews, was a collection of all the relevant stakeholders that should be taken into account for this topic.

Following from the first two interviews, new literature and information was found, which led to three new interviewees. These were experience experts of discussions that had already been held about the future of peat meadow areas. A good example of these 'former discussions', is the 'Veenweidevisie Friesland' (a vision on the future of peat meadow areas in Friesland). To set up this vision, multiple experts and stakeholders worked together. A critical element was to find out how every stakeholder could be motivated to participate (in an effective and open way). In these sessions, new methods were used, like a touch table on which maps could be designed and edited by anyone there, to visualise the plans and ideas.

Although original methods were used, not many of the sessions ended with a result that is now put into practice. As a reason for this, one interviewee mentioned, for instance, that the feeling of urgency was missing to execute the plans immediately. And another session was only focused on hypothetical meadows, which brought more open conversations, but not a solution for a specific area.

The last five interviewees were more specific stakeholders of the case and experts on bringing different stakeholders together. Thinking about the follow-up of this research in which a tool will be designed, it was useful to exchange thoughts about the form of this tool or workshop with experts.

Overall, these interviews were very useful. Actually, more information than expected was gained here. Because the interviewees were sometimes able to play the advocate of the devil, insight was gained in ideas and perspectives that were not specifically their own. In this way, the stakeholder groups and their ideas and visions became clearer and clearer, especially when depicting the gathered information in diagrams, as can be seen in the next sub chapter (2.3.2).

2.3.2 Problems, goals and solutions

The information that was gathered in the interviews in the first phase of this research, was quite valuable as described above. This information together with the literature research, was used as a starting point for the setup of the next phases of this research. Patterns in this information were looked for by trying different types of analyses.

The first structure of information led to an Excel file (Appendix D) in which the different statements were grouped in three main headlines: problems, goals, and solutions. This structure was chosen, because the interviewees mentioned those three items quite often, sometimes explicit, and sometimes more implicit. The grouping for statements under these three headlines came quite naturally. Although for some situations, problems had to be described based on the goal or solution that was mentioned, which makes this process different per interpretation. Therefore, it is important to iterate on this model and let other viewpoints influence it as well, to grab the widest scope for looking at the information.

An important note to make, is that, while the problems, goals and solutions are ordered per interviewee, the interviewees do not necessarily support them. What was mentioned before, is that sometimes the technique of playing advocate of the devil was used to give a broader scope of the situation.

The first step of this file in Appendix D only included one column, the one on solutions. This was subdivided in four types of solutions, based on intuition: technical, economical, land use and social. The solutions that were mentioned in the different interviews, were actually quite different in origin. A solution like installing a device that controls the water level below the meadows, is a technical solution for decreasing the subsidence by keeping the soil wetter. Other interviewees mentioned solutions like subsidy or fines to motivate people for taking action, which is more economically oriented and less specific on the actual intervention. Other mentioned options were about stopping to use the peat meadow areas as agricultural grounds, which is a solution in line with land use changes. Few interviewees spoke about the social relationships between the stakeholders; they came up with solutions like using a tool for cooperation to achieve more accepted solutions. This latter type is of course not at all specifically focused on the exact way of reducing the subsidence. It focuses more on the process of reducing peat oxidation.

While arranging the solutions in those four columns, it became clear that some elements were stated more as future goals rather than solutions. Because of this, the column on goals was formed as well and here was the subdivision of the 4 categories applicable as well. Together with this realisation came that the origin of goals and solutions should be certain problems, which were less explicitly mentioned, but quite clearly present as well in the interviews. These problems were easily divided in the four subdivisions as well, which made it interesting to compare the statements.

When looking at the analysis, it was quite interesting to see that some interviewees mention for example quite socially related problems, such as ‘people tend to let their

frustrations flow' and come up with mostly technical solutions that do not match very well with this kind of problems.

To expose also the more related and corresponding statements over the different interviews, colours were used to show the related statements. The legend on the side explains to which category each colour belongs. Multiple interviewees mention this in their interviews as a problem which slows the process of change down. However, following the pink colour in the table, shows that despite these observations, not many solutions for these problems are given. This overview shows more elements like this, where some statements follow up perfectly in problem, goal and solution, and other statements are less coherent.

2.3.3 Diagrams

In the next phase of searching for patterns in the collected information, multiple diagrams were made to visualise the situation and organise the underlying problems and the proposed solutions. Here, the link of which interviewee said what was abandoned, for that was not essential information in this research.

2.3.3.1 Situation visualisation

The first step was to cluster the interviewed stakeholders and the stakeholders that were mentioned in the interviews (Figure 2.1). In what interview which information on stakeholders was gathered, is hard to distinguish, since the complete picture was formed by little pieces. Each interview contained some information on all involved parties, which means that the picture of the whole situation got sharper with each new interview.

Ultimately, all involved organisations would fit quite naturally into larger stakeholder groups, which would simplify the total field of stakeholders; eventually, five groups found their origin in this diagram (Figure 2.1). These groups are the following:

- Research organisations
- Agricultural stakeholders
- Water management organisations
- Nature preservation organisations
- Administrative bodies

Roughly, these five stakeholder groups will have five different perspectives on the situation. Yet, it is important to understand that within these stakeholder groups, each individual stakeholder can have a totally different perspective as well. For instance, the more progressive farmers will have a more open mindset towards some solutions than more conservative farmers. However, for the sake of organising the information and of simplifying the field, these groups are hold on to in further diagrams.

Some stakeholders are more directly involved in the discussions (those are pictured closer to the core of the discussions), and other stakeholders do not participate regularly in these sessions (those are pictured further from the core of the discussions). This diagram shows that within the different groups, there can be quite

some differences in involvement. It also shows that some actors and stakeholder groups are more intertwined that others, which is shown in the overlap of some circles.

In the validations that were done afterwards, the notion that probably not every single stakeholder is now mentioned here was made. Therefore, 'empty' blocks were added to indicate the groups that are not specifically mentioned. Another notion that was made in the validations, was that the nature preservation organisations could be divided in two groups with different interests: on the one hand there are landowners like 'Staatsbosbeheer' (shown on the right side of the green circle) and on the other hand there are more idealistic organisations like the 'Weidevogelbescherming' (shown at the left side of the green circle).

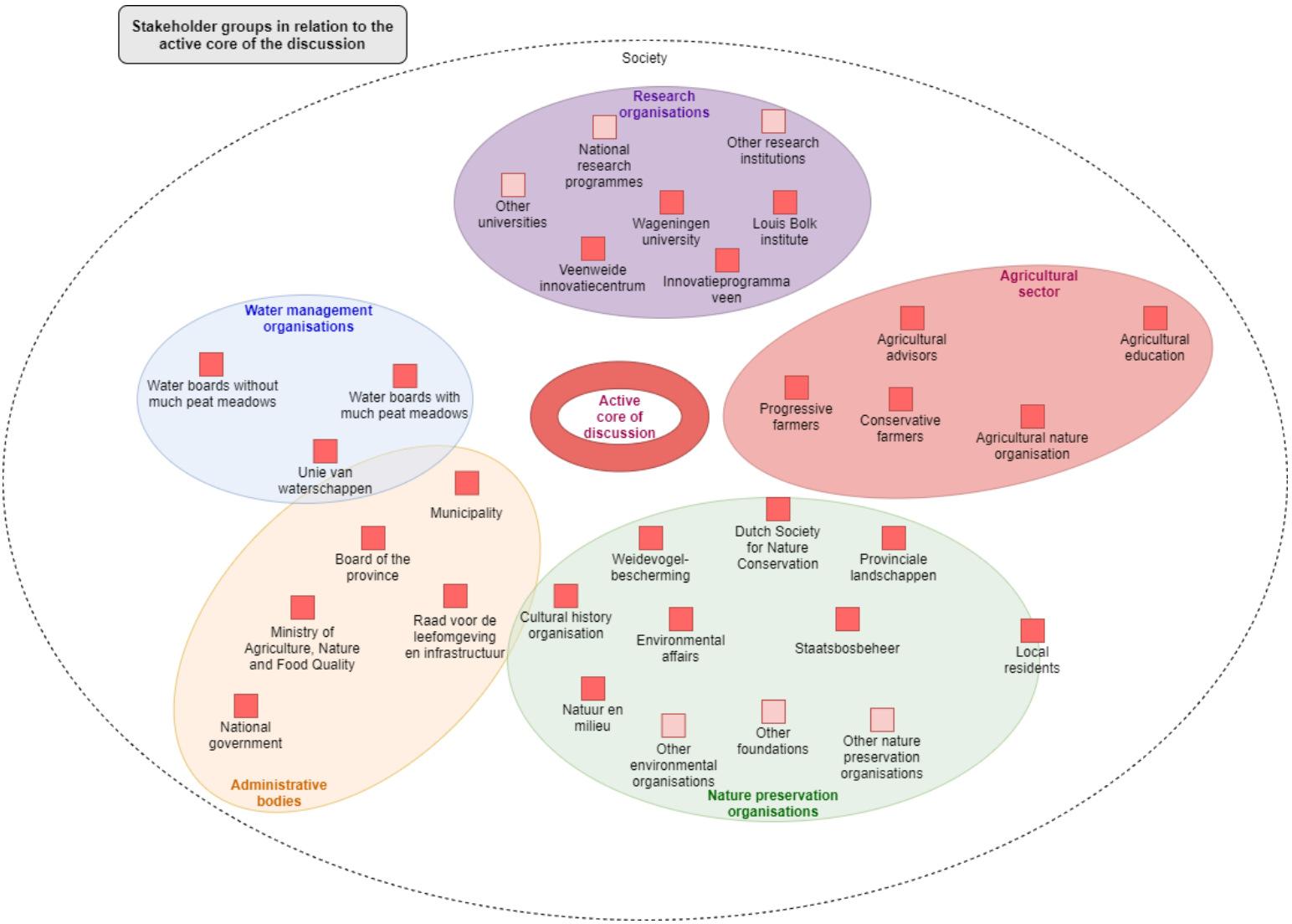


Figure 2.1: The different stakeholder groups that are part of the case study of peat meadow areas. Each stakeholder has its own red block, and the lighter red blocks indicate possible stakeholders that are not indicated in this research specifically. The coloured circles indicate the different stakeholder groups that were made by grouping some stakeholders together. (Source: made by author)

The next phase in the diagrams was to visualise the current and future situations of processes and conversations about peat meadow areas. To begin with, Figure 2.2 was made, which represents the current way of negotiating visualised in a flow diagram. Although every process attempts to give each stakeholder influence on the search for fitting solutions, very few results actually make it to reality. It seems that the outcomes of most projects are not accepted by every stakeholder, which keeps the solution from being completely implemented. This situation is sketched based on the different interviews used as ground knowledge for this thesis. It appears that people do not understand each other's world view before shouting the solutions that fits their own perspective best, which makes every stakeholder some sort of island on his own.

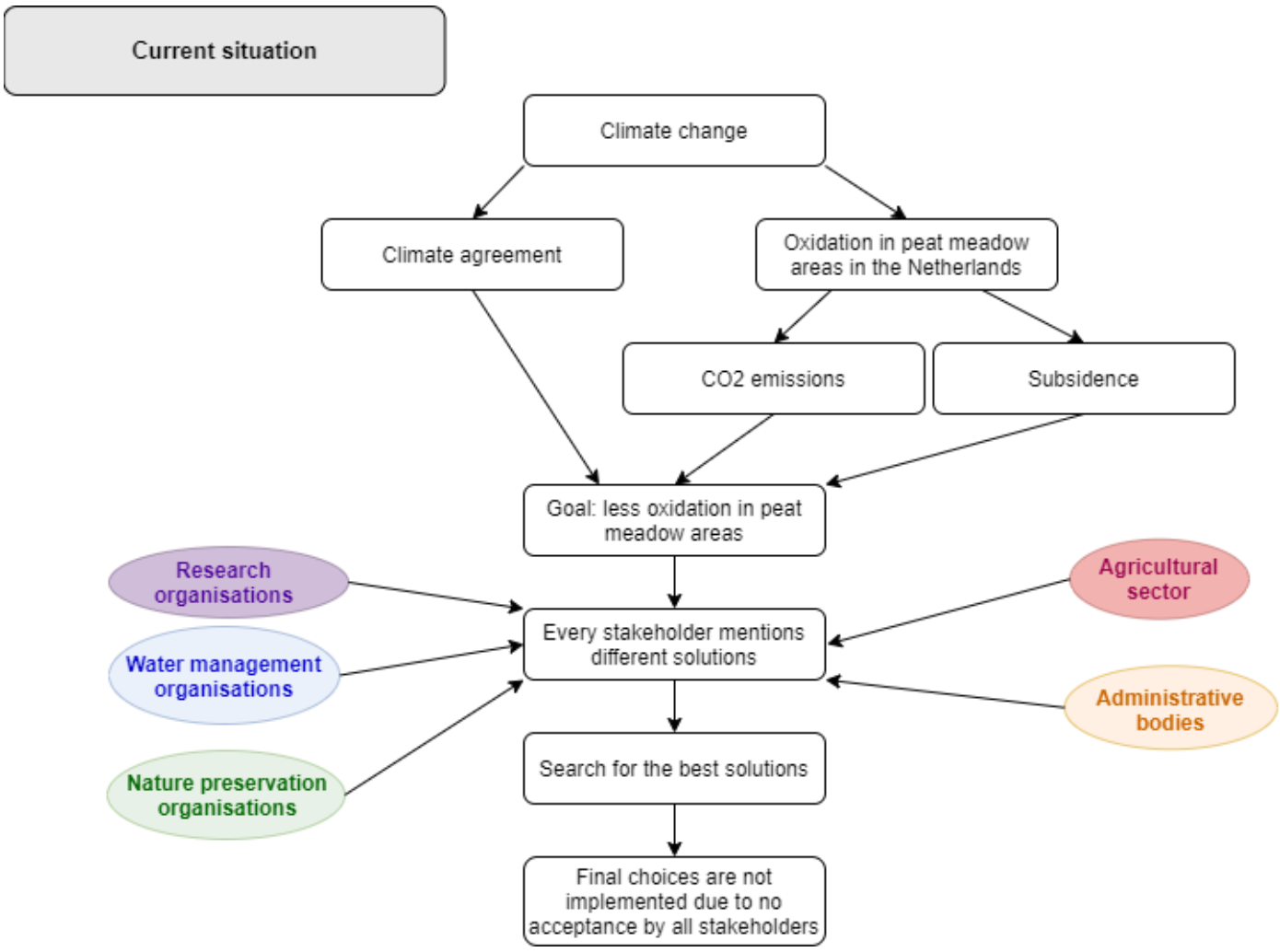


Figure 2.2: The current way of negotiating in the situation of the controversy of peat meadow areas explained in a flow diagram. (Source: made by author)

2.3.3.2 Visualisation of problems and solutions

To visualise the information that was gathered in the interviews, the Excel file that was mentioned before (Appendix D) was used as a base. In the search for patterns, all proposed solutions that were collected in the interviews were organised. This led to the diagram in the Figure below, 2.3. This figure shows that the blue blocks are now marked as 'water-related solutions' instead of technical solutions. This was done since almost all technical solutions included a solution with water, which makes the description of these types of solutions clearer.

Based on intuition and later modified based on the validations, the proposed solutions were sorted by the perceived ease of implementation and/or use of this solution. Another division that is made here, is if the solution has a direct effect on the reduction of subsidence versus a more indirect effect, which contains solutions that compensate or support solutions in that first row.

The upper row contains mostly solutions that are focused on supporting the conversations itself. For instance, 'organise sessions at the houses of the stakeholders' to make them feel more understood and more at ease, is something that you can choose for and does not need much effort to accomplish. All solutions in this row are marked red, which means that the solutions are socially based. This explains as well why all mentioned solutions are placed in the row of indirect effect.

The second row includes solutions that do not lead to immense changes in the peat meadow areas and are therefore quite easily implemented as well. When the environment is suitable and the right mindset is there, solutions like 'attract tourists as a new form of income' will not appeal to everyone, but it will help some stakeholders to switch focus and decrease the intensity of the agricultural use of peat meadow grounds. In this row, most solutions are still socially based, but a few economical, and land use solutions are placed here as well. There is also shown one water-related solution, which is also the only solution with a direct effect: 'Insert clay into the peat grounds'. According to the interviewees, this could be a good solution without much resistance. However, the research of this solution is not yet finished, so the details of the implementation and the effect are not clear.

The solutions now enter a more difficult and harder to achieve area. The third row shows solutions that might be experienced as quite drastic by mostly the agricultural scene. Solutions such as pressure drainage and changing the land use of the peat meadows will ask for quite thorough changes for the farmers on these lands. The water-related solutions that are mentioned here, will cost quite some money as well, which is not every farmer prepared or able to pay. In this phase, hardly any socially related solutions are mentioned here; water-related, economical and land use solutions prevail here. And more solutions can now be classified as direct solutions.

The fourth level of solutions contains drastic solutions on a bigger scale. The solutions that are mentioned here, need cooperation from a larger part of society and will need changes in infrastructures and water structures. Some water and land use solutions suggest water supplies from other sources and the social solutions ask for involving more national guidance and involving more actors. Most solutions are,

however, economically based; these include solutions like introducing grants and fines, which will need a clear economical structure. Remarkably, most direct solutions are to be found in this layer of the diagram, which means that these direct solutions will be quite hard to accomplish.

The final row of solutions includes elements that will change the complete use and structure of peat meadow areas or asks for systems which will change society as a whole. An example of the latter is the introduction of CO2 credits, which is something that should be done internationally and have been tried already without success. Luckily, this row contains the fewest number of solutions in this diagram. This might be the case, because the solutions are only mentioned by the interviewees when they are feasible in any way.

Figure 2.3 (next page): The different solutions against oxidation and subsidence as mentioned in the interviews. They are ordered from easier on top to harder to achieve below. Per achieving level, one row contains solutions that have a direct effect on solving the oxidation and subsidence, where the second row has a more indirect effect.

The blocks that indicate the different solutions can have 4 different colours. The meaning of these colours is shown in the legend. (Source: made by author)

All mentioned solutions from the interviews ordered by 'type' of impact and its influence on the reduction of oxidation and subsidence

Legend

- Socially related solutions
- Water related solutions
- Economical related solutions
- Land use related solutions

Measures that could be applied without much changes of the current situation

Solutions with **direct** influence on the oxidation and subsidence

Solutions with **indirect** influence on the oxidation and subsidence

- Use scenarios and maps for depicting ideas
- Start changes with trusted and well-known people
- Talk about their direct environment
- Use an area planning process as knowledge source and analysis of the situation
- Organise sessions at the houses of the stakeholders
- Use a general case study to avoid conflicts
- Make a factsheet with all stakeholders together as a starting point

Practical solutions which could be applied quite easily if stakeholders are open to it

Solutions with **direct** influence on the oxidation and subsidence

- Insert clay into the peat grounds

Solutions with **indirect** influence on the oxidation and subsidence

- Make room for water storage
- Start fish farming in ditches
- Attract tourists as a new form of income
- Use a future scenario of keeping our current habits as motivation for changes
- Use a tool such as re:peat, a serious game
- Use the concept of reflexive design
- Mention the urgence of the situation for motivation
- Use a physical tool such as a touch table
- Involve the water boards in the search for solutions
- Do more research to gain more knowledge
- Teach new principles at the agricultural educations

More drastic solutions (most impact on the agricultural sector)

Solutions with **direct** influence on the oxidation and subsidence

- Pressure drainage
- Under water drainage
- Remove commercial dairy farms from areas with a thick layer of peat

Solutions with **indirect** influence on the oxidation and subsidence

- Marketing in waders
- Exchange meadows to be able to execute each solution on the most fitting spot
- Decrease the farming cycles and create more varation in cultivation
- More variation in the use of the lands

Drastic solutions with a bigger scope

Solutions with **direct** influence on the oxidation and subsidence

- Wet crops
- Create biomass from wet crops
- Buy farmers out
- Make dairy farming less intensive
- Put less cows on each m2
- Cranberry and cattail cultivation

Solutions with **indirect** influence on the oxidation and subsidence

- Re-meander rivers
- Use brackish water to stop the growth of organisms
- Give fines for not reducing the subsidence
- License to produce
- Depreciation of land
- Rewards for ecosystem services
- Other forms of farming
- Grants for the application of measures against subsidence and oxidation
- Create more balance with a variation in the use of adjacent lands (like Friesland)
- Create a more stable water level by using direct water from the rivers
- Spread the stakeholders
- Use hierarchy: from national orders, to provincial orders, to area orders

Measures which would drastically change the situation of peat meadows and society as a whole

Solutions with **direct** influence on the oxidation and subsidence

- Elevate ditch water level
- Remove all farmers from peat meadow areas

Solutions with **indirect** influence on the oxidation and subsidence

- CO_2 market/ CO_2 credits
- Take into account less stakes of the agricultural sector in politics and banks
- Create more personal contact between stakeholders with a more diverse landuse

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In order to seek patterns in the type of solutions that the different stakeholder groups suggest, Figure 2.4 has been created to fit these into the different stakeholder groups. This structure shows that the research centres bring up most solutions for reducing the oxidation of peat, this includes all types of solutions, from drastic ones to the ones that are easy to implement and from direct solutions for subsidence to indirect solutions to compensate for the direct solutions.

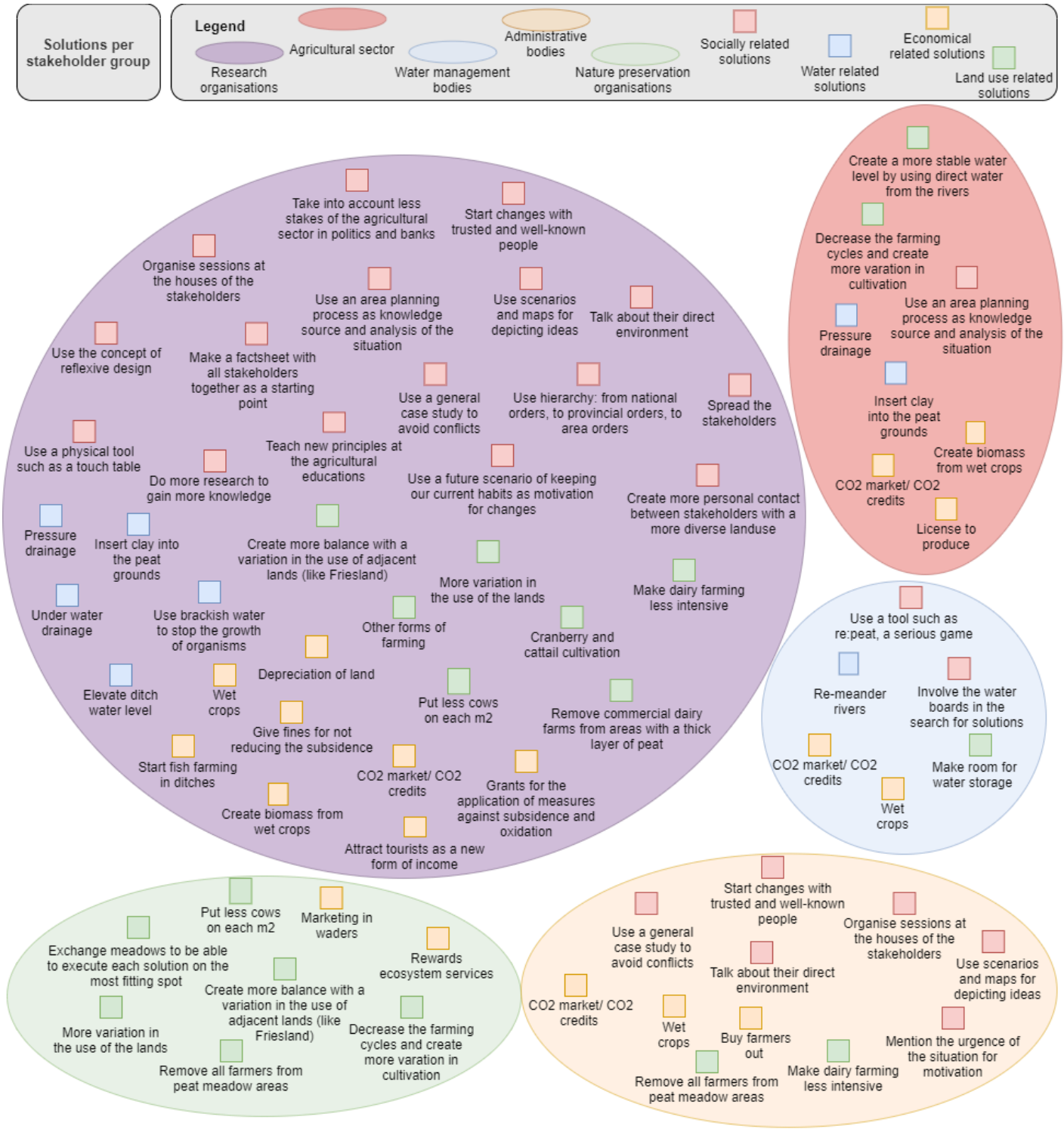

Figure 2.4: The solutions against oxidation and subsidence, ordered by the stakeholder groups that come up with the solutions. The legend explains the colours of the circles and the blocks. (Source: made by author)

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Since this research is aimed at taking a step back, so that stakeholders learn about each other's worldviews, it would also be interesting to organise the underlying problems that they individually perceive. The problems mentioned in the interviews are often the underlying problems that can be read between the lines. These were made explicit to be able to use them in the analysis as well. Figure 2.5 shows the problems that were perceived per stakeholder group that were gathered indirectly from the interviews.

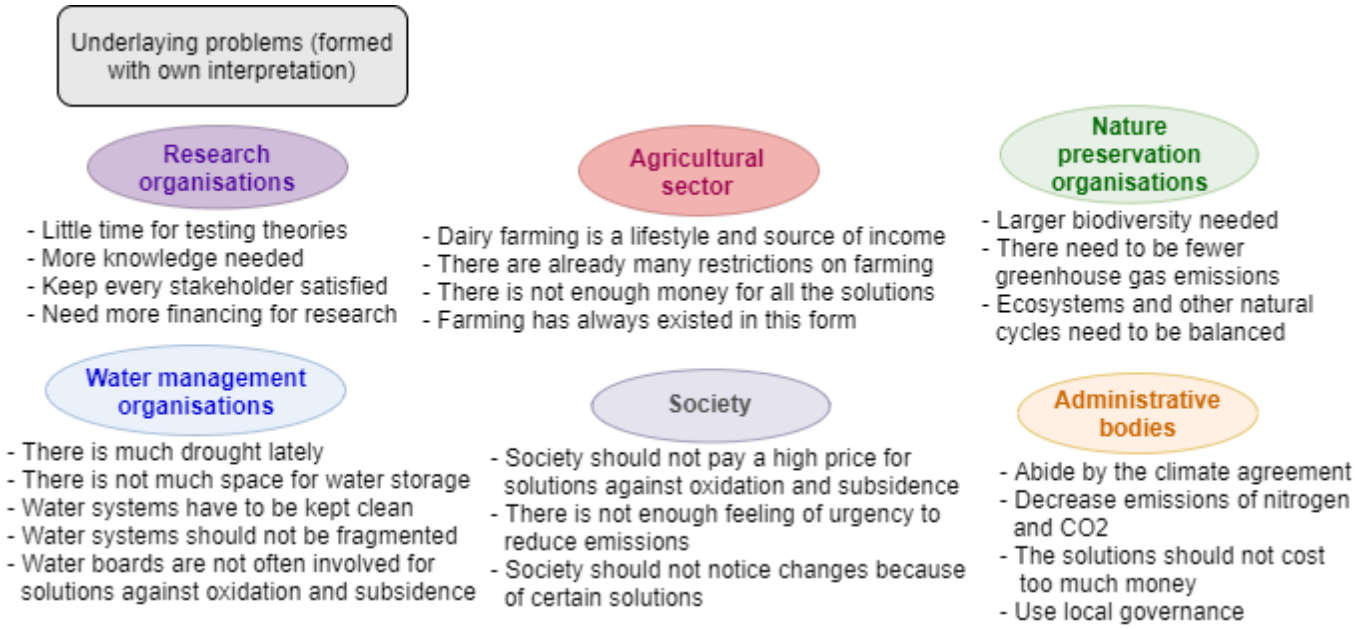


Figure 2.5: An overview of (underlying) problems that different stakeholder groups perceive from out their perspective. (Source: made by author)

For problems, the organisation of information in Figure 2.6 gives the most relevant insights. The problems that stakeholders perceive are closely connected to the worldviews that they have. Therefore, it is interesting to examine through which perspective the case is perceived by each stakeholder.

The problems that stakeholders in the agricultural sector see, are almost exclusively economically and socially related. With this perspective, they seem to be in exactly the opposite position of the water and nature preservation bodies and the research centres. This difference in perspective might be part of the reason that there may be misunderstandings and disagreements in the conversations between stakeholders. This can be explained through the literature of Pesch et al. (2017) and Sarewitz (2004), which explains that people may speak different languages, which makes it extremely difficult to build understanding which could lead to collaboration; Spruit (n.d.) makes this distinction between technical and personal language as well in her paper. Interestingly enough, most persistent problems that were experienced by parties trying to organise these discussions, were indeed socially related. The solutions did not meet much technical resistance, but social elements like a lack of incentive and an abundance of people blaming other parties formed the sand into the gears of the conversations.

There are a few other remarkable circles to see here. One of them is the purple circle of the research centres. This stakeholder group seems to experience hardly any problems at all that are related to the peat meadow areas and its solutions. Considering this, it seems to be indeed quite logical, since they do not have personal stakes in the land here, they are only involved as a research group for solutions.

There are also two extra circles compared to the previous diagram. On the one hand, there is a circle of 'society', since this group does indeed experience relevant problems related to the subsidence of the peat. But the most remarkable and quite big circle, is the white one in the middle. The owners of problems within this circle, are the people that try to set up a conversation with stakeholders about solutions. As was seen in the interviews, there had already been quite some attempts to unite stakeholders in the search for a solution. However, the experience of those initiators includes quite some problems as well. As can be seen those problems are mostly socially related which seems logical, since these conversation leaders will not be content experts, but they will be focused on the social side of the case.

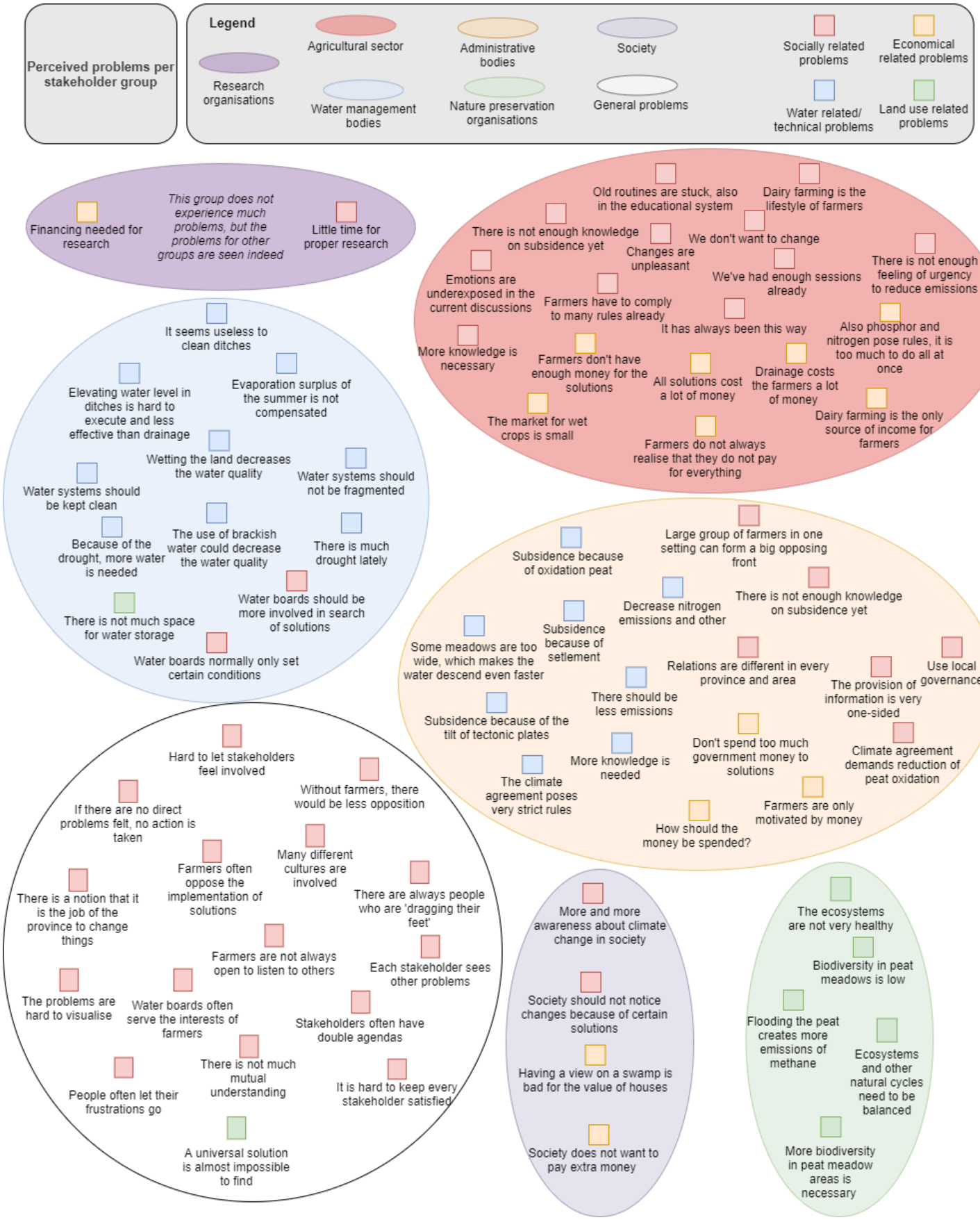


Figure 2.6: The perceived problems in the case study, ordered by the stakeholder groups that perceive these problems. The legend explains the colours of the circles and the blocks. (Source: made by author)

2.4 Conclusion & discussion – controversy

In this second chapter of this thesis, the controversy in peat meadow areas were central. This part will be concluded by answering the leading sub-questions. Then, as short discussion of this chapter will point out the items that are still uncertain or that could have been done differently.

2.4.1 Conclusion

2.4.1.1 The controversy

The first sub question that was leading in this part of the thesis, was:

- *What does the controversy of the peat meadow discussion look like?*

To start with, the situation of peat meadow areas in the Netherlands does indeed fit the definition of controversies that was mentioned in the introduction: "controversies are situations where actors disagree (or better, agree on their disagreement)" (Venturini, 2010, p. 261). It became clear from the results that this controversy contains many different elements and different actors. These different stakeholder groups do disagree on different elements and therefore this situation can indeed be seen as a controversy. The different elements of this controversy will be explained further now.

First, the case includes quite a history already. During the literature research and the interviews, multiple former conversations were mentioned. These sessions were quite different in form, but all focused on finding a solution to the subsidence in peat meadows. And not many of these former sessions seem to have led to a result that was actually implemented or executed. Some groups might be involved more in this history than other groups, which causes every group to have a different starting point in the discussion at this point. This might lead to overflowing as was explained in Chapter 2.1.2 by Pesch et al. (2017). This also shows that it had already been tried to involve multiple stakeholders already, but that it has not led to satisfying results yet, this is in line with the current trend described by (Behnam Taebi, 2017).

Another element of the controversy is that there seem to be a lot of solutions that are currently being developed and discussed. Figure 2.3 shows this variety of solutions, but it also shows the distinction between solutions with a direct effect on the subsidence in peat meadow areas and solutions that are more indirectly involved. There are more indirect solutions than solutions with a direct effect. This shows the history of this case as well, since the indirect solutions are there mostly to mitigate the effects of implementation of some direct solutions for certain stakeholders. Also, unfortunately, not all solutions have completely been developed yet, which makes it hard to see all consequences here. Also, there always seems to be a stakeholder group that cannot agree with each of the direct solutions that are ready for implementation.

Figure 2.4 shows that most of these solutions are brought forward by the research organisations. This sounds quite logical, since this group is organised to do research on solutions for peat meadow areas.

All in all, an attempt has been made to show the controversy of the peat meadow areas and its origin in Figure 2.2. Here, it is shown that the current way of looking for solutions against the subsidence in peat meadow areas – which will then reduce the influence on climate change-, mostly does not lead to actual implementation of the results. This might indeed be caused by a lack of feeling the urgency, as was mentioned in some interviews. But with so many potential solutions, it still seems to be strange that it is so hard to find one that everyone agrees with.

2.4.1.2 Epistemic outlooks

The reason for the difficult relations and conversations might be found in the fact that there is a group of very different stakeholders involved in this case. Figure 2.1 shows all different stakeholders that were found in this research. It must be mentioned that some stakeholders might still be missing in this overview. However, the answer to the other sub question of this part might help us understand better why sometimes it is so hard to find consensus on potential solutions. This question was:

- *What do the epistemic outlooks that the different stakeholder groups have, look like?*

To start with, in Figure 2.1, the stakeholders are divided into five main groups, to be able to get a better grasp of the case better. These five groups each have different stakes and different world views, therefore it can be said that each group has a different epistemic outlook. Part of these differences can be found in the combination of Figure 2.4 and 2.6, where it is shown what solutions and problems are mentioned by the different stakeholder groups.

The first obvious thing to notice, is that the research organisations have a rather solution focused epistemic outlook (Figure 2.4). They seem not to have many stakes in the case, which is why this group sees few problems (Figure 2.6). It might be safe to say that this is a more neutral group, of which its greatest challenge is to find solutions against the subsidence and indirect solutions to make the landing of these, often drastic, solutions a little softer. This group fits the formal trajectory (Pesch et al., 2017), since their narrative is based on facts and research.

Looking at the green bubbles of the nature preservation organisations, their green glasses stand out. All problems that this group sees are related to the quality and health of the ecology in the peat meadow areas (Figure 2.6). This is probably why they also only come up with solutions that will decrease the agricultural use of the land, to give the peat landscape the chance to become healthier (Figure 2.4 This group does not really appear to consider the fate of the farmers here, since they have more eye for the problems of the ecology. This group can indeed be seen as a protesting group, as was mentioned in Chapter 2.1.2 according to the theory of Spruit (n.d.), since their considerations have an activistic touch. However, a lot of their considerations might be more in line with the proponents, so this is not a clear distinction to make here. Most of this group acts more from ideals and emotions on the ecology and the preservation of the land that is owned by this group, which can be seen more as the informal trajectory (Pesch et al., 2017).

The next bubbles to discuss here are the blue circles that depict the water management bodies. This group seems to look through quite practical glasses in this case. Looking at Figure 2.6, it becomes clear that most problems that are seen are water related. This might have to do with the fact that water is a large part of most of the solutions against subsidence and that the job of these water boards is to control the water use in its area. This means that all solutions are probably automatically checked with the practicality of its water use by this group. However, the number of solutions that is mentioned by this group, is quite limited. Obviously, most are water related, which confirms again that practical, water related epistemic outlook of the water management group. This group mostly follows the formal trajectory (Pesch et al., 2017), since they are not personally connected to the areas.

The agricultural sector is shown in the red circles in Figure 2.4 and 2.6. This group seems to have one of the highest personal stakes in the case and was therefore often mentioned in the interviews as a group that has to be handled with delicacy. This makes this group indeed a protesting group as was mentioned in Chapter 2.1.2 according to the theory of Spruit (n.d.). Their argumentation is indeed quite value-based, partly because of the personal attachment to the land and their farm. Their argumentation is also both formal and informal (Spruit, n.d.) based as can be seen in Figure 2.6 and their information source is partly based on information coming from their own personal network. Their narrative is therefore quite emotion and belief based, which confirms that this group fits the informal trajectory of Pesch et al. (2017). They do mention a few solutions in Figure 2.4, but all of these are only acceptable with certain conditions, although some very progressive farmers are quite willing to invest in strong solutions.

Figure 2.6 shows the perspective that the group as a whole has, which is quite twofold. On the one hand, much socially related problems are seen, which (although stated quite harshly sometimes) shows the conservative outlook of the largest part of this group in the socially related problems. Next to these socially related blocks, only orange blocks are shown. These show that this group is also concerned about the financial element of this situation. Since most of the critical peat meadow areas are owned by this sector and are used for their cattle, almost every solution has a significant impact on the farmers and their financial situation. They worry that they will have to pay the highest costs and that makes them cautious towards all changes. Figure 2.6 captures this epistemic outlook quite strongly.

The last group that is studied during this research, is the group of administrative bodies. This group does not show a clear perspective here at first sight. When looking closer, however, some lines of reasoning can be found. The problems shown in Figure 2.6 are all connected to the bigger picture of the climate agreement or to the agricultural sector, which the administrative bodies seem to struggle with most. This might also explain why quite some socially related solutions are mentioned in Figure 2.4. This group seems to want drastic solutions but is also looking for ways to soften this implementation. It confirms that this group follows the formal trajectory (Pesch et al.,

2017), since they mostly seem to base their value expression of proposed solutions on facts and legitimacy. They can be seen as the proponents (Spruit, n.d.) who focus on the content and find it difficult to think on the emotional level of the other stakeholders like the agricultural sector.

Figure 2.6 also shows the perspectives of the group of people that is trying to set up conversations about possible solutions. This group, shown in the white circle, only sees socially related problems, since they focus on the conversations themselves. It is not clear from this research if this group (1) did try to involve the stakeholders in this process from the start (Behnam Taebi, 2017), if (2) the project was seen as a self-organised participation (Cuppen, 2018), or if (3) the emotional arguments were taken seriously (Lorenzoni & Pidgeon, 2006; Roeser & Pesch, 2016) (all in Chapter 2.1.2). If these different elements had indeed been taken into consideration, it might have already led to better results.

There is also a grey circle here, which represents the perspective of society. This group seems to understand that climate change is a problem but does not want to pay for or do much about the problems in peat meadow areas.

These two groups have not been taken into account in the further parts of this research, but they put some things into perspective. The white group shows the history of conversations and their experiences on this topic. The society group shows the environment in which this situation takes place.

2.4.2 Discussion

There are a few things that need to be taken into account here. To start with, the stakeholder groups that are formed here, do not grasp all different views and perspectives on this topic. As is shown to a certain extent in Figure 2.1, each group consists of all these smaller groups, whose ideas might differ quite a lot. It is important to realise this during this thesis, because some individuals might not feel represented by the group that they are put in. This grouping is, therefore, not ideal to do, since the epistemic outlook of a group as a whole is hard to solidly define. Nevertheless, general lines of reasoning can be found and stakes for the different groups that make the analysis easier to grasp.

As was explained in the results, the analyses are built on the interviews that were mentioned in the methodology. Since my own expertise on this topic started on level zero, it might be that my interpretation was not completely correct. To catch this possible flaw, the final results are validated by two interviewees. This validation has already been explained in the methodology, but it should be mentioned that the analyses are still my own interpretation. Although Erik Jansen and Daan Henkens understood and recognised most of these analyses, they might have done it differently themselves.

From the interviews, the Excel sheet (Appendix D) was made on which the analyses were made. It might be noticed that in that sheet three classifications were made: problems, goals and solutions. In the analyses, the goals were not used

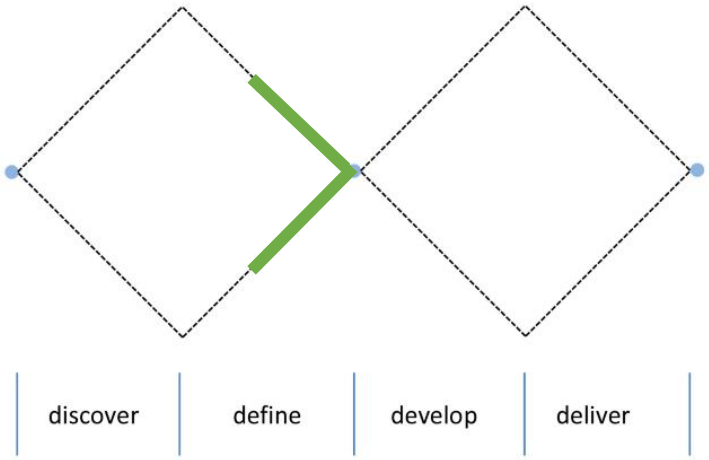
anymore. This choice was made because this was less relevant in picturing the controversy and in explaining the epistemic outlooks. It might be interesting in future research to research whether the goals connect to the solutions that were mentioned to see whether the solutions would indeed lead to the goals that were set. Another interesting future research could focus on a more quantitative confirmation of the epistemic outlooks, since this research is more qualitatively performed.

3. Choice for a tool

The chapter 'choice for a tool' closes the gap between the current situation in the peat meadow areas, which is discussed in the previous part of this thesis (2), and the explanation of the design of the serious game, which was eventually chosen as the tool for this thesis (spoiler!), in the next chapter (4).

First, some literature was found on the topic of **effective collaboration**. This theory is explained here, but it also forms the base of the 'design of the game' and will also return in the 'analysis of the game' (Chapter 6).

Following from this literature research and the information of Chapter 2, **multiple options for a tool** were considered. In this chapter is explained which options were mentioned and why, in the end, the choice for a serious game was made. This completes the 'define' phase of the diamond.



3.1 Theory – choice for a tool

The end goal of this research aims, on the one hand, for the different stakeholder groups to gather insight in the motives of the viewpoints of the counteracting parties. On the other hand, a new base for these stakeholder groups should be formed in which a good situation for (renewed) collaboration is created, which can lead to more effective conversations on the future solutions in peat meadow areas**.** In this situation, the counteracting parties will be willing to find the best solution for the peat meadow area together instead of pushing through their own opinions. To be more exact, this means that a situation will be created in which a decision on the peat meadow discussion could be made and that all contestants are able to agree with that decision. Understanding that the different parties each have a different worldview, can support them when making such a decision.

The forming of this new base can be supported by an intervention tool. This chapter will describe which tool was chosen, how it was chosen, and why. This selection process started with literature on effective collaboration and collaboration readiness, since this would be the basis of the tool. In Table 2, a brief summary of the discussed theory is shown; this table can be found at the end of Chapter 3.1.

3.1.1 Design-based research - Define

This chapter forms the last part of the 'define' phase of the double diamond (British Design Council, 2019; van der Sanden & de Vries, 2016) as was also depicted at the title page of this chapter. This brings us then to the intersection in the middle of the two diamonds, which is known as the 'design brief'. At this point, the specific scope of the project is defined, and its deliverables are known. Therefore, this part of the research, where a choice for a participatory tool will be made and the scope is set, leads us to the end of the define phase.

As was described in Chapter 2.1.1, in this define phase the designer is stimulated to approach the case with a different angle. For example, the angle of former sessions was mostly to search for solutions against oxidation with all stakeholders together. As explained before, this research will not focus on these solutions themselves, but on the collaborative environment that will be needed to find these solutions. The information on the case and the definition of the stakeholder groups and their epistemic outlooks that was gathered in the previous chapters, are used as input for this last part of the 'define' phase. Making collaboration requirements and design focus points out of the theory of this chapter and the input of the previous chapters, will help to define an angle with which the choice for fitting tool can be made.

Now, the problem is defined, and the approach is set, after which the next diverging movement can be made (see Chapter 5.1.1).

3.1.2 Single and double loop learning

Argyris (1977) introduces the distinction between single-loop and double-loop learning. Single loop learning is a form of learning with which someone learns to adapt to situations with certain rules and boundaries. This means that someone learns what

the standard is and how to make corrections to meet this standard. Double loop learning is another form of learning. When learning the standards with its rules and boundaries, it is in this form learned to question these standards and its conditions and to be critical to the underlying motives (Argyris, 1977). This study of Argyris (1977) might seem a bit outdated, but it illustrates the core of this concept, which is nowadays still used and referred to by various studies in the same context.

In this research, in which the aim is to form a basis for collaboration between various stakeholder groups with different epistemic outlooks in a controversy, social learning is an important element for the understanding of the different outlooks and a more open attitude for collaboration. Therefore, single and especially double loop learning are connected to the case study of this research. Gaining insight in another worldview and knowing how to connect this worldview to other similar situations as well (being able to predict what one thinks) is a form of single loop learning. Questioning people's motives to have this worldview and accepting this in a certain way, can be seen more as forms of double loop learning. For this research, one of the goals was for the stakeholders to gain insight and understanding in the motives for the different worldviews of other stakeholders. Therefore, the participatory tool that is created in this research, should include and stimulate double loop learning. However, single loop learning is also needed to learn the different perspectives in the first place.

Allert et al. (2004) introduce the concept of lifelong learning, with which they include many different forms of learning, among which single and double loop learning are also included. The different forms of learning are then explained to be conveyed via two types of learning objects: first order learning objects and second order learning objects. First order learning objects are objects in which the learning objective is central, think about educational materials like a textbook. Second order learning objects have a more strategic character with which learning is stimulated without a straightforward learning objective as was mentioned at the first order objects (Allert et al., 2004). "*Second-Order Learning Objects are not formal process models for learning but collaborative artefacts mediating processes such as planning, structuring, organising, reflecting, and communicating knowledge generating endeavours.*" (Allert et al., 2004, p. 706).

It might be said that the first order learning objects mostly stimulate a form of single loop learning, whereas the second order learning objects stimulate double loop learning more. To put the emphasis on double loop learning in the participatory tool in this research, the tool should therefore be designed as a second order learning object. The second order learning objects can lead to a development of certain skills, such as "*decision making, solving problems, mediating and organising team-oriented work*" (Allert et al., 2004, p. 707). This connects to the aim of this research which is to create a situation in which a collaboration is stimulated in which sophisticated solutions for the subsidence in peat meadow areas can be found that every stakeholder group can accept in some way or the other.

Elements which stimulate and form second order learning objects are (among others) the use of creative methods, reflecting methods and problem-solving or decision-making strategies (Allert et al., 2004, p. 706).

3.1.3 Collaboration

As explained above, double loop learning can lead to development of skills that could support better team-oriented work. That shows that learning and collaboration are closely connected, which can also be seen in the concept of transdisciplinary collaboration. For this research, the aim is to create an environment in which a collaboration between the stakeholder groups (which have different epistemic outlooks as was explained in Chapter 2.4.1.2) is stimulated. Because of the different worldviews of the stakeholder groups, a certain collaboration between them could indeed be seen as transdisciplinary as well. For such a collaboration to be stimulated, exploring the concept of collaboration readiness of the different parties can be an important first step.

Collaboration readiness is explained by Rosas & Camarinha-Matos (2009) as follows: "*an organisation could be considered ready to collaborate if it is prepared and willing to work in collaboration for the achievement of common goals, performing tasks in an accurate and reliable way*" (Rosas & Camarinha-Matos, 2009, p. 4713). Hara et al. (2003) also mention the presence of a common goal and the sharing of knowledge as important factors for collaboration. According to Lotrecchiano et al. (2016), being ready to collaborate involves intrapersonal factors and interpersonal elements. This can lead to higher and lower motivations of collaboration, which they call a hierarchy of motivations. Together with a critical reflection session, the development of learning would be better and could strengthen the intrapersonal willingness to cooperate. The reflection can help, since it can make people correct their mistaken impression they may have had of something or someone before (Lotrecchiano et al., 2016). Other elements to include, when creating an environment for a possible high collaboration readiness (which depends on many more factors), are the character of the organisation, their willingness to collaborate and the empathy relationships of a party - the latter can also be negative when there is no trust between parties - (Rosas & Camarinha-Matos, 2009).

The collaboration readiness of this case can be seen as quite low, since the different stakeholder groups have already tried to collaborate in various organised conversations and sessions without a positive outcome. For this research, the stakeholders should be placed a step back in this collaboration, where they get to know each other on another level before searching for solutions. This session should then focus on getting ready to collaborate, which means that the group should focus on common goals and performing tasks with the tool. Since it appears to be a challenge to find a common goal in the controversy of peat meadow areas, that does not seem a good first step. The group might need to 'learn' to see common goals on a lower level, as for instance in tasks during the session.

The sharing of knowledge and learning from other insights is another important element of collaboration. Kamp, Smits, & Andriesse (2004) discuss four types of learning: learning by searching, learning by doing, learning by using and learning by interacting. The type of learning relevant for this research is mostly learning by interacting, since the value of this research is to achieve a mutual understanding in

which both parties can learn from each other's viewpoints. In their literature research, Kamp et al. (2004) find four conditions which can help to develop learning by interacting:

1. "*mutual interest in the learning process,*
2. *proximity in the broad sense, including geographical closeness, cognitive closeness, a common language and culture, national standardisation, common codes of conduct, a certain lack of competition and mutual trust between the actors, and congruent frames of meaning regarding the technology,*
3. *norms of openness and disclosure,*
4. *the presence of an intermediary if information is not transferred easily or if not all relevant actors cooperate spontaneously.*"(Kamp et al., 2004, p. 1628)

With the right conditions such as mentioned here, learning by interacting can be quite an important factor to achieve the goals of collaboration. However, if these conditions are not met, and a situation arises in which parties do not 'share the same frame of meaning', where they focus on the 'different educational backgrounds' and where they 'do not trust each other', learning by interacting can become problematic (Kamp et al., 2004).

To create a situation for the collaboration that is aimed for in this research, trust and some kind of friendship will be needed (Hara et al., 2003). This ties in with the mentioning of Xue et al. (2018, p. 418) that "*collaborative relationships are formed by informal communication and social mechanisms*". Trust can lead to a more effective collaboration and can be formed best if the stakeholders have room for development, if there is a certain team interdependence, and when group rewards are given (Bulińska-Stangrecka & Bagieńska, 2019).

This means that sometimes, closer ties are needed in the network for a stronger bonding. However, weaker ties can create the ability to bridge to other knowledge, which is needed at the start in this research, since there will be no strong ties between the two different parties. Only within these parties, the ties will be stronger. If they find a way to bridge between the different visions, their mutual knowledge will be able to extend and new solutions could be found in the peat meadow case that everyone can agree with (Pieron, 2012). Furthermore, for creating a more integrative collaboration, moving from external motivational factors towards more personal incentives to work together will be needed. Having a steady structure and leadership for meetings to foster collaboration, also help to develop a better collaboration (Hara et al., 2003). In the research of Porter & Birdi (2018), 22 factors are mentioned that have an influence on the success or failure of a collaboration. These elements are shown in Appendix E and contain more known items such as trust and less known aspects such as the influence of activities being connected by a specific place (Porter & Birdi, 2018).

For the construction of a collaboration, it should be taken into account that people have round characters and are able to surprise. This means that no one is completely predictable and even if we follow all the tips and tricks to create the ideal environment for collaboration, it is not guaranteed that it will work (Goldie, 2004).

According to the research of Walsh & Maloney (2007), there are some critical aspects that can influence collaborations. One of them is the size of the group, smaller groups have less misunderstandings and are easier to coordinate. Another element is interdependence; for a good collaboration, the task interdependence should not be too high. This has a limit, because a too low interdependence will lose the productivity that can be achieved as a group. Furthermore, they mention a small distance as an important factor: having regular communication is important. In short, Walsh & Maloney (2007) seem to conclude that structural elements like those mentioned above are more likely to cause problems in collaboration than demographical elements like different backgrounds. This is important to know for this research, since it brings together people with quite different backgrounds. And although physical meetings give a better feeling of where you stand as a group as a whole, they are not found to be much more beneficial than remote meetings. This is also important information for this research, since the current pandemic is forcing us into remote solutions.

3.1.4 Formats for collaboration

When considering different forms of meetings in which collaboration can be fostered, Sufi et al. (2014) bring an interesting style for a workshop; they use a so-called 'unconference' style. Interesting elements of such a format, are that the contestants of the workshop can all have input on the agenda of the day, which gives them an incentive to attend the meetings. Moreover, the flexible form of the meeting makes it easier to filter the most important topics from a group of people. By alternating between working in small groups and working together as a whole group, every person can feel like they contributed something to the end results (Sufi et al., 2014).

The participative innovation platform that Auch & Pretzsch (2020) mention is also an interesting form to keep in mind for this research, since it is designed to be adaptative to different solutions in organising an effective cooperation. During this process, trust and respect are built and knowledge is shared, which are elements that were mentioned earlier in this chapter as well. An important element for the effect of this instrument is mentioned to be that it should be consistently checked that every stakeholder (group) is represented during the process (Auch & Pretzsch, 2020).

As was mentioned in the general introduction, HDSR (n.d.) used another interesting method to bring the different stakeholders together: a serious game. The interesting part here, is that the RE:PEAT game was also specifically designed for the case in the peat meadow areas. It shows that this session did indeed lead to a new way of collaboration, since the stakeholders with different perspectives had to work together to win the game. It was focused on finding solutions together and experiencing the influence of the other stakeholders. To top it off, the contestants described it as the most fun meeting they had had in a very long time (HDSR, n.d.). Serious games can increase the strength of relationships and might stimulate a different form of learning as was stated in the general introduction as well (Blunt, 2009; Medema et al., 2016).

Table 2: A brief summary of the literature that was discussed this chapter.

Paper	A brief summary of the literature in this chapter
Argyris (1977)	• Single loop learning: someone learns to adapt to situations with certain rules and boundaries. • Double loop learning: when learning the standards with its rules and boundaries, it is in this form learned to question these standards and its conditions and to find the underlying motives.
Allert et al. (2004)	• Second order learning objects are no standard models of learning with a strategic character which can lead to skills such as *decision making, solving problems, mediating and organising team-oriented work.*
Rosas & Camarinha-Matos (2009)	• *An organisation could be considered ready to collaborate if it is prepared and willing to work in collaboration for the achievement of common goals, performing tasks in an accurate and reliable way*
Hara et al. (2003)	• A common goal and the sharing of knowledge are important factors for collaboration. • To move slightly towards an integrative collaboration, personal incentives to work together, a steady structure and leadership and mutual trust are necessary.
Lotrecchiano et al. (2016)	• Together with a critical reflection session, the development of learning would be better and could strengthen the intrapersonal willingness to cooperate
Kamp et al. (2004)	• Learning by interacting is possible to be reached when fostering the four key conditions mentioned in the text.
Xue et al. (2018)	• Collaborative relationships are formed by informal communication and social mechanisms.
Bulińska-Stangrecka & Bagieńska, (2019)	• Trust can lead to a more effective collaboration.
Pieron (2012)	• Bonding is important for stronger ties to work closer together. • Bridging can be used to learn the viewpoints of the other groups and develop broader knowledge.
Porter & Birdi (2018)	• 22 factors that influence the success or failure of a collaboration (Appendix E).
Goldie (2004)	• People have round characters and are therefore never completely predictable
Walsh & Maloney (2007)	• For good collaboration, structural elements like smaller groups, a little task interdependence and small distance

	are more important than focusing on demographic differences
Sufi et al. (2014)	• Unconference style meetings can help to create more incentive to attend meetings
Auch & Pretzsch (2020)	• A participative innovation platform could be an interesting form to work towards an effective cooperation.
HDSR (n.d.)	• RE:PEAT is a serious game on the case of peat meadow areas which was positively received.
Blunt (2009)	• Serious games have the potential to stimulate a different form of learning.
Medema et al. (2016)	• Serious games can strengthen relationships and can lead to more communication.
British Design Council (2019) & van der Sanden & de Vries (2016)	• In the define phase of the double diamond of design-based research, the angle of the approach and the design brief are formed.

3.2 Methodology - choice for a tool

The methodology of this part of the thesis will explain which methods were used to answer the following sub question of this research:

- *When analysing the controversy of the peat meadow areas, what elements of collaboration could be applied to create a situation in which effective collaboration could take place?*
- *What participatory intervention tool can be chosen to organise a situation in which the different stakeholder groups can achieve double loop learning?*

To be able to answer the first sub question, a literature research was done on collaboration and circumstances or conditions that are necessary to create a good situation for collaboration. The information that was gathered here, formed the main conditions that should lead the choice for a tool. Together with the input of the literature, brainstorms were done to be able to answer the second sub question.

3.2.1 Literature review

The theory chapter above (3.1) discusses that creating a situation for effective collaboration includes many elements. The information described there, was found via a literature study which was mostly done via Scopus and via input of multiple teachers that I have spoken to.

Key words that were used to find literature on Scopus were: 'collaboration readiness', 'effective collaboration AND stakeholders', 'effective collaboration'. To limit the results more, most of the time the option limit results to 'social science' was used, to collect only results that comply with the social sciences.

An important note to make, is about the thesis of Kalmar (2016), which was recommended by one of my teachers. In Chapter 3.1, it is shown that this thesis is not directly used as a source. However, a lot of papers that were used in this thesis were found by snowballing from Kalmar (2016), which made this a useful document. The details of each paper can be found in Appendix A.

Another notion to understand, is that one mentioned source was not found via Scopus, but via the desk-research that was executed in research of the case study. The website of HDSR (n.d.) is used as an example for a serious game, and is supported by literature that was indeed found via Scopus with specific terms like 'serious game" AND "design" AND "board game" OR "card game"'. Since this hit quite some computer related research, this area was later excluded, which led to the papers that are used in this study.

3.2.2 Brainstorms on the form of the tool

As was described before, one of the main goals of this research was to create an environment in which the different stakeholders would come closer towards another to get ready for a collaboration in the search for solutions for the subsidence in peat meadow areas. In Chapter 3.1, multiple elements are mentioned that can help in

creating this kind of collaborative environment. After the literature study was performed, concepts of collaboration that were mentioned in the different studies were used as a base for the road towards the tool. From these concepts, collaboration requirements were defined as will be explained in Chapter 3.3.2.

These requirements, together with elements that seemed crucial for this specific case study were then mapped on a Miro board. A combination of these elements and some interpretation-based items were noted as a group of post its on this Miro board.

The next step was to prioritise these elements to be able to find the focus of the tool. The terms of the post its were iterated mostly by my own fresh perspective after a week or so, but also by discussing these things with different supervisors. Ten focus points were eventually listed in an Excel file. By discussing this with supervisors, it was then found that the different elements could be grouped under two main directions, which could form the main focus of the tool.

With these focus points in mind, a brainstorm was done on the possible different forms of the collaborative tool that could be used to achieve a situation in which collaboration can be reached. These were then iterated in some casual conversations with friends and co students. These different options were eventually presented in the midterm meeting of November 19th, 2020. After this presentation, the different options were considered and together with the supervisors, a choice was made for a preference for one of these tools.

3.3 Results- choice for a tool

The results of this part will contain an overview of the relevant elements from the literature which could create the environment for a more effective collaboration. Furthermore, it will be shown what choice was made for a fitting tool in this research.

3.3.1 Focusing on six out of 22 factors

In Chapter 3.1.3, different studies are described which propose multiple concepts which influence an effective collaboration. These concepts are part of the results for this chapter of the research and are used in Chapter 3.3.2 as a base for the collaboration requirements. First, however, it is explained why only six out of the 22 factors of the study of Porter & Birdi (2018) are focused upon in this research.

Porter & Birdi (2018) have made a clear overview of 22 factors that influence the quality of the collaboration (Appendix E). Six of the elements are seen as most relevant for this research and therefore these are used mostly in this research. These six items are all directly cited from Porter & Birdi (2018, p. 103) and shown below together with the reason of relevance for this thesis:

- "Acceptance of different social values, norms and cultures"
    - In the research on the different epistemic outlooks, it came forward that the different stakeholder groups have completely different values, norms and cultures (see Chapter 2). It is important to give the groups insight in these different epistemic outlooks, to understand why everyone mentions different elements.
- "Participation is open to all stakeholders"
    - Although there might be some friction between the different parties and although it seems easier to discuss the best solutions only with people that seem to stand closely to your perspective, a solution will only make it if every stakeholder group can accept it. Right now, some groups might not be very open to other groups, so the tool of this research should be open to every perspective and the value of each group should be shown.
- "Trust"
    - In almost every research on collaboration, it is mentioned that trust is needed to make it work. Since this case has some history already, there is no complete trust between the different stakeholders. The tool should try to form new trust by using earlier mentioned elements like informal factors.
- "Activities are bounded by a small geographical area"
    - The peat meadow areas do already bind the activities, but this is still a large area. It would be even better if the group stakeholders could be found in one specific peat meadow in the Netherlands, to make the conversation as concrete as possible. The individual connections that could be formed would then be worth much more, since these specific persons need to work together later.

- "Effective communication, data sharing"
    - Another element that would be interesting to touch upon in the tool, is effective communication. Because of the different epistemic outlooks of the stakeholder groups, it may occur that the groups seem speak a different language. Focusing on effective communication about relevant information in the tool, when people have to take these differences into account, could also bridge the gap.
- "All actors are fully committed"
    - In this case study, all actors have quite high (and different) stakes on the peat grounds. This automatically creates a situation of high commitment to the case. The tool should highlight this as well, since this can be seen as a common ground. It can show that every stakeholder wants what is best for the ground from their own perspective.

3.3.2 Collaboration requirements

Now that it is clarified why only six elements of Porter & Birdi (2018) are included in this study, it is possible to combine all these different elements of collaboration; Figure 3.1 shows an overview. The nine elements that are mentioned here, are in this study the requirements of stimulating effective collaboration. Therefore, these elements should in one way or the other all be included in the participatory tool for as much as possible.

The collaboration requirements will form the theoretical base to which the outcomes of this research will be compared. However, for the creation of a tool, a simpler, more accessible lay out was made in which the requirements are included in combination with my own ideas of importance for this case and in combination with some insights that were collected in the study of the case. This extra iteration on these different elements and the way this has led to a choice for a tool is explained in the next chapter, Chapter 3.3.3.

Collaboration requirements for the game

1. Trust should be built (Auch & Pretzsch, 2020; Bulińska-Stangrecka & Bagieńska, 2019; Hara et al., 2003; Kamp et al., 2004; Pieron, 2012; Porter & Birdi, 2018; Rosas & Camarinha-Matos, 2009; Xue et al., 2018).
    a. By performing tasks in a reliable way (Hara et al., 2003; Rosas & Camarinha-Matos, 2009).
    b. By using informal communication and social mechanisms (Hara et al., 2003; Xue et al., 2018).
    c. By giving the contestants room for development and by giving group rewards (Bulińska-Stangrecka & Bagieńska, 2019).
    d. By creating a certain amount of interdependence between the contestants (Bulińska-Stangrecka & Bagieńska, 2019; Hara et al., 2003; Walsh & Maloney, 2007)
2. A new way of learning should be stimulated (Allert et al., 2004; Kamp et al., 2004; Lotrecchiano et al., 2016).
    a. By using creative methods, reflecting methods and problem-solving or decision-making strategies (Allert et al., 2004).
    b. By including intrapersonal and interpersonal elements and a reflection session (Lotrecchiano et al., 2016).
    c. By finding mutual interest, proximity, norms of openness and disclosure and possibly the presence of an intermediary (Kamp et al., 2004). Of which proximity also links to: activities are bounded by a small geographical area (Porter & Birdi, 2018).
3. Different social values, norms and cultures should be accepted by the participants (Porter & Birdi, 2018).
4. Participation to the tool should be open to all stakeholders (Porter & Birdi, 2018).
5. Room for sharing of knowledge should be created (Auch & Pretzsch, 2020; Hara et al., 2003; Porter & Birdi, 2018).
6. Regular and effective communication should also be included (Kamp et al., 2004; Porter & Birdi, 2018; Walsh & Maloney, 2007; Xue et al., 2018).
7. A moment for reflection should be created (Allert et al., 2004; Lotrecchiano et al., 2016).
8. A common goal should be found and highlighted (Hara et al., 2003; Kamp et al., 2004; Porter & Birdi, 2018; Rosas & Camarinha-Matos, 2009).
9. The group of contestants should not be too big (Sufi et al., 2014; Walsh & Maloney, 2007).

Figure 3.1: The collaboration requirements of the participatory tool.

3.3.3 Choice for the tool

3.3.3.1 The process

As was explained in Chapter 3.2.2, a few elements that should be coming back in the tool, were noted on post its on a Miro board. This was the result of one of the first iterations on the focus points for the design of the tool. The ideas here consisted of a combination of interpretation of the case and the collaboration requirements that were mentioned in Figure 3.1. Appendix F shows the overview of this iteration.

In a later iteration, ten focus points were listed in an Excel sheet. These were then prioritised, to bring a certain focus to the tool. The prioritisation happened quite naturally, since it seemed that the ten elements could be grouped under two main focus points: 'Realise the interdependency' and 'Learn to work together'. These were therefore coloured in a dark green shade, where the elements attached to them were lighter green depending on the importance and relevance of these factors (see Figure 3.2).

Since the focus points are based on multiple iterations made in conversations and individual processes, the elements are not direct copies from the collaboration requirements in Figure 3.1. Factors from the case study itself and ideas from other people are also blended in these focus points. To reassure the connection of each focus point to the collaboration requirements, Figure 3.2 also shows the numbers of the different collaboration requirements that each focus points is connected to in some way.

Focus Point	Link to requirements	Focus Point	Link to requirements
Realise the interdependency	1, 2, 8	Learn to work together	1, 2, 3, 4, 5, 6, 7, 8, 9
Think from other perspectives	2, 3, 5, 7	Give solutions that fit other's needs as well	1, 2, 4, 6, 7, 8
Give everyone an opportunity to bring value to the game	1, 3, 4, 5, 9	Build trust	1
Be open for other perspectives	1, 3, 4, 5, 7	Use active ways of communication	1, 2, 5, 6, 9
Learn to see the common goal	1, 2, 3, 7, 8	Have a moment of reflection	2, 7

*Figure 3.2: Elements from literature, the research on the case study of peat meadow areas, conversations about this research and individual brainstorms, presented as **focus points** for the tool. They are prioritised under the two upper focus points from important and closely connected (dark green) to less important and less connected (lighter green). The link of each focus point to the connected collaboration requirements from Figure 3.1 is shown in the white columns. (Source: made by author, screenshot Excel)*

The factors of Figure 3.2 should form the base of the tool, but next to these, there were also different options for the group of people to execute the tool with for this thesis; this could also influence the form of the tool. Three options were considered here. (1) Ideal would be to find stakeholders of one specific meadow where the situation of subsidence because of peat oxidation is applicable. (2) Another option would be to take a group of different experts, since their ideas about an ideal solution will already differ quite a lot. (3) The last option would be to do a role play, in which it would be possible to test the tool on a certain level, although the personal stakes might not be as high as it would be with actual stakeholders.

With the factors and optional participants in mind, different brainstorms on the form of the tool were performed. These brainstorms were done solo, in conversations with friends and with fellow students. After collecting a lot of ideas, the six best fitting options for the goals of this research were chosen. In this selection, it was also taken into consideration that the session would probably have to be performed in an online setting. As explained in Chapter 3.1.2, the participatory tool should be designed as a second order learning object to stimulate double loop learning. Therefore, the different options are also compared with some of the elements that stimulate the forming of second order learning objects, such as the use of creative methods, reflecting methods and problem-solving or decision-making strategies (Allert et al., 2004, p. 706).

Per option, it is explained why this option could work (behind the √) and why this would not work on the other hand (behind the O)

- Doing a workshop in which people will work on effective collaboration.
  - ✓ A workshop could place the contestants in a different situation where multiple elements of collaboration and trust could be discussed. Exercises can be done which relate to the main focus points of learning to work together and realise the interdependency. With different exercises during the workshop, reflecting methods and problem-solving or decision-making strategies could be included to make it a second order learning object.
    - o The exercises of the workshop itself determine whether the workshop could have effect. However, in the history of the peat meadow case study, already multiple workshops were organised, which often did not have a strong effect on finding solutions for the problem.
- Designing a serious game.
  - ✓ It is a new, creative way of putting the stakeholders in a situation where they could think about the case and about each other. The game could include elements of all different focus points and collaboration requirements in the different aspects of the game. Also, the serious game could be designed in a way that the different contestants would be confronted with interdependency and the necessary knowledge of each other's epistemics outlooks to win the game. This concludes that the different stimulating elements for a second order learning object can be included in a serious game.

    - It can be seen as an activity which is not serious enough for the case of peat meadow areas. People might not feel the need to take the game seriously, which could mean that the game has no effect on the situation.
- Writing a manual on effective collaboration.
    - ✓ Making a clear and easy overview of the ideal way to stimulate effective collaboration, could be used as a realisation of what is necessary to successfully argue about the solutions against the oxidation. This could include a moment of reflection, which is one of the collaboration requirements.
    - A manual gives ideas on how to work together, but it does not take the ideas into action. So, the focus point of learn to work together is not thoroughly incorporated. The participants have to find their own motivations and ways to implement the tips of the manual into action. The focus point 'realise the interdependency' is not even touched upon at all in a manual. Each participant could read it on its own but is not confronted with their connection with other stakeholders. It is hard to make a second order learning object from the manual, it becomes more of a first order learning object.
- Research the different epistemic outlooks and their willingness to collaborate by carrying out surveys.
    - ✓ Surveys could give a more detailed overview of and more insight in the differences and similarities between the different stakeholders. Based on these insights, the tool could be customised and specifically aimed at underlying problems and relations between every different stakeholder.
    - This idea could be an extra step before designing a tool, but surveys itself do not help the situation directly and is not a learning object. Yes, it might lead to a form of reflection and to the realisation of their expectations of a collaboration. However, it does not use the focus points of learn to work together and realise the interdependency.
- Make a do-it-yourself-tool for stakeholders at home that would inspire them with more interest in other perspectives and therefore a better collaboration.
    - ✓ Such a do-it-yourself-tool could include the main focus point of realise the interdependency and the focus points related to this one as well. A confronting tool could force participants to see other perspectives on different topics and it could show what every stakeholder could attribute to a successful whole. It could with some effort also include creative methods, reflecting methods and problem-solving or decision-making strategies to support double loop learning.
    - The downside of a tool that every stakeholder can use for themselves, is that the tool does not force the players to work together and to build trust, since it is used individually. The focus point of learn to work together is therefore not enough included here. This idea has also the same setback as the manual: the participants need to actively use the tool without having a meeting as a big stick to actually do it.

- Give a lecture on how to establish an effective collaboration.
    - ✓ A lecture could include an overview of the different epistemic outlooks which the participants could then see from others as well. Despite these differences, similarities and common ground could be presented as well. The lecture could also include simple tips and tricks on how to work together and why that is important for this case.
    - This form of a tool is quite a one-way communication (sending), while learning by doing and experiencing is more related to double loop learning. It does handle the focus points of realise the interdependency and learn to work together, but the contestants only hear it, and they are not forced to apply this knowledge. This way of informing might be interesting as a first step but will not have much effect on the situation on its own. This is a good example of a first order learning tool, but it cannot be formed into a strong second order learning object.

The selected forms were then presented to my supervisors in a midterm meeting. Here a choice for a tool was made. The process towards this choice is described in the next chapter.

3.3.3.2 The choice for a serious game

In the midterm meeting, it was further discussed what direction would be the most interesting for this research. First, it was concluded that a choice for the target group would not necessarily have to be made in this phase yet. The different ideas for a tool could work for all options.

Then, options for the tool that would not serve both main focus points of Figure 3.2, were crossed out as potential options. As can be checked with the pros and cons of each idea in Chapter 3.3.3.1, the eliminated ideas were: a manual, surveys, a do-it-yourself tool and a lecture. These would not completely serve the element of 'Learn to work together' and/or 'Realise the interdependency' in a practical way. With the workshop and the serious game left, both ideas were elaborated upon and discussed. The elaboration of the workshop can be found in Appendix G, where a flowchart is shown in which multiple choices were considered of what the workshop could look like.

Simultaneously, it was also decided to take one month to search for the ideal contestant group in which stakeholders of one specific peat meadow area would participate in the game. Because of the Covid-19 pandemic, there was a fair chance that this would not be realistic and therefore one of the other options should be chosen if there would be no perspective for the ideal group within a month.

Eventually, the serious game was chosen as best and more original option. The choice for the game was based on a couple of considerations. To start with, the case has already had quite some history of conversations, a serious game would be a different, new angle that was not used many times before.

Furthermore, the example of RE:PEAT in Chapter 3.1.4 shows the positive energy that contestants get from playing such a game instead of having a regular meeting. It is also explained here that it could create a situation in which a different form of learning is stimulated (Blunt, 2009). Keeping in mind that reaching a form of double loop learning is aimed for in this research, a serious game could therefore be a good method to use. Medema et al. (2016) do also mention that a serious game will stimulate stronger relationships and more effective communication between the stakeholders.

Another reason could be found in Chapter 3.1.2, where Allert et al. (2004) mention that second order learning objects can be stimulated by, among others, using creative methods. A serious game can be seen as a creative method, so that might help in creating a stimulating environment for double loop learning. The other stimulating elements to form a second order learning object, could also be implemented in a serious game. Therefore, it seems that a well-designed serious game has quite some potential to become a second order learning object indeed.

3.4 Conclusion & discussion – choice for a tool

This chapter of the thesis contains a literature study on the different elements of effective collaboration, and it shows the path towards the choice for a fitting tool in this research. Here, the sub questions that were posed in Chapter 3.2 will be answered and the steps that were made in this part of the research will be discussed and reflected upon.

3.4.1 Conclusion

Chapter 3 of the study was led by the following sub questions:

- *When analysing the controversy of the peat meadow areas, what elements of collaboration could be applied to create a situation in which effective collaboration could take place?*
- *What participatory intervention tool can be chosen to organise a situation in which the different stakeholder groups can achieve double loop learning?*

To answer the first question, Figure 3.1 in Chapter 3.3.2 can be used. All of the collaboration requirements that were mentioned in Figure 3.1, are potential factors of creating a situation in which collaboration could be stimulated. These will therefore also be used as a theoretical base to which the final outcome of this study will be compared.

The focus points of Figure 3.2 in Chapter 3.3.3.1 form the outcome of later iterations on the theories and the case together. These will form the base of the tool design.

The answer to the second sub question could also be given quite briefly when looking at the results. One can choose multiple potential tools to achieve a potential for double loop learning, like:

- Doing a workshop in which people will work on effective collaboration.
- Designing a serious game.
- Writing a manual on effective collaboration.
- Research the different epistemic outlooks and their willingness to collaborate by carrying out surveys.
- Make a do-it-yourself-tool for stakeholders at home that would inspire them with more interest in other perspectives and therefore a better collaboration.
- Give a lecture on how to establish an effective collaboration.

For this study, however, a serious game was chosen as a tool to create an environment in which double learning can be achieved and effective collaboration is stimulated. The most important considerations on choosing a serious game, were the following:

- It serves both main factors of 'Realise the interdependency' and 'Learn to work together' when designed well.
- It would be a new angle to start the conversation again, which is needed, since there has already been some history in discussions on this case.
- A serious game can lead to stronger relationships and more communication.

- Using creative methods can support the creation of second order learning objects and (the design of) a serious game is a creative method.
- A serious game has the potential to become a second order learning object and could therefore stimulate double loop learning.

3.4.2 Discussion

This part is a crucial step in the research that explains the direction of the complete thesis and builds a fundamental base of collaborative literature. It is therefore important to note that another conclusion on the sub questions of Chapter 3 of this thesis, might have led to a different, but strong outcome as well. In fact, when someone would perform the exact steps of the process as described in the methodology, it is quite possible to conclude that another tool would fit best for this situation. It can even be the case that other optional tools than the six that were mentioned here can originate. A creative workshop with cooperative exercises, could possibly achieve the same (or better) results in the further part of this research as well. Brainstorms and discussions with other people on this subject might have led to a different direction than where this research is going as well.

Interesting to note, is that this part shows the exploratory character of this thesis. At the start of the process, the proposed research incorporated a session in which the different stakeholders would describe their view of an ideal and a realistic future in the peat meadow areas. This description would then give me and each other insight in their worldview, with which a participatory tool could help to reach a collaborative environment. However, Chapter 2 did already show the clear worldviews of the different stakeholder groups, which meant that that did not have to be a large part in the final session. On the Miro board, however, a flow chart can be seen which includes a session where describing the future would be the main part of the workshop/session (Appendix G). This big turn shows the comprehensive iterations that were made to decide upon the choice of the tool.

4. Playing the serious game

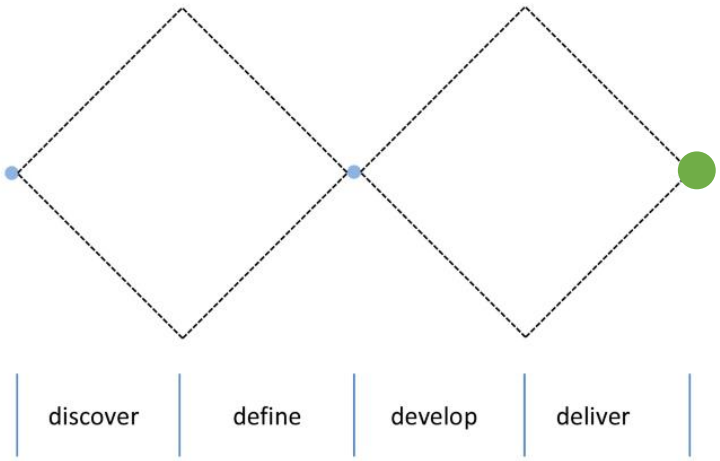
With this chapter, we have reached the **bridge** of this research. Therefore, the form of this chapter is a bit different, just like a bridge in a song.

The conclusion of the former chapter (3) was that a **serious game** could be an effective tool to create a situation in which effective collaboration could be accomplished in the controversy of peat meadow areas (as was studied in Chapter 2).

In the next chapter (5), the **designing process** of the serious game will be covered. To understand this design process of the game 'Samen door het veen', it is useful to know how the game should be played.

Therefore, in this chapter, the serious game and all its elements will be explained. It is not built-up like the rest of the chapters; it is only a **manual of the game**. In this way, if you are only interested in the game itself and not in the rest of my brilliant research, it is easy to find the part you need to read; this one!

As illustrated in the picture below, this final design of the serious game forms the end product of the double diamond.



4.1 How to play 'Samen door het veen'

With playing this serious game, players learn to see the value that other stakeholder groups can bring. The game also brings more insight in the different perspectives on the topic of peat meadow areas in the Netherlands that the different stakeholder groups have. When the game is finished (and won), the players learned how to work together. Also, more trust will be built, which should all together lead to a fresh mindset with more willingness to accept different solutions for the peat meadow areas.

With this new mindset, a session of discussing the different solutions against subsidence in the peat meadow areas can be started again.

4.1.1 Goal of the game

All five players have to reach the finish line in the exact same round.

This can be controlled per player by choosing a longer or a shorter route, taking some detours or shortcuts, by earning enough stepping cards (stappenkaarten) and by watching (and adapting to) the pace of the other players during the game.

4.1.1.1 Preparations

- Enter the Zoom meeting via the link that the coordinator shared with you and turn on your camera and microphone.
    - Make sure the Zoom meeting is filling a part of your screen, so you are able to see the contestants all the time. For an example of organising your screen, see Figure 4.1.
- Make sure you have a (free) account in Miro and enter the game board via the Miro link that the coordinator shared as well.
    - Make sure that this board is also a standard part of your screen. This can take up more room than the Zoom meeting, so you are able to follow the progress of the game well (Figure 4.1).
    - Try to move your pawn (the diamond shaped object at the lower part of the board in your colour).
- Grab a dice to play the game with (an online dice works as well).
- Open the four different links of the playing cards with Pickerwheel and make sure that each link contains a different tab of your browser, so they are easily accessible.
    - Minimise the browser until you need to draw a card from one of the four stacks.
- Open the PDF document (with seven minigames for 3 or more players) and minimise this document as well until you need it in the game.
- Find out who of the players is the oldest, because that player may start the game!

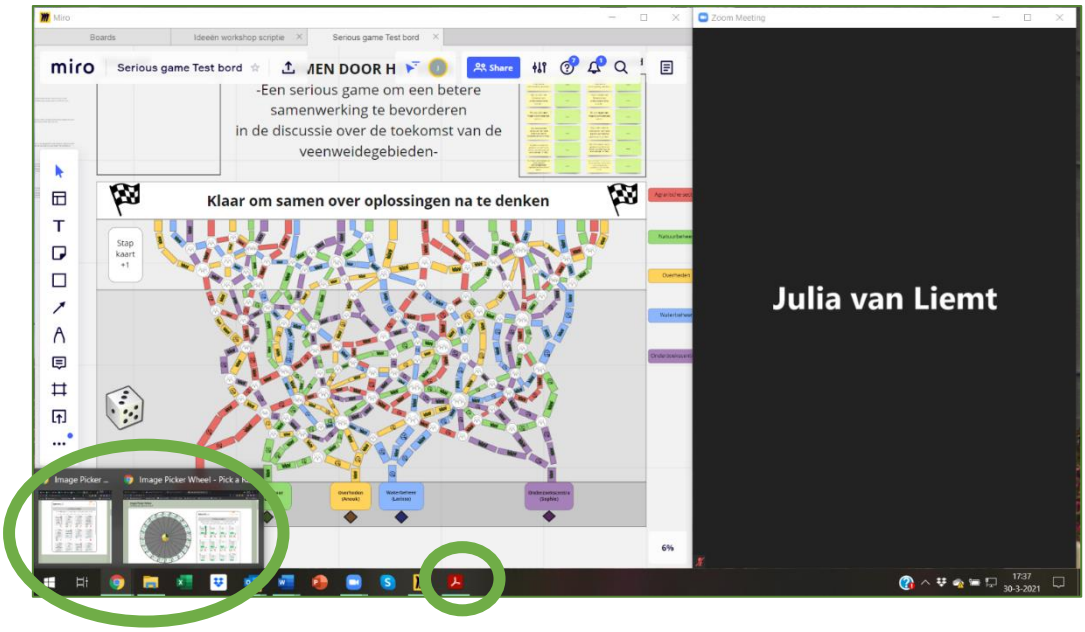


Figure 4.1: The rough organisation of your screen, with most room for the game board in Miro on the left, the Zoom meeting on the right and a web browser with the minimised Pickerwheels in the big circle and the PDF document minimised in the small circle. (Source: made by author, screenshot)

4.1.2 The game turn

Figure 4.2 depicts what the complete board looks like. The game is split into two zones, the dice zone and the finish zone. For each of these zones will now be explained what your game turn could look like.

Figure 4.2: A complete overview of the board as presented in Miro. (Source: made by author, screenshot Miro)

4.1.2.1 The dice zone

During the whole game, you will always follow the steps of your own colour, in which you can choose different routes. The order of turns will follow the order as presented on the board, starting with the oldest player. The distribution is as follows:

- **Agricultural stakeholders - red**
- **Nature preservation organisations - green**
- **Administrative bodies - yellow**
- **Water management organisations – blue**
- **Research organisations - purple**

As can be seen on the game board in Figure 4.2 the board is divided in three shades of grey. The darkest shade shows the starting point of the pawns. The middle part of the game has the icon of a dice on the left, which shows that you are in the dice zone. The lightest shade of grey as shown in the upper part of the board, shows an icon of a stepping card on the left, which indicates the finish zone.

As might sound obvious, in the dice zone, you move your pawn over the board by throwing your dice. For instance, if you throw 5, you can move your pawn 5 steps forwards on the steps of your colour on the board. Try to obtain as many stepping cards as possible in the dice zone before entering the finish zone. This can be done with playing Minigames and doing secret tasks.

When you have thrown the dice, there are multiple situations in which you can get:

- The path of your colour can **split** into different routes. You may decide for yourself which route you want to follow, although you can never take steps back on the exact same steps. Your choice can depend on the pace of the other players: do you have to catch up or slow down, then choose a shorter or longer route. Also, the stepping stone that you land on may influence this choice.
- When ending on a stepping stone with the icon of grass, you can pick a **meadow card (weidekaart)** from this Pickerwheel (Figure 4.3 & 4.8). You read the card out loud, and you execute the command on the card. Then you click the option 'hide' on the wheel.
    - **PAY ATTENTION**: if you have to move forwards or backwards because of the meadow card, consider this as a new turn and also pick a card for the stepping stone you land on (if this has one of the icons).
    - **PAY ATTENTION**: if another player has to move forwards or backwards because of your card, this player does **not** execute the mission of that tile he or she lands on.
- After throwing the dice, you could also land on a tile with an emoji with zipped lips, that means that you can pick a **secret task (geheime taak)** of the according wheel (Figure 4.4 & 4.8). **PAY ATTENTION**: do **not** read this task out loud; this task is only meant for you. Try to find the answer during the game, maybe start a little

Figure 4.3: The front side of a meadow card

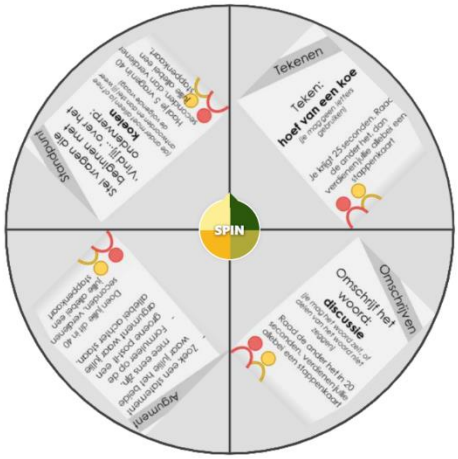
Figure 4.4: The front side of a secret task

conversation that will help you solve the task but try not to make it too obvious. Keep the card, until you have found the answer; then click 'hide' on the wheel.

- When you have solved the mission, you present the mission and your found answer in your next turn. When the answer is confirmed by the relating player and by the coordinator, you receive a stepping card.

➢ Your turn could also end on a crossing point with one other player (a white circle with only 2 persons), you will play a **minigame for 2 persons (minigame met 2 personen)** with the player of the colour that you cross (Figure 4.5 & 4.8). Spin the wheel with only the relevant cards on it. So, if you follow the red route and you cross paths with yellow, you select on the wheel only the red/yellow combined persons on the cards as shown in Figure 4.6. **PAY ATTENTION**: first read the task for yourself before sharing it with the group, to prevent that you already read the answer out loud. After playing the minigame, you press the X behind that game in the 'inputs', preventing you from spinning the same card again. When you succeed the task, both players are awarded with a stepping card by the game coordinator.

Figure 4.5: The front side of a minigame with 2 persons



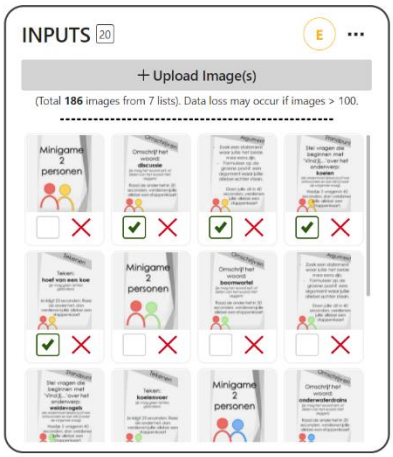


Figure 4.6: The wheel as it should be filled before spinning, with only red/yellow combined tasks. On the right side of the picture (at 'inputs'), you see that only the relevant cards are selected with a ☑. (Source: screenshot Pickerwheel)

➢ Another tile you could land on, is a crossing with three or more different colours (a white circle with the picture of 3, 4 or 5 players in it). This means that you are going to play a **minigame with 3 or more persons (minigame met 3 of meer personen)** with the players of the colours that do cross on this point (Figure 4.7 & 4.8). You can spin the relevant wheel; here, you do **not** have to select specific cards.

- **PAY ATTENTION**: if you spin a card with number **1-6** (see Figure 4.7 to know where to look for the number), let the other players all look up the correct number in the PDF document to play the game with.

Figure 4.7: An example card of a 3-person minigame with the number in the green circle

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- **PAY ATTENTION**: when the minigame is played, let every player hide this number on the 'inputs' (remove the checkmark) on their wheel as well. This also counts for the players who were **not** included in the minigame.
- If the minigame has a certain time limit or an unknown answer, the game coordinator checks the time and answers. He/she will award the stepping cards when the task was done correctly and in time.

➢ There are also a few empty tiles. If you end up here, no further action is needed, and the turn of the next player starts.

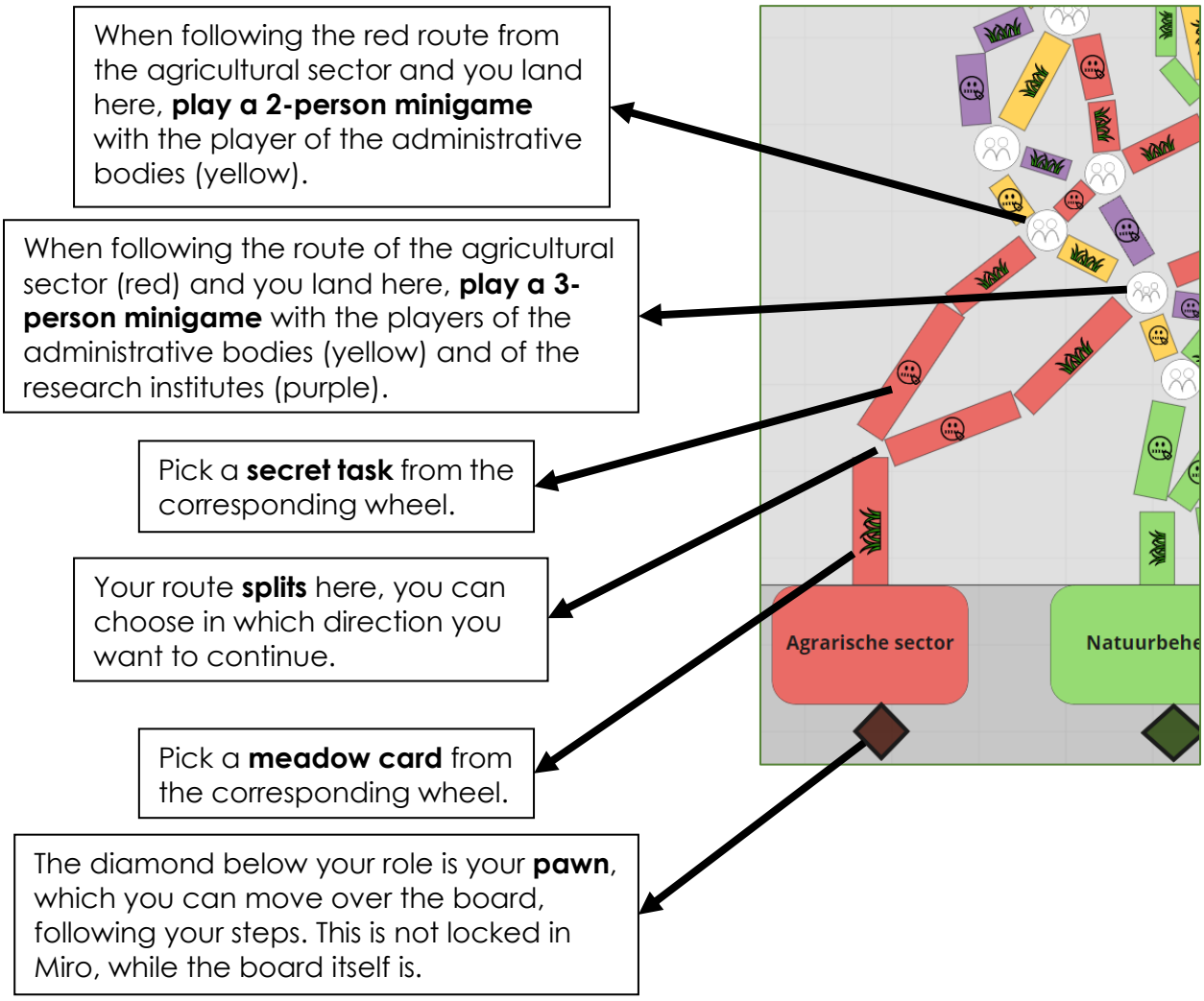


Figure 4.8: An explanation of the different elements that you can come across while playing the game. On the right side is shown a small piece of the board, with arrows from specific locations on the board to its explanation. (Source: made by author, screenshot Miro)

4.1.2.1 The finish zone

As told in the beginning of the former chapter, the board is divided in three shades of grey, which indicate the different zones of the field. The **finish zone** can be found on the upper end of the board with the lightest shade of grey and the picture of a stepping card on the left. The **finish** is the white area with the finish flags on the sides which reads: 'ready to think about solutions' (klaar om over oplossingen na te denken) (Figure 4.9).

In this part of the board, you can only move forward by using **stepping cards (stappenkaarten)** that you collect during the game, so you do not need the dice anymore. For each step that you make, you lose one card. The number of stepping cards are kept track of at the right side of the board. In Figure 4.9, you can for instance see that the agricultural sector only has three stepping cards left, while the player of the nature preservation bodies has six stepping cards.

It can be the case that you did not collect enough stepping cards yet, like the player of the agricultural sector in Figure 4.9, who needs to do five steps to land on the finish, but only has three stepping cards left. Therefore, it would be wise to land on the minigame to earn an extra card. The players of other colours may also be able to help red in earning a card by landing on a minigame to play with red.

You can also gamble and land on the meadow card, since there are some cards here that force you to go forward. Notice that there are no secret tasks in this zone. Those have to be solved during the earlier part of the game.

- **PAY ATTENTION**: the other players **cannot** donate some of their own stepping cards to the player in need.

Figure 4.9: The finish zone, with the icon of a stepping card on the left. You can see that the different pawns are all in the finish zone and on the right, you can see the number of stepping stones that some of the players have collected during the game. (Source: made by author, screenshot Miro)

As soon as you enter the finish zone, your optional actions look a bit different than in the dice zone:

- If your last throw with the dice ends in the finish zone, you may **finish that roll** and take the last few steps of your throw forward in the finish zone. The next turn your steps are taken with stepping cards.
- Each stepping card counts for 1 step, and you can use as many as you want (depending on how much you have in total).
    - **PAY ATTENTION:** you have to take at least 1 step every turn.

- In this phase, it is even more important to **watch the progress of the other players**. Are they not in the finish zone yet? Try to take only one step at the time and try to take a longer route (if you can get enough stepping cards for that).
- **Keep communicating!** As explained before, it can be necessary for yourself or for other players to collect more stepping cards. Try to play minigames with those players or try to get lucky with a meadow card. If one player is going too fast and putting pressure on the pace of the others, certain meadow cards could help as well.

4.1.2 The end of the game

The game has ended when 1 or more players land with their pawn ON the finish.

You have **won** the game when all players manage to reach this exactly in the same round. Congratulations, you are now ready to have a discussion on the possible solutions for the peat meadow areas in the Netherlands on a stronger basis than before.

You have all **lost** the game when not every player makes it in the same round. It might be needed to have an extra session like this before you can discuss solutions on the peat meadow areas.

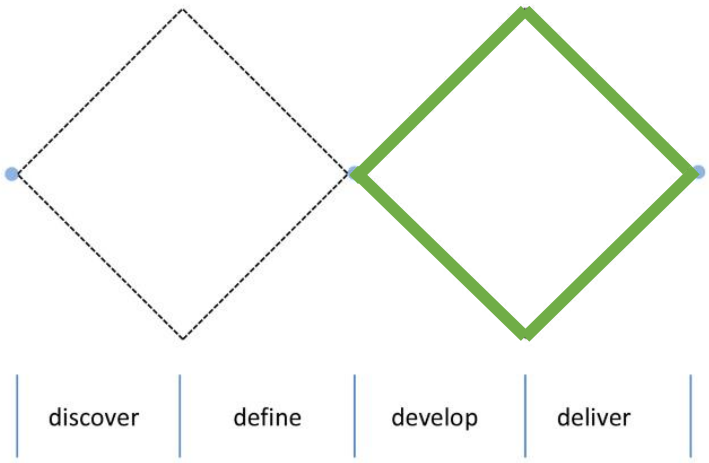
5. Creation of the serious game

The conclusion of Chapter 3 was that a **serious game** could be an effective tool to create a situation in which effective collaboration could be accomplished. This part of the thesis will explain how this game was designed.

For the design of the serious game, the literature of collaboration, explained in 'choice for a tool', was used as input. Apart from that, literature on serious games was used as input as well. The **theory of serious games** will therefore be explained in this part of the thesis.

Then you are taken through the **creative processes**, choices and considerations that were made to create the result. This result is the serious game called 'Samen door het veen' which was explained in the previous part of this thesis: 'playing the serious game' (4).

As in this chapter it is explained how input and inspiration on all forms and aspects of a potential serious game were collected, the 'develop' phase is passed here. When choices are made and one design will be further developed into the end product, the 'deliver' phase of the double diamond is passed as well. Therefore, both phases are highlighted in the picture below.



5.1 Theory – creation of the serious game

In 'Choice for a tool', it was concluded that a serious game would be a good tool to use for the case of peat meadow areas in the Netherlands. To start with the design of this game, the collaboration theory that was described in Chapter 3.1, was used as a base. Apart from this theory, however, more knowledge on the design and analysis of serious games was needed. In Table 3 at the end of Chapter 5.1, a brief summary is given about theoretical elements in this chapter.

Nevertheless, it must be noted that the design of a serious game is a creative process, which does not follow one path. Every designer uses his own steps and therefore, none of the described theories gives an exact roadmap on how to design a game step by step.

5.1.1 Design-based research – Develop and Deliver

In Chapter 1 to 3, the 'discover' and 'define' phase of the double diamond of design-based research were passed. Information on the case study and its stakeholders was collected and the different epistemic outlooks were defined, what finally led to the choice for a serious game as participatory tool for this research. The design of the serious game will be explained in this chapter and will include both the 'develop' and the 'deliver' phase, which is also depicted on the figure on the title page of this chapter.

At this point in the study, the choice for a serious game is made and a focus for the game is defined. That means that we are at the point of the design brief and the 'develop' phase starts (the double diamond on the title page of this chapter), when as many ideas and inputs as possible are collected. A creative process will start which will be formed mostly according to your own preferences. Van der Sanden & de Vries (2016) describe a process of design thinking that tries to depict the different cycles a person can make in a design process (see Figure 5.1) following the book of Roozenburg & Eekels (2003). It shows that 'understanding' and 'observing' are the first steps, which link to mostly to the 'discover' phase of the double diamond that was passed in Chapter 1 and 2. The 'point of view' (the design brief that was formed with the analysis of Chapter 2 and the choice for a tool in Chapter 3) can then be formed and might be reformed during the next steps of the design.

Then, in the 'develop' phase of the double diamond (where we are now), ideas for different forms of a serious game are collected, which could all help to improve the collaborative environment of the case. Inspiration can be found in different disciplines and co-design with people from different disciplines can increase the collection of various ideas even more (British Design Council, 2019; van der Sanden & de Vries, 2016). These activities mostly include the 'ideate' step in the cycle of a design process, although 'prototype' might also follow in cycles for some ideas (Roozenburg & Eekels (2003) as mentioned in van der Sanden & de Vries (2016) (Figure 5.1).

In the 'deliver' part of the diamond, the ideas, input, and literature elements are made more concrete, where they will be formed into one final design. A direction and form

of the final design of the game will be chosen and further developed. The steps of 'prototype' and 'test' will follow in cycles, where events in one step influence the other steps, which will bring multiple iterations on the game to strengthen the design (Roozenburg & Eekels (2003) as mentioned in van der Sanden & de Vries (2016). The step of 'ideate' might sometimes be used as well, when new elements are added to the game.

Collecting ideas and brainstorming on concrete executions of these ideas can be guided by a morphological chart, for instance (Roozenburg & Eekels (2003) as mentioned in van der Sanden & de Vries (2016)). A morphological chart gives some guidelines for thinking of multiple options that would be possible to include the different elements that you want to use in your product (a serious game in this case). Different combinations of these options can then be tested and compared, to find the end result that fits all of your goals.

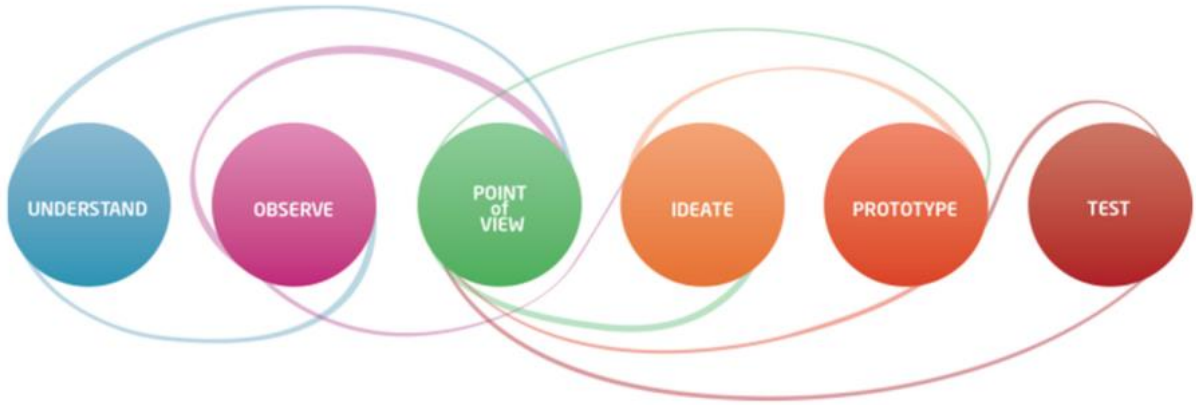


Figure 5.1: The cycle of a design process. Source: van der Sanden & de Vries (2016, p. 136)

5.1.2 Three elements of a serious game (design)

There have almost no studies been done in which an explicit step by step manual in designing a serious game is explained. The process of design-based research with all its iterations makes this nearly impossible to create. Therefore, it is easier to find studies on how to analyse serious games. However, some directions can be derived from different studies, of which the Triadic Game Design book of Harteveld (2011) is one.

According to Harteveld (2011), the most important elements of a serious game are 'Reality', 'Meaning' and 'Play'. During the design, the balance of these three basics should be secured at all times and in all important choices. If the design leans too much to one of these elements, the ultimate harmony is not met, which decreases the quality of the end result. Therefore, the three elements should be explained a bit more extensively, in order to understand the distinction. These three elements can be connected to the three elements of Hunicke, Leblanc, & Zubek (2004) who distinguish between 'rules', 'system' and 'fun', which in design can be referred to as 'mechanics', 'dynamics' and 'aesthetics'.

By 'Reality' is meant that the game should always have some relation to the real world, even when it is so abstract that it is hard to recognise. Therefore, to develop a serious game, some knowledge about the topic is necessary to make this connection with the reality of the case. The type of connection with reality is indicated by different 'domains'. The domain in which this serious game fits best, is probably the 'Public policy' domain, since this type of game is dealing with a public subject with all different stakeholders together to create awareness about the topic and the different interests (Harteveld, 2011). The mechanics of Hunicke et al. (2004) is also the more dry part of their three elements, although it has a different focus. Where reality is aimed at the outside world, the mechanics are focused on the 'drier' parts of the game's design; it contains the rules which structure the game. The mechanics control the game in combination with the content of the game (which might be seen as reality) (Hunicke et al., 2004).

The factor of 'Meaning' is focused on what and how players of the game learn by playing it. There is always a form of meaning present, which might in this case be focused on gaining insight in each other's worldviews, building trust and learning to work together (Harteveld, 2011). It can be connected to the design element of 'dynamics' of Hunicke et al. (2004). Meaning and dynamics are both the central element of the study they are mentioned in, since it connects the two other parts. Ma, Vallet, Cluzel, & Yannou (2019) also highlight the need for a strong connection between your real-life goals and the fictional world of a serious game. Just like reality, the element of meaning can also be placed in a certain domain, which is here referred to as the 'value' that is aimed for. The value of this game could be found in developing certain social skills such as collaboration and communication. These skills may be necessary in multiple forms of games, but this serious game should be focused on the further development of these skills. Another value could be found in stimulating a certain attitude change, in which the stakeholders are more open to listen to each other (Harteveld, 2011). These different values connect to the main focus points of 'Realise the interdependency' and 'Learn to work together' that were defined in Chapter 3. The dynamics of Hunicke et al. (2004) can be interpreted to focus on creating the opportunity to develop these kind of values in the game.

As is explained in Harteveld (2011), learning can also be connected to different learning theories. Since the world of meaning could maybe be seen as the point where people learn things in a fun way, such learning elements in playing a serious game could be defined differently as well. Soska, Mottok, & Wolff (2017) mention certain conditions in order to be able to learn in a serious game. Since this paper is purely focused on card games, it must be taken into account that these conditions might not be directly applicable to other types of serious games.

One of the conditions that Soska et al. (2017) mention, is that you should ensure that the learning elements are mentioned multiple times on multiple levels, in order to better digest the content better and to create a better reflection in the game. It is important here to know what knowledge your contestants have and to adjust the level and learning techniques to your contestants, so everyone can keep up with the game

(Soska et al., 2017). The content that you implement, should also be valid, according to (Ma et al., 2019). To support this learning process, it should be considered to stimulate collaboration and gaining knowledge during the game. For instance, you could reward knowledge and taking a more strategic step in the game (Soska et al., 2017).

The last world is that of 'Play', which is the third important element in the creation of a serious game (Harteveld, 2011). This is the fun element that makes the serious game a game and can be connected to the aesthetics part of Hunicke et al. (2004). Harteveld (2011) mentions that there are seven main genres of games, which are: "*action, adventure, puzzle, role-playing, simulation, strategy and virtual world*" (Harteveld, 2011, p. 71). Next to these, the taxonomy of aesthetics, as mentioned in Hunicke et al. (2004), can be placed. This comprises the following terms: sensation, fantasy, narrative, challenge, fellowship, discovery, expression and submission. A game may include multiple of these elements as mentioned in both Harteveld (2011) and Hunicke et al. (2004).

5.1.3 Game elements

As was mentioned before, the literature on serious gaming mostly focuses on analysing a serious game instead of designing one. In the designing process, however, these analysis papers can help with bringing order or balance in the game, but also as an inspiration for the different game elements.

For instance, it is a good start to know which type of game you are going to develop. Urban (2019), for example, describes six types of digital games: text-based adventure games, graphic adventure games, competitive games, sandbox games and mini-games. Whereas Urban focuses on digital games, Soska et al. (2017) are looking at different game elements in card games. Appendix H shows the complete list of game design patterns coming from this paper (Soska et al., 2017, Table 4). Most of these elements, however, are quite competitive and therefore could conflict with learning goals in collaboration, teamwork and communication, which is important to keep in mind (Soska et al., 2017). For instance, if you wanted to include an element such as 'conceal' when a player has to hide certain information to win, it should somehow be shared in another phase of the game to avoid players to get a negative feeling.

Since the game for this research will be more of a physical-known game that could be played online, most of the game types that Urban (2019) mentions, are not applicable here. As we saw in the previous chapter, the competitive element and the minigames are both partially included, but do not form the complete game.

The framework that Medema et al. (2016) introduce, connects a serious game with elements of social learning, which leads to three main concepts which should be taken into account when designing a serious game: characteristics of the stakeholders, interactions and organisation, and the quality of the relationships. When defining the target audience and the learning objectives, it might therefore be

interesting to consider which characteristics the stakeholders have, what their interactions and organisation look like and what the quality of their relationships is. For each element that is mentioned within these three concepts, specific barriers are indicated which might appear when implementing such an element (Medema et al., 2016). The barriers that can be found on these three levels, might partly form the learning objectives of the tool.

Using the framework of Medema et al. (2016), the characteristics of the stakeholders should become more prepared for participation with the design of this game (which can also be linked to collaboration readiness of Rosas & Camarinha-Matos (2009) in Chapter 3.1.3). The differences in motivation, available resources and scientific capacity were also quite large, as can be derived from Chapter 2. The game should therefore include a focus on preparing the group for collaboration and showing the different values of each stakeholder.

The element of interactions in this game should include involving all these different interests and crucial stakeholders, stimulate open communication and interaction and exchanging the different epistemic outlooks. The element of reflection, that was also mentioned by Allert et al. (2004) and Lotrecchiano et al. (2016) should also be included in the game. To achieve all this, however, it is important to stimulate the engagement and involvement of all stakeholders (Auch & Pretzsch, 2020; Medema et al., 2016; Porter & Birdi, 2018).

For the quality of relationships, most elements of Chapter 3.1 are needed. The game should include room for frequent interactions, awareness of the interdependence and building mutual trust (Medema et al., 2016).

Another way of approaching serious games, which is also used in the study of Urban (2019) and Ma et al. (2019), is the framework of 'Learning mechanics' and 'Game mechanics' as described by Arnab et al. (2015). The framework mentions that every step of a serious game should include at least one learning mechanic and at least one game mechanic. They introduce a framework with which a serious game could be analysed on both the game mechanics as the learning mechanics (Arnab et al., 2015). In the design process, it may help to mirror the prototypes to this scheme. However, when that is too extensive, the individual mechanics themselves could also form more of an inspiration for elements to accomplish certain (learning and fun) goals in your game.

Table 3: A brief summary of the literature that was discussed this chapter.

Paper	A brief summary of the literature in this chapter
Harteveld (2011)	• The process of a design for a serious game includes three main elements: 'Reality', 'Meaning' and 'Play'. These should be in balance for a strong serious game.
Hunicke et al. (2004)	• A serious game design contains three main elements: 'Mechanics', 'Dynamics', and 'Play'. One can design a serious game from mechanics to play or the other way around, but all should be considered.

Soska et al. (2017)	• There are multiple conditions that should be met to stimulate learning in a serious game. • Appendix H shows the different game elements that can be used in card games or form an inspiration for other types of games.
Urban (2019)	• A digital game could be ordered into these six types: text-based adventure games, graphic adventure games, competitive games, sandbox games and mini-games.
Arnab et al. (2015)	• Every step of a serious game should include at least one learning mechanic and at least one game mechanic.
Medema et al. (2016)	• Three main concepts for a serious game: characteristics of stakeholders, interactions and organisation, quality of relationships. • These three elements could lead to requirements like: show different values of each stakeholder, stimulate open communication, include moments for reflection and stimulate engagement and involvement of all stakeholders.
British Design Council (2019) & van der Sanden & de Vries (2016)	• In the develop phase of the double diamond of design-based research, many ideas and input from different sources are collected which could all fit in the defined angle that was decided upon in the former phase. • In the deliver part, all input is made more concrete and eventually formed into one final design.
Roozenburg & Eekels (2003) as mentioned in van der Sanden & de Vries (2016)	• Collecting ideas and doing brainstorms can be guided by a morphological chart.

5.2 Methodology – creation of the serious game

In this part of the research, we know the situation of the controversy, we know on what points we want to improve the situation and we know that we want to achieve this by designing a serious game. This part will then describe the designing process of the game, following the next sub question:

- *How can a design of a participatory serious game be made that could create a situation in which the different stakeholder groups could achieve a more effective collaboration?*

To answer this question, multiple steps were made towards the final design. Additional to the collaboration literature of Chapter 3.1, knowledge on serious games and a design process was needed, for which a literature study was done. After that, creative processes and quite some testing sessions were executed to come to a final design.

5.2.1 Literature review

In the conclusion of Chapter 3, a list of ten elements for creating a situation which would be more open to collaboration, was made. Then it was decided that a serious game could be a good choice to use as a tool for this thesis. Since this method requires knowledge about serious games in general, their effect and the designing process, a literature study was done on these topics (Chapter 3.1).

The literature on serious gaming was mostly found with the search tool Scopus with terms like:

- "serious game" and design and steps
- "serious game" and collaboration and design
- "serious game" and design and "board game" or "card game"

Furthermore, snowballing also delivered useful studies, such as a conversation I had with practically an expert on serious gaming who handed me one research as well. The details on the retrieving of the papers can be found in Appendix A.

In the master programme of Science Communication, the creative process of Design-Based Research is taught. Therefore, the research of van der Sanden & de Vries (2016) (and then mostly Chapter 8), was helpful in structuring my design process. This book is written by a professor and a teacher of the master Science Communication (which now switches its name to Communication Design for Innovation) and was therefore easily retrieved.

5.2.2 Choice of target group

Before starting the actual design process of the game, it was important to know what my target group would be. As was mentioned in Chapter 3, the Midterm meeting was the moment when the choice for a serious game was made together with my supervisors. In this meeting, it was also decided that I would take one month to find a group of 'real' stakeholders to play this game with. If I did not manage to find this group of stakeholders in time, the game would be played with an alternative group.

After a month of trying, it was decided to not spend more time on this search and the idea of using students of relevant studies for each stakeholder group was born. The idea to look for students from the relevant study perspectives to play the parts of the different stakeholders, originated in a conversation with one of my supervisors and had multiple reasons:

- Students of the relevant studies for the stakeholder group that they will represent share that same perspective to a certain extent.
- Students are often more used to and capable of working online with different tools.
- Students often have a more flexible schedule and more time available to participate in this game.
- Students are able to deal with the case of peat meadow areas in a more general way, instead of one specific location, which had the advantage that students could be recruited from all over the Netherlands.
- Choosing from all students of the relevant studies, would generally lead to more enthusiastic students who are motivated to participate in a game, because they would not have reacted if they had not been motivated.

To search for students that could represent the five stakeholder groups, Google was used. With search terms like 'opleiding watermanagement', 'opleiding natuurbeheer', 'opleiding veehouderij', 'opleiding bestuurskunde', multiple institutions with relevant studies popped up. The stakeholder group of research organisations was harder to connect with a study, since these groups mostly know a lot about all kinds of possible solutions for solving the subsidence in peat meadow areas. However, while searching for the correct study to represent the agricultural sector, the study of 'Agrotechnologie' was found, which appeared to be a perfect representative.

When comparing the different studies, a few conditions were taken into account: (1) did the description of the study match with the role of the stakeholder group, (2) how difficult would it be to come into contact with someone from the study, (3) would the combination of students (of all stakeholder groups together) have a variety of educational level in the end. Based on these conditions, one study was chosen for each stakeholder group to contact. An email was sent (often to the study advisor) with an explanation of my research and the question whether one or two students could be found who wanted to join this serious game. It also specifically asked for people with some knowledge of or experience with peat meadow areas.

For the research organisations, 2 students were found via the programme 'Agrotechnologie', who were both doing their MSc thesis on peat meadow areas and its solutions, which made them indeed 'experts of solutions'. Each time one student was found, a one-on-one Zoom meeting was organised, to meet each other and to give a bit more background to the idea of the game. Eventually, ten enthusiastic students were found:

- Two students to represent the research organisations.
    - Both writing a master thesis on the subject of Peat meadow areas for the MSc programme Biosystems Engineering with the specialisation on Farm Technology at Wageningen University & Research.

- Two students to represent the agricultural sector.
  - One following the MBO programme 'Veehouderij' at Terra MBO Meppel.
  - The other following the HBO programme 'Dier- en Veehouderij' at Aeres Hogeschool Dronten.
- Two students to represent water management organisations.
  - Both following the MBO programme 'Watermanagement' at Helicon.
- Two students to represent the nature preservation organisations.
  - Both following the BSc programme 'Bos- en Natuurbeheer' at Wageningen University & Research.
- Two students to represent the administrative bodies.
  - Both following the HBO programme of 'Bestuurskunde' at the Hogeschool van Amsterdam.

The choice for two students per stakeholder group instead of one, was made simultaneously with developing the game and getting reactions from students to join the game, because it would give me more results and therefore a stronger basis for conclusions if there would be two separate final sessions. So, at the point where this seemed possible, because I had already found multiple students per study, extra effort was put into finding two students for all stakeholder groups. This was done by using activities such as asking the first student for another enthusiastic friend from the study programme or asking the teacher or study advisor that I had spoken to before.

To make sure that all students had at least the same basic knowledge on the case, a small glossary with some extra info and terms was sent to all contestants (Appendix I). However, the students knew already most of the list beforehand.

5.2.3 The design process

Simultaneously with searching for relevant students to play the game, the design process started in order to develop the serious game. Although the process as described in van der Sanden & de Vries (2016) structured the rough outline of the design process, a strong result can only be reached by using your own creativity and preferences.

5.2.3.1 Brainstorming with the morphological chart

The design process started at the focus points that were defined in Chapter 3.3.3.1 and shown in Figure 3.2. The goal is to process these different focus points into the game for as much as possible. Therefore, a certain form of a morphological chart was created (Figure 5.2), to be able to brainstorm on elements that would support the focus points in the game. The scheme was utterly simple: the focus points were placed in a row in Excel, and I would think of different ways and associations per focus point on how it could be used, stimulated, or processed in a serious game. This process was a brainstorm during which every association or thought was written down in the cells behind that certain focus point that I thought about.

This type of brainstorm was also done with different groups of students, who were willing to help. There was one group of Science Communication students, one

group of Architecture students, and there was a one-on-one session with an embedded engineer. Without showing the collected ideas, I would present the different groups with the goals of the game and the focus points. Then, by brainstorming about ideas of using every focus point in a game, all options and associations were written down. The different brainstorm groups were chosen to collect more ideas than my own and to use different angles and backgrounds to think about the game. This was also described in Chapter 5.1.1, where the British Design Council (2019) and van der Sanden & de Vries (2016) mentioned that co-design with a variety of people can lead to broader inspiration.

5.2.3.2 From morphological chart to game ideas

When multiple iterations on the morphological chart were executed with different groups, it was time to create prototypes for games out of the ideas. For this, my sketch book resurfaced, and sketches were made on all sorts of ideas. These ideas were then discussed with my supervisors, after which new iterations were made.

Together with this sketching cycle, three options of game goals were also formulated, which could determine the further form of the ideas into a game. These were mirrored against the values and ideas in the morphological chart, to determine which end goal of the game would fit most of the focus points (Appendix J). For each goal, the following two steps were taken. (1) The elements in the morphological chart that could be used as parts of the game ideas with this goal were given a yellow colour. (2) The elements in the chart that corresponded with the main goal of the game idea, were given an orange colour. This colouring was done based on intuition and it was discussed with the supervisors afterwards. After there were three versions of the morphological chart with yellow and orange elements, the game goals were compared. The comparison was made based on which idea had the most coloured elements in total, which idea had the most orange elements, and which had the most coloured elements for the most highly prioritised focus points of 'realise the interdependency' and 'learn to work together'. After this, one goal was chosen for the game.

As the sketching process was more or less simultaneously done with this goal choosing process, multiple ideas fitted the chosen end goal. After some iterations, it led to three main options for a game, which seemed the best combination of fun and achievable with opportunities to become a second order learning object to stimulate double loop learning. The options were an online escape room, an online board game and a game in which everyone had one piece of the puzzle. These were further developed, after which one was chosen: the board game. This choice was made, based on having the highest potential to encompass most elements from the morphological chart, and on being the most original.

5.2.3.3 Making it digital

Considering all the struggles that the pandemic brought with it, it was also decided to make the serious game into a digital version. Because of all the restrictions and no sight

on any relaxations of the rules, it was much safer to plan a digital meeting for the game. This also offered the advantage that it would be easier to bring together the students from every corner of the country without much trouble.

There were, however, some problems here. A digital game is often associated with programming and creating a virtual world where people can move around with their avatar and solve puzzles (most studies on digital games (Chapter 5.1) were also mainly focused on these types of games). Since I have no skills in developing such an online game, I had to think of other types of games in an online variant.

To turn the idea of the board game into a digital format, not many options were considered. One website was found on which a board game could be developed, however, this required a paid licence and that was too big a threshold. The initial idea that I had was therefore chosen: making a game board by hand on a Miro board.

By creating rectangular shapes on the board representing steps of the pathways, and by copying, pasting and mirroring the different pathways, the main lines were set. The pathways of each different player were then given one colour, to distinguish the routes of the different players. All crossings were then made circular and with icon finder, the icons of the different game elements were added to the game. To indicate the different zones of the board, rectangular shapes with different shades of grey were placed on the background, with each a fitting icon on the left side. When the board was complete, all of it was locked, so no one could accidentally move or change items on the board. The pawns of the players were not locked, so these could then be moved over the locked board. Also, the stepping cards were unlocked, so these could be copied and pasted when a player earned one. (For an image of the board, look at Figure 4.2 in Chapter 4)

The playing cards that were part of the game, were made in PowerPoint. The shape of the slides was made into a playing card like form, and a standard theme was chosen, of which the colours were adjusted to create different sets of cards. The icons on the board were also used on the front of each card, to indicate which set was what. (For an image of the playing cards, see Chapter 5.3.3.2.) The choice for PowerPoint was made based on experience of another course in the master programme, when we also used PowerPoint for our playing cards, since there is plenty of room for creations in this programme. For the end result, these cards were then downloaded as PNG's and uploaded per type on different image picker wheels on the website https://pickerwheel.com/tools/random-image-generator/. To save each set of cards on this website, multiple free accounts had to be created, which was not ideal but doable.

5.2.3.4 Developing the game

When the first prototype of the game was designed, it was played with a group of fellow students, to see what elements worked well and what did not, to gain ideas on the further development of the game and to see the overall effect of the game. After this session, the game was developed further based on the experiences and evaluations of the first test, and on ideas that were formed during discussions with my supervisors. Then a new test session was played with another group of students and

more elements were developed. In total, there were six different test sessions, which all delivered new input for the development of the game.

The evaluation of the test sessions was done in three ways: (1) the game was observed during the play and notes were made on things that happened, (2) the game was evaluated in the zoom session after the game had been finished, and (3) the contestants all had to fill in an evaluation form via Google forms. The focus of these forms changed over the different test sessions, since the game was further developed each time. The choice for Google forms was made, because I had experience with this manner of evaluating and the application is easy to use.

Over time, the game changed considerably, new minigames, secret tasks and meadow cards were added, and elements were shaped and formulated differently. The different versions of the game were collected in another Miro board and an overview of these can be found in Appendix K. Each change that was made after a test session was noted down, to be able to trace that back (Appendix L).

This endless testing and modifying of the serious game, led to a final version of the game, of which the playing details were explained in Chapter 4.

5.3 Results – creation of the serious game

Since the end goal of this research includes at one hand for the different stakeholder groups to gain insight in the motives of the viewpoints of the counteracting parties and on the other hand the stimulation to create a situation for collaboration, the serious game will also focus on these elements. For this to happen, elements of both single and double loop learning should be included, and the game should become a second order learning object. In the focus points of Chapter 3.3.3.1 in Figure 3.2, both the collaboration requirements and the controversy specifics are combined. Therefore, the serious game should include as much focus points as possible, to create the best chance of achieving both main goals of this research in the end.

In this Results section, the process towards the final concept game is shown first, after which the development of the final game will be explained.

5.3.1 Generating ideas

As was described in the methodology, the morphological chart was filled with ideas from three different brainstorm sessions to start with. This generated the chart that is shown in Figure 5.2. This shows that part of the items here are mere associations with known games and therefore link to the world of 'play' from Harteveld (2011). For instance, there are ideas of Monopoly, Cluedo and Portal that might work towards one of the intended goals. Interestingly enough, these three associations are all made with the concept of 'Realise the interdependency'.

Another type of ideas that can quite often be found in Figure 5.2, are certain game elements that could help in achieving the goal of the study. Examples for these are 'Have one common enemy' and 'Get points for getting to know each other' These are more related to the world of 'meaning' from Harteveld (2011).

A more abstract type of input can also be found in the chart. What is meant by abstract elements, is that these do not directly associate with a game, but when these are reached while playing a game, it will help in accomplishing the focus point in the game. These can be seen as related to the world of 'reality'. For instance, 'Tell personal stories' is not a game or a game element in itself, but when it could be processed into the game, it might indeed help with having a more open mind to thinking from other perspectives (Figure 5.2).

Possible game elements					
Realise the interdependency	Solve puzzles where other one's knowledge is needed	Literally having only one piece of the puzzle	Seeing only part of the whole situation alone	Think of Colonisten van catan --> you often need to make deals to win	
Think from other perspectives	Roleplay: pretend you are another stakeholder	Put on different glasses (/perspectives)	Try to predict the next move of another player	Get points for getting to know each other	
Give everyone an opportunity to bring value to the game	Make sure each expertise is highlighted	A game where each player has their turn	Send emoji/ statement cards that can be brought on camera to express yourself	pass it on -->cooking something in a chain, one player starts and the next one continues etc	
Be open to other perspectives	Listening needed to solve puzzle	Tell what someone told accurately to score points	Try to solve a puzzle from multiple perspectives	Show 3D object that looks completely different from each angle	
Learn to see the common goal	A game without explanation before the start	Solve the puzzle by revealing pieces of common goal	Discuss what common goal could be and reflect on it	pass it on -->cooking something in a chain, one player starts and the next one continues etc	
Learn to work together	Working together to solve puzzles	Work towards one (common) goal	Have one common enemy	Escape from situation all are trapped in	
Give solutions that fit other's needs as well	List solutions that are suitable for more than just you to earn points	Lose time/points when you do not serve other one's needs	The goal of individual game is to reach the finish exactly all at the same time	Get points for getting to know each other	
Build trust	A form of catch me if I fall	Solve puzzles by being open about yourself	A step-based game where you learn to know each other better each round	Play games/ do fun things together each week to build a bond	
Use active ways of communication	Search who your card belongs to by asking questions	Searching the twin game element of the one you received	Have a discussion starter after each phase/ step/ turn of the game	Get points for getting to know each other	
Have a moment of reflection	Have a discussion starter after each phase/ step/ turn of the game	Discussion after the game	Connections made to real life during the game	Try to make the same reflection as your team mates without talking about it	

Figure 5.2a: The morphological chart, filled in after three brainstorms (first half of the chart). (Source: made by author, screenshot Excel)

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Realise the interdependency		Think of Cluedo --> find the solution together	You can have Monopoly 'kanskaarten' in which players are linked together	Portal --> to solve the puzzle both of you are needed		
Think from other perspectives		Tell personal stories	In 30 seconds, you are forced to think how to explain it so your team mate gets it	Try to think who said what to score points		
Give everyone an opportunity to bring value to the game						
Be open to other perspectives		Do something like the elephant cartoon and solve it together	Common interest/ common goal	Respect		
Learn to see the common goal						
Learn to work together		Forced working together with support from independent person	Pandemic --> together against the game	Cluedo you collect clues and you want to solve it together	Each teams sport has one goal	Realise when someone is stuck and know how to help
Give solutions that fit other's needs as well		Simultaneously answering 1 question and try to give the same answer as you team mate	Pandemic --> together against the game	Working together makes you earn more points than working alone	Make connections and small cooperations with certain players to win	In secret hitler you have to propose something that works for you and for others as well
Build trust		Get points for getting to know each other	Make connections and small cooperations with certain players to win	The game Among us is the exact opposite		
Use active ways of communication		Try to obtain information for your secret task from other players	Send emoji/ statement cards that can be brought on camera to express yourself			
Have a moment of reflection		Try to think who said what to score points --> why do I think that				

Figure 5.2b: The morphological chart, filled in after three brainstorms (second half of the chart). (Source: made by author, screenshot Excel)

Using the input of the morphological chart, the choice of a target group and conversations with supervisors as inspiration, multiple ideas and elements were sketched in a sketchbook, of which some ideas can be found in Appendix M. An attempt was made to connect elements from different rows of the morphological chart into some sort of game. The generated ideas led to three main concepts, which could all work as a serious game, and which would include elements from (almost) every row of the morphological chart. The first of these ideas, was the game 'Part of a whole'. In this game, every player has different pieces of information, which, combined with the pieces of the other players, would bring a solution to the puzzle. These puzzles could have multiple forms and multiple difficulty levels (see Option 1 in Appendix M-2).

In my interpretation, this game would fit in perfectly with the two main focus points of 'Realise the interdependency' and 'Learn to work together', since this game was not solvable on one's own and the type of information that a player had, could be adjusted to that role, so every expertise was needed to come to the solution.

The second idea was an 'online Escape room', which could consist of multiple different puzzles that had to be solved in order to be able to take the next step (see Option 2 in Appendix M-2). Each answer had to be filled in on a Google form for instance, where the answer was checked. If it was correct, the next pieces of information would be given to solve the next part of the puzzle. Here, different types of puzzles could be built, where for instance every player could have one or more puzzles that fitted in with their expertise, whereas they needed the help of other players to solve other puzzles (a sketch can be found in Appendix M).

This could also fit to both main focus points, since for each puzzle, another expertise will probably be necessary, which shows the interdependency. This interdependency would also lead towards more collaboration. However, it is important then to often check if indeed every expertise is needed and if there is not one player who knows everything. Otherwise, the goals may not necessarily be achieved.

The last option was an online board game, in which all players could choose their own route and had to reach the finish in the same round. The routes would be full of crossings with other routes, which would provide the opportunity to do certain puzzles together with other players before moving on (see Option 3 in Appendix M-2).

The general interpretation of this game was to meet the main focus points as well, since the puzzles during the game could be focused on a specific expertise, which would stress the interdependency and stimulate collaboration. Moreover, the main goal of the game, to finish in the same round, would demand from the players to watch each other's pace and choose another path to go faster or slower, which would also fit the focus points.

All three options would in my interpretation have the potential to become a second order learning object as well. This because the various options can all include a decision-making, inquisitive, problem-solving and learning character with the potential for reflective moments.

5.3.2 Choosing one option

As was explained in Chapter 5.2, simultaneously with the development of the options, different goals of an eventual game were explored. In this way, the designer of the game (me) could take into account the most suitable game goal for the case study.

Therefore, the morphological chart was used to test three main goals of the final game. (1) The first goal was to collect the most points during the game to win. Appendix J shows that this did indeed meet many of the aspects that were mentioned in the morphological chart (shown with yellow and orange colours as explained in Chapter 5.2.3.2). (2) Another goal that was tested, was to finish the game first. This goal met less of the elements in the chart than the first goal. (3) The last goal was for all the players to finish the game at the same time. Appendix J shows that this goal met the most elements in the chart compared to the other two goals.

It could be argued that this was a logical outcome, since option (1) and (2) would be more individually orientated, while players could still be forced to solve puzzles together to be able to move further. Having the main goal of finishing together (3), would make the game even more focused on working together and it would indeed make the players interdependent. Therefore, this main goal was chosen for the final game.

All three options that were described in Chapter 5.3.1, could fit this chosen main goal. That meant that a choice had to be made on different levels. The first choice that was made, was to delete 'Part of a whole' from the options, since this could also be one of the puzzles in the Escape room or the board game. Another reason was that in order to create highly difficult puzzles, it was necessary for me, the designer, to have expertise in every area, and that might not have been enough to make it challenging for every player.

With two options left, both were tested on feasibility. The Escape room could be created with a Google forms structure and the board game could be made in Miro. While both were touching many aspects from the morphological chart and had potential to add more elements to different puzzles, it was hard to choose. But although they could both work as a serious game, the board game was chosen on the basis of two details. (1) The concept of this type of board game was quite original, whereas an online escape room would merely use an existing framework. (2) Furthermore, the escape room was at risk of one person being able to solve all puzzles on his own, whereas the board game did not, for instance by having contestants play in turn.

5.3.3 Serious game design

5.3.3.1 The general line of the game

When the choice for the board game was made, a playable version had to be developed. This first brought the question on how the players could control reaching the finish together. Choosing longer or shorter routes was one way of adjusting your pace to others, but being able to finish in the same round, would need more specific control. This because, using a dice to move over the game would be too unpredictable. This matter was discussed in casual conversations with friends and family, when finally, the idea of stepping cards was born. By creating a finish zone where players could only move with stepping cards, which they could earn by solving puzzles along the way, control was achieved for players to be able to finish the game together.

As mentioned before at the beginning of Chapter 5.3, the focus points of Figure 3.2 in Chapter 3.3.3.1 were meant to be included in the game for as much as possible. Since the morphological chart consisted of ideas based on these focus points, including as many of these ideas as possible would create a bigger chance of achieving the main goals of this research in the serious game.

To add as many ideas from the morphological chart as possible, minigames were created to have different games and puzzles that could be played when a player would cross the route of one or more other players. Furthermore, secret tasks were added, to establish the more personal conversation as well and to learn new aspects of the players. Additionally, the meadow cards were introduced, which would enable players to influence the pace of the game and promote social talks during the game. Each game element was given a recognisable icon on the board and on the card sets that were made.

These main concepts were not changed during the different test sessions. The individual minigames, secret tasks and meadow cards themselves changed a lot, however. The board also developed from vertical into horizontal, with less steps, different routes and more icons and crossings. This change can be seen in Figure 5.3, the left side shows the very first version of the game and the right shows the final version of the game (more versions and more detailed pictures of the board can be found in Appendix K). Differences on the boards can be found in the colours of the routes, a switch to a horizontal board, extra minigames, another name, shorter routes, less stepping stones, more icons and all sorts of details. The combination of Appendix K and the notes of changes after each test in Appendix L, lead you through the detailed transformation process.

All test sessions contributed much input for changes in the game, game elements and in the lay out of the board. Especially the fifth test session influenced the lay out of the game quite much. This session was played during a skills day that was held in the master programme of science communication. Time was more limited here and the number of players was unknown until shortly before the session started. This resulted in a large cut in the length of the routes. This can be seen in Appendix K; the board has decreased in size before the fifth test session. And since this decrease was successful, this lay out was maintained for the final version of the board. This test session also showed that it was possible to play the game with more than five players, if some stakeholder roles were played in pairs.

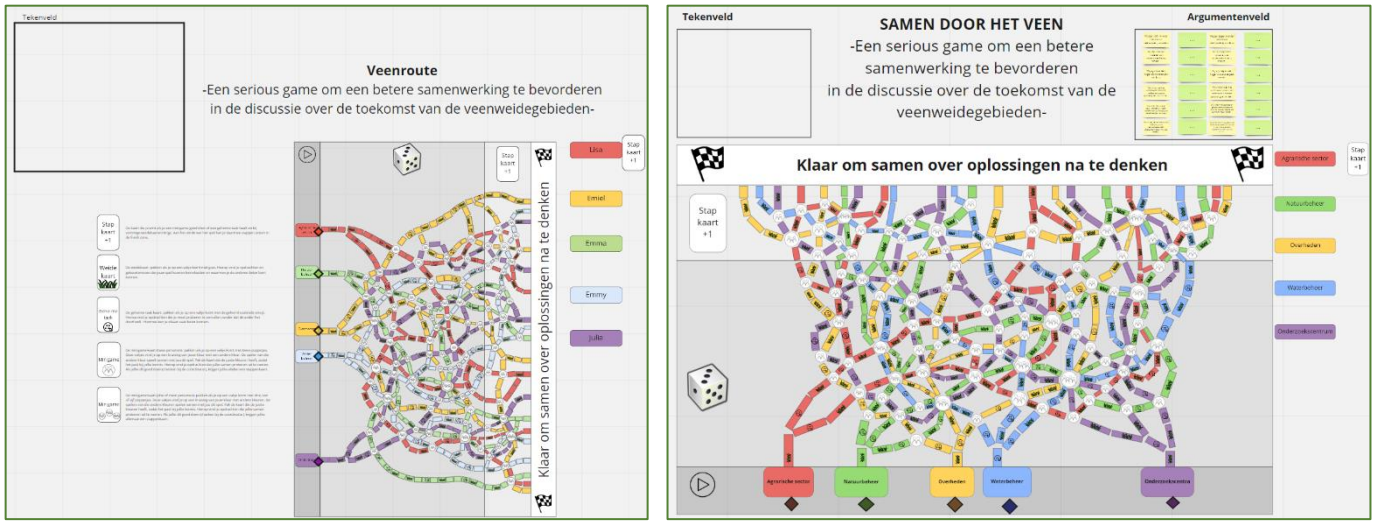

Figure 5.3: The first version of the board game on the left and the final version of the board on the right. (Source: made by author, screenshots Miro)

5.3.3.2 The different game elements

As mentioned in the former chapter, the final design of the game contains some game elements coming from ideas of the morphological chart. These will now be explained with an example for each element and the line of reasoning that can be found behind it. The legend of the different explanations is as follows:

Legend

- **Game element**
  - Why is this game element included?
  - Some specifics on the cards that come with this game element.
    - ***Specific type of task for this game element*** with a short description.
      - ➢ How does this element connect to the focus points? (For an overview, see Figure 5.15 in Chapter 5.3.3.3.)
      - ❖ What aspects of single and double loop learning are included?
        - An example with the picture on the side.

- **Minigames for two persons**
  - The distinction of minigames for two people and for more people was made, because the minigames for two people could be specifically focused on the two stakeholders and their different expertise. Therefore, different minigames were made for these sets of cards than for the stack with minigames for three or more players.
  - Each player would get their own set of cards, to adapt the games for this specific stakeholder. Details on how this would work, can be found in the former chapter, Chapter 4.
    - ***Describing (omschrijven)***: the description game is known as the main element of the game 30 seconds, although this contains just one word and 20 seconds of guessing.
      - ➢ This minigame connects to the theory via the morphological chart, where it was thought of as a way to think of other perspectives, since you have to describe it in such a way that the other understands it to score points.
      - ❖ This minigame tries to enhance the stimulation of double loop learning. The player does not only need to know what the worldview of the other player is, he or she also needs to understand and apply the underlying motives to use the perfect fitting manner of describing the word to the other player.
        - The words that are used, (as much as possible) try to establish a link between the two roles that are playing the game and might ask for a different point of view from the other player. See for instance Figure 5.4, where the agricultural sector has to describe 'discussion' to the governmental bodies. Both players

Figure 5.4: An example card of the minigame 'describing'.

probably attended discussions with one another, but they might have different feelings about it (for instance, a more negative experience for the agricultural sector and a more problem-solving feeling for the governmental bodies).

- ***Argumentation (argument)***: both players have to find a statement on the board in the argumentation field, which both players could agree with to a certain extent. Then both players have to come up with an argument that they do also agree with. This has to be done within 40 seconds (these cards look the same for every stack and is shown in Figure 5.5).
  - ➢ This minigame does directly link to finding common ground. So, connecting it to the morphological chart, this helps to see the common goal and to provide solutions that fit other's needs as well.
  - ❖ This game comprises both single and double loop learning. On the one hand, players share their ideas about various statements, with which they both learn the perspective of the other player (single loop). When the players are quite aligned, this might be enough. However, to find common ground between players with larger differences, the players need to understand why the other player thinks in a certain way to propose an agreeable option. This might even need a certain self-reflection to change your own view slightly to be able to agree (related to double loop learning).
    - It is on purpose only focused on finding things that they can agree with, to stress the overlap that they have and not the differences. The time pressure makes sure that there is limited time for discussion, otherwise people might linger on the statements that they do not agree with.

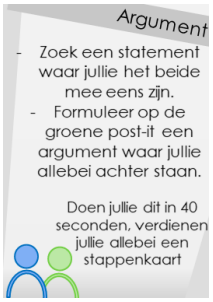

Figure 5.5: An example card of the minigame 'Argumentation'.

- ***Point of view (standpunt)***: in this minigame, the leading player has to find out the point of view of the other player on a certain topic. By asking questions that the other person only answers with yes or no, the player can find the point of view, without starting a discussion on the why and the how.
  - ➢ By searching for the other's point of view on a certain topic, you are forced to be open to other perspectives and it might lay a base for thinking from other perspectives when that is needed. Both these aspects can also be found in the focus points of the morphological chart.
  - ❖ In principle, this game is focused on single loop learning, since the player has to ask questions that lead to finding the point of view. However, depending on the questions that the players ask, this game can go from single loop learning to double loop learning. If you can steer your questions to the why of the point of view, you might reach double loop learning as well. This is, however, very challenging with the

Figure 5.6: An example card of the minigame 'Point of view'.

time pressure and the restrictions of the questions. Therefore, single loop learning is also a valuable achievement here.

- An example of this card is shown in Figure 5.6, where the (maybe more neutral) player of the research centres can find out what the position of the nature preservation organisations is on the topic of 'preservation of dairy farms'. Since the other three roles have to wait for their turn, they will also have to listen and might also learn more about this point of view.

▪ ***Drawing (tekenen)***: just like the describing variant, this is a more classical and less serious form of the minigames, when the leading player has to draw a certain -peat meadow related- term and the other person has to guess it in 25 seconds (in the drawing field on the board).

➢ It has the same background as the description game, since it also relates to thinking from other perspectives. In the game, despite of what your drawing skills are, you have to think how you can draw it in such a way that the other one understands it.

Figure 5.7: An example card of the minigame 'Drawing'.

❖ Just like the describing game, this minigame tries to stimulate double loop learning. The player needs to understand and apply the underlying motives of the perspective of the other player to use a clear and customised manner of drawing the word of the card.

- Figure 5.7 shows that the topics here are again closely related to the playing roles. The topic of 'drought' brings stress for the nature preservation bodies as well for the water management bodies but might have different backgrounds.

- **Minigames for three or more players**

o These minigames would have a rather more generic angle than the two-person minigames, and therefore include different games.

 Since it would be impossible to customise the cards to each possible combination of players such as the minigames with two people, this set of cards is the same for each individual player. There is, however, one exception: for the first seven minigames each player sees a different picture, while playing the same minigame.

▪ ***Part of a whole (deel van geheel)***: the exception mentioned above concerns the minigame 'Part of a whole', where each player sees another aspect of the puzzle, and the players have to find the solution by describing the pieces of the puzzle. The piece that a player sees, is often linked to his or her role in the game, which links the point of view in real life to the role in the game. The interesting thing here, is that sometimes you only have three clues, but if all five players are destined to play this game, five clues are revealed.

➢ This might sound familiar, since one of the options for the serious game, would consist of only these types of puzzles

Figure 5.8: An example card of the minigame 'Part of a whole'.

(Chapter 5.3.1). This game is meant to have much value, since it connects to multiple elements of the morphological chart. This game emphasises the realise the interdependency, since it is hard to solve with only one piece of the puzzle. By having the possibility of owning a crucial piece of the puzzle, everyone can bring value to the game, and you have to be open to another one's perspective. When answered incorrectly, it is also interesting to look at the clues of the players who did not attend the minigame. If these contain a crucial angle, there might be an increased realisation that every position is needed in this problem. It also includes elements of working together, since the solutions that are given, have to fit all pieces of the puzzle and active communication is needed.

- ❖ This game also aims to stimulate double loop learning mostly like the describing game. Since your piece of the puzzle connects to your point of view, it might be something that is not easily understood by the other players. Therefore, you need explain it in a way that connects to their way of thinking. For this to happen, a certain (self) reflection and understanding of the underlying motives of the other players is needed.
    - Figure 5.8 shows a sample card of this minigame, of which the solution should be: 'ditch water level'. Seen from the perspective of the role of water management, you will see logos of different water boards. Another player with minigame 3 would for instance see a ditch or a ruler. So, everyone has to explain what he or she sees, after which a decision on (hopefully) the right solution should be made as a group.

- ***Associating (associëren)***: the games of association are quite simple. One topic is mentioned on the card and all contesting players have to mention their first association in turns (however, they cannot mention the same thing as another player). To make sure that people say the first thing that comes up in their minds, there is a time pressure which asks for 6 associations in 25 seconds.
    - ➢ This game mostly relates to being open to other perspectives. Since the player has hardly any time to think, the idea is that the pure perspective of the player comes forward, which might lead to more insights for the other players.
    - ❖ This game does not give much room for double loop learning, since time is limited and there is no explanation given for the associations that are mentioned. It can, however, support single loop learning, since it gives more insight in the perspective of the other players.
        - The picture in Figure 5.9 shows an example of the association game, where the contesting players have to associate on the topic 'cows'. Since the different roles

Figure 5.9: An example card of the minigame 'Associating'.

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might have other visions of the future of cows in peat meadow areas, it might lead to mainly positive or mainly negative associations per stakeholder group.

- ***Name it (noem op…)***: this game has two different sides. Approximately half of the 'name it'-cards ask for naming advantages of a topic, and the other half are aimed at naming disadvantages of a topic. Just like the association game, this should be done taking turns, so every player can shine his or her light on the subject. This game has less time pressure than the association game, since major (dis)advantages might need a bit more time and still, repetitive answers are not allowed. At least five (dis)advantages have to be mentioned in 40 seconds.
  - ➢ This game links to the morphological chart on the main focus point of realise the interdependency. It gives every player an opportunity to bring their value into the game -if only because each different perspective can name different (dis)advantages and if everyone would think the same way, it would be hard to find five different ones- and because of that every player gets their own turn. It also demonstrates the different perspectives and might help in being more open to what another role thinks. And by sometimes having to think of advantages when you see very few, it might also reveal options in searching for a common goal or thinking from another perspective.
  - ❖ Just like the associating game, this game does not give much room for double loop learning. Here, time is limited as well and there is also no explanation given for the (dis)advantages that are mentioned. It is still valuable for single loop learning though, since it gives more insight in the perspective of the other players.

Figure 5.10: An example card of the minigame 'Name it'.

    - The example shown in Figure 5.10 shows that the mission is to name advantages of buying out dairy farmers in peat meadow areas. Here, the nature preservation bodies might see a lot of advantages, but the farmer might not be as enthusiastic. To win the minigame, however, this role is forced to think from an alternative perspective.
- ***Argumentation***: this minigame is the only similarity between the two-person and the three-or-more-person minigames. This game contains the exact same objectives as in the two-person version, so it will not be further explained here. The only difference is that the version for three or more persons gives the players 60 seconds to find the statement and formulate an argument instead of 40 in the two-person version.

- **Secret tasks (geheime taken)**
  - The secret tasks are objectives that have to be completed by the individual player without giving away the actual task too obviously. It (almost) always needs some sort of conversation to be completed, since the tasks are focused on finding out personal things and perspectives of the other players.

- This set of cards is the same for every individual and include more personal elements and more perspective oriented elements of other players.
  - ***Personal secret tasks***: this type of secret task involves finding out a personal detail of a player from another role.
    - These tasks link to the morphological chart in the part of building trust, since getting to know each other personally, helps to build trust. This will give a more positive foundation for more difficult and content related conversations afterwards, because you know the people better, which leads to more openness to other ideas. Since it asks for a subtle way of conversing in the game in order to complete your secret task, the element of active communication is also affected here.

Figure 5.11: An example card of a personal secret task.

    - These tasks are aimed to stimulate double loop learning. This game includes finding out personal details of other players by watching or questioning them during the game when searching for the answer for the task. By doing that, a player might be able to understand the underlying motives of why these other players have a certain perspective on the case. Not all tasks will reveal underlying reasoning, but these tasks also include some single loop learning, since you find out certain elements about the player.
      - In Figure 5.11, the personal secret task is to find out what the player of water management is drinking. This delivered fun conversations that started with comments such as 'are you guys also getting thirsty by playing this game?'. The conversations often went further than drinking, which lowered the threshold of not knowing each other beforehand and building up relationships.
  - ***Content related secret tasks***: this type of secret task involves finding out details on the perspective of other stakeholder groups.
    - The idea of the content related tasks is that players have to listen carefully to other players' perspectives, which might provide more insight and openness towards one another. In multiple minigames, the topics of these tasks will be specifically mentioned, which means that you do not have to start the conversation on your own. However, sometimes this was necessary as well, which led to great conversations during the game.

Figure 5.12: An example card of a content related secret task.

    - These tasks also try to enhance double loop learning in the game, mostly in the same ways as was mentioned with the personal secret tasks. However, since these tasks are more directly related to the worldviews on the peat meadow topic, more content related understanding might be found. Trying to find out what another player thinks, might even lead to a reflection to

your own ideas on the topic. Here is also single loop learning included since the player finds out some content related aspects of the target player.

- The example of Figure 5.12 asks to find out what the most important element is in the peat meadow situation for the agricultural sector. This asks for a better understanding of the agricultural perspective, which might be obtained during the minigames, or in conversations during the game.

- **Meadow cards (weidekaarten)**
  - The meadow cards are added to the game to include some unpredictable events on the board and to start some social talks during the game. The leading player reads the card out loud and chooses the player(s) that have to act upon it.
  - This set of cards is also the same for every individual player, which can sometimes lead to similar tasks for different players.
    - ***Game related meadow cards***: the game related cards hold game elements that influence pawns on the board and force certain moves.
      - These types of cards for instance relate to seeing the common goal, since the influence on the pace of a player on the board can influence the common goal of reaching the finish together. When you have to choose the player whom it will affect, you also have to work together and give the solution that fits other's needs as well. The last elements that it connects with, is that it requires an active communication to make the best choice if, for instance, a player of choice has to move forwards or backwards.
      - These cards are not specifically aimed to entail single or double loop learning.
        - The example in Figure 5.13 shows this dilemma. The leading player has to move three steps backwards and has to appoint another player to follow that lead. It would be a wise choice here to select the player who is going fastest towards the finish, to get him or her more in line with the rest of the players.

Figure 5.13: An example card of a game related meadow card.

- ***Social talk related meadow cards***: these meadow cards include topics on which a short social talk can be started. The leading player chooses the specific players who have to talk about something as described on the card.
  - ➢ These cards are added to the game for more or less the same reasons as the personal secret tasks. Trust is built by getting to know each other on different levels and the use of an active way of communication is forced here.
  - ❖ These cards can both include single or double loop learning in the same way as both types of secret tasks did, since conversations on personal and more content related are stimulated.
    - The example of Figure 5.14 shows a sample card on which every player is asked to talk about the most fun element of their studies. This gives more insight in the personal motivators of the different players.

Figure 5.14: An example card of a social talk meadow card.

5.3.3.3 Link to collaboration requirements

In the previous chapter (5.3.3.2), each game element is explained in combination with its link to the focus points. It can be noticed that some focus points are mentioned more than others. Since the process of the design includes processes of quick decisions, original combinations, and multiple iterations, the thinking steps are sometimes hard to trace back. Furthermore, to create a game, choices have to be made that improve the fun part of the game, which sometimes lead to less balanced reality elements.

However, when we trace these game elements with their focus points back to the original collaboration requirements, it is notable that many elements are included in the game. Figure 5.15 shows an overview of which focus points are connected to the different game elements. It also shows the number of times each collaboration requirement was included. In Appendix J-4 it can also be seen which elements of the morphological chart are in some way included into the final design of the game.

In Figure 5.15, it can be noticed that the focus point of reflection is not included even once, which means that the elements of the game do not include a literal reflection moment. However, the collaboration requirement of reflection (number 7) is touched upon for 18 times, which means that there is indirectly quite some room for reflection during the game. Also, the evaluation forms force the players into a moment of reflection before and after the game.

Looking at the overview, the main focus points of 'Realise the interdependency' and 'Learn to work together' are not connected to many game elements. However, these points are strongly connected to the overall form of the game. The goal of finish the game together, makes the players highly interdependent and forces them to work together. Also, the hierarchy of focus points leads to the stimulation of these two main points. The lighter coloured ones contribute to a stimulation of the main focus points.

Furthermore, it is notable that requirement 6 (regular and effective communication) is mentioned the fewest number of times. However, this skill is also included in the overall form of the game, since the players have to communicate actively on who needs more stepping cards and which route they should take. This also applies to requirement 4 (participation open to all stakeholders) and 9 (group contestants not too big), since the overall outline of the game decides who can participate.

For the collaboration requirements, it is notable that requirements 1 (build trust) and 2 (stimulate a new way of learning) are connected to mostly. Also 5 (room to share knowledge) and 7 (reflection) score high here. As mentioned before, it is not literally counted out to balance the requirement into the game. However, the different ways of stimulating these collaboration requirements in the game, will probably give the game a higher chance of succeeding the main goals of this research. Also, it has been proved many times that repetition can increase the chance that people will take the information (in this case the knowledge of other perspectives and the preferred behaviour for collaboration) with them.

Game element	Focus points	Link to requirements								
Describe	Think from other perspectives		2	3		5		7		
Argumentation	Learn to see the common goal	1	2	3				7	8	
	Give solutions that fit other's needs as well	1	2		4		6	7	8	
Point of view	Be open for other perspectives	1		3	4	5		7		
	Think from other perspectives		2	3		5		7		
Drawing	Think from other perspectives		2	3		5		7	8	9
Part of a whole	Realise the interdependency	1	2						8	
	Give everyone an opportunity to bring value to the game	1		3	4	5		7		
	Be open for other perspectives	1		3	4	5		7		
	Learn to work together	1	2	3	4	5	6	7	8	9
	Use active ways of communication	1	2			5	6			9
Associating	Be open for other perspectives	1		3	4	5		7	8	9
Name it	Realise the interdependency	1	2						8	
	Give everyone an opportunity to bring value to the game	1		3	4	5		7		
	Be open for other perspectives	1		3	4	5		7	8	9
	Learn to see the common goal	1	2	3				7	8	
	Think from other perspectives		2	3		5		7		
Secret task - personal	Build trust		2							
	Use active ways of communication	1	2			5	6			9
Secret task - content	Be open for other perspectives	1		3	4	5		7	8	9
	Use active ways of communication	1	2			5	6			9
Meadow card - game	Learn to see the common goal	1	2	3				7	8	
	Learn to work together	1	2	3	4	5	6	7	8	9
	Give solutions that fit other's needs as well	1	2		4		6	7	8	
	Use active ways of communication	1	2			5	6			9
Meadow card - social	Build trust		2							
	Use active ways of communication	1	2			5	6			9
Number of links to the collaboration requirements:		**21**	**20**	**16**	**11**	**18**	**9**	**18**	**13**	**11**

Figure 5.15: An overview of the different game elements, their link to the focus points as also described in Chapter 5.3.3.2, and the links to the collaboration requirements (Figure 3.1, Chapter 3.3.2). At the bottom is shown which collaboration element is used how many times in total. (Source: made by author, screenshot Excel)

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5.4 Conclusion and discussion– creation of the serious game

In this fifth chapter of the thesis, the theory, methodology and results of the design of the serious game were shown. In this chapter, a conclusion will be drawn by answering the sub question of this part. After that, the elements that need further elaboration will be covered in the discussion.

5.4.1 Conclusion

Chapter 5 of this thesis was led by the following sub question:

- *How can a design of a participatory serious game be made that could create a situation in which the different stakeholder groups could achieve a more effective collaboration?*

To start the design of a participatory serious game design, some requirements should be set. In this case, the focus points of Figure 3.2 in Chapter 3.3.3.1 are used as a basis for the game design. Then, the process that is described in this part of the study, runs through the second diamond of the theory of van der Sanden & de Vries (2016) (Figure on the title page of Chapter 5). First, the developing phase was run through to generate ideas and sketches of potential serious games (Chapter 5.3.1). To gather this input, a morphological chart was built, which took the focus points as a starting point. Various brainstorms on game elements that would fit the different focus points were done, which gave enough input to compose multiple game options. These game options could then be explored further by developing the ideas and by iterating on this development.

After the diverging movement of the double diamond, the 'deliver' phase started, which makes a converging movement towards the final game design. Only three games and three main goals were selected in the choosing process based on its connection to the focus points, together with concepts like the triadic game design of Harteveld (2011) (Chapter 5.3.2). Then, after some elaboration on the three final options, the board game was chosen eventually by crossing out the other two options after selecting even more strictly on the criteria. Running towards the end point of the converging movement, the game was further and further developed as explained in Chapter 5.3.3.1. In this process, the last steps of the cycle of a design process of van der Sanden & de Vries (2016) in Figure 5.1 was run through many times around with the iterations of each different test session.

It was explained in Chapter 5.3.3.2 how each element of the final game design links towards these focus points in one way or another. The final design, as it is based on collaboration literature via the focus points and as it comprises elements of double loop learning and strategic, problem-solving and reflective elements, has then the potential of being a second order learning object. This means that the game has potential for creating a situation for effective collaboration between stakeholders with divergent epistemic outlooks.

It has to be mentioned of course that there are many other ways to design a serious game that live up to different aspects of double loop learning and building an

environment for effective collaboration, which could work as well. This, however, is indeed one effective way.

5.4.2 Discussion

As it is mentioned in the conclusion, the design process that has been followed for this thesis, is unique, since all designs and design processes are unique. Therefore, a few aspects will be mentioned here that might have delivered other results if they had been conducted with different people or in another way.

5.4.2.1 The target group

The influence on the end result already starts with the choice for a target group to play the final game with. It may have been a reasonable decision to not waste too much time on searching for actual stakeholders of the case to play the game with, but it would have changed quite some elements of the game. The simultaneous use of Miro, Zoom, PDF and Pickerwheel during the playing of the game, might for instance be far too difficult for some of the stakeholders, since the generations above my own, did not grow up in the digital era. It might also have meant that more research had had to be done on the background of the different stakeholders. Is there a history, which suggests that they already know each other to a certain extent? How high is their stake? What is their knowledge level on the case and is mine sufficient?

The last question also had to be checked for this case with the students, but since they were not knee-deep into the discussions, the history and the stakes of the students were less important to find out. The game itself can probably be played more playfully and more light-weighted than with stakeholder groups who bring high (personal) stakes to the table.

The game elements would also differ significantly, since more details could be brought up, as the knowledge level of the case would be higher. Finding out what someone studies would not be relevant either, so building the personal trust should also be set on another level. The big picture of the game, however, could also work for this different group of players. Some of the details should be changed, and the game might have to be made into physical board game, which would not be that hard to accomplish.

The choice of the studies for the students was important as well. To represent the stakeholder group, having enough role-specific knowledge and to have individuals from all levels of education, the right mix of students had to be found. In Chapter 5.2.2, this process has already been explained, but when another person would search for students, he or she might find a completely different group of students from different studies. Especially finding students representing the research institutions, was a challenge, since there is no specific study on peat meadow areas. The study of Agrotechnologie fortunately provided two students who were indeed experts on the subject. However, the students of the nature preservation organisations for example could have been casted better, since these students had no specific knowledge on the case, whereas this stakeholder group in ‘real life’ has serious interests in the case.

But even if students did not know much about the case, their point of view still became quite clear during the eventual session. More on that in Chapter 6…

5.4.2.2 The brainstorms

In the designing process, the choice of using a morphological chart with the focus points as leading elements for ideas, was a creative step on its own. If someone else would have started the design process, he or she might have started with a mind map, causal diagrams, or other visualisation or design tools to generate ideas. The chart itself was not a classical morphological chart with sketches of forms per aspect of the end product either. It might not even be called a morphological chart used in this manner, but more a way of structuring the brainstorming process. But despite these critical notes, it helped me as a start for generating ideas that were somehow linked to the goals of this research.

The groups of students with whom the different brainstorms were performed, were quite biased, since these groups involved only befriended students. Other and stronger results would have been delivered if the groups had been more randomly selected, since more different perspectives would then have been added. However, these groups already had clear differences. One group would focus more on the more abstract elements that a game should possess, while another group had more associations with existing games. So, the variation brought various different ideas, but it could have been an even wider scope if the groups had been selected more randomly.

5.4.2.3 Developing the game

Using the input from the brainstorms as inspiration and connecting and combining different game elements from the chart into different game options, is also a process that would not be repeated by another researcher. This creative process is hard to trace and could therefore deliver completely different game options when done again. However, generating ideas based on the focus points which were based on the literature, would lead to a game that could in potential reach a situation of double loop learning and building an environment for effective collaboration, such as the result from this research. This would achieve the goal of this research anyway, although maybe in a different form.

When the rough lines of the game were set, the six test sessions were conducted as explained in Chapter 5.2.3.4 and 5.3.3.1. This was very useful, since it changed the looks of the game, it changed difficult missions and it tested the time pressure of the different minigames. It also showed the general flow of the game, which led to changes in the length of the board, the amount of minigames, secret tasks and meadow cards and the total amount of steps. The ratio of earning stepping cards was good and remained quite stable during all the test sessions. However, although the test sessions added considerably to the development of the game, it might have become a stronger result in other conditions.

The groups that were selected for the test sessions, were also mostly selected from acquaintances in my environment. This might bias the personalities that entered the game, and it also biases the education level of most of the contestants being at university level. It would have been a more realistic test, if none of the contestants had known each other and all different education levels had been mixed during the game. The game might have had even less flaws than it has now.

Since none of the test persons were familiar with the subject of peat meadow areas and the different stakeholder groups that were involved, the test sessions were also biased. To bring at least a basic knowledge on the topic, each group was given a short introduction of the topic. To also be able to test if the game helped the players to learn other people's perspectives, they also received a short introduction of the perspective of the role they would play in the game. In this way, most of the game elements could be tested quite properly. However, if the game could have been tested with groups similar to the groups playing the final sessions, the game could have been customised even better.

The development of the game could also have taken much more time, if it had not been limited to this MSc thesis. Playing the game more often, could lead to an even stronger game than the serious game that is presented here.

5.4.2.4 Tools

As was stressed in Chapter 5.2.3.3 as well, the choice for building a board in Miro, designing the cards in PowerPoint, using Pickerwheel to randomly select cards during the game, evaluating the sessions with Google forms and using Zoom as a base for the group, were personal preferences. Another designer might have used different tools and would have gotten the same or an even better result. The Pickerwheel for instance, was not as random as they claimed, which resulted in quite often being dealt the same cards. To prevent that from happening, each player was given 4 different wheels, in which the cards had already been mixed up. This was quite complicated, since four different accounts had to be made to save the different lists. Probably other solutions exist that would have been more suitable, so if this research would have to be done again, it would be good to research this even better.

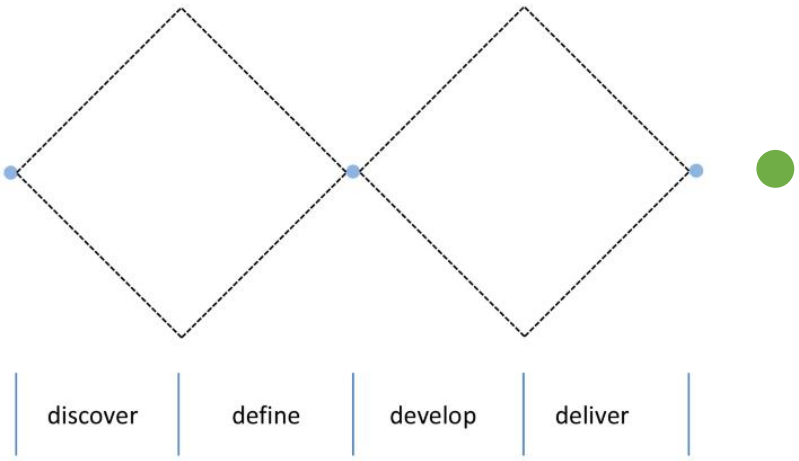
6. Analysis of the game

You have reached the **analysis part** of this thesis. At this point, we have learned what the controversy of peat meadow areas looks like (Chapter 2), how the choice for a serious game was made (Chapter 3), how the final design of the game should be played (Chapter 4), and how that game was designed (Chapter 5).

This part will explain what the **final session** looked like. How long did it take? What was the experience like? These are some of the questions that will be covered here.

This part will also comment on the goal of double loop learning and to what extent this was achieved by playing the serious game. Via evaluation forms and experience, it is possible to **analyse** quite extensively what the different elements of the game contribute to the game and achieving its goals. The theory that supports this evaluation is the collaboration theory that has already been explained in 'Choice for a tool' (Chapter 3), which is assumed to be well-known in this part of the thesis.

As it is illustrated in the picture below, this chapter comes after the design-based research. It is not part of the design itself, but it looks back at it and analyses its effect (for which it uses knowledge that was found during the process).



6.1 Theory – analysis of the game

For the theory that is needed to understand this part of the thesis, see Chapter 3.1.

6.2 Methodology – analysis of the game

The last part of this thesis features the analysis of the serious game. Did the game meet its goals and how was this tested? This analysis is directed by the last sub-question of this research:

- *To what extent does the design of the participatory serious game create a situation in which the different stakeholder groups can achieve double loop learning?*

The elements that are used to answer this question include the theory on collaboration, which has already been discussed in Chapter 3. The methodology of the literature research was also explained in the methodology chapter of that chapter (3.2), so no further attention will be paid to this in this part of the thesis.

Furthermore, the situation and methods of the actual game session of the serious game will be explained. Another method that was used to analyse the serious game, was the use of multiple evaluation forms that the players of the game had to fill in beforehand and afterwards. The methodology of these forms will be explained as well.

6.2.1 The play session of the game

As was explained in Chapter 5.2.2, students from relevant studies were chosen as a target group for the serious game for this thesis. When my game got more and more shape and all contestants of the final session were gathered, it was time to plan and organise the final session.

As explained before, two students per study were found, so that the final game could be played twice to collect more results. One group played on the 7th of April and the other group on the 8th of April. When these dates were set, a meeting with each student was planned two weeks before these sessions. During this meeting, the game was already explained for the first time and practical things were tested. Also, the evaluation forms were explained and sent beforehand. These will be elaborated on in the next sub chapter.

The final sessions then included the following:

14.00-14.15 h - The students received a Zoom link via email, which could be joined at the agreed time. The students had made a free account in Miro, with which they entered the game board via another link in the email. Also, four links with the spinning wheels and a PDF document with the different card sets were sent to the students, which they also opened before the session started.

14.15-14.30 h - Then a short introduction and an extra explanation of the game was given.
14.30-15.30 h - After that the game was played.
15.30-15.40 h - There was a short break in the game.
16.00-16.15 h - The game ended after approximately 1.5 hours.
16.15- 16.50 h - An animated and interesting conversation followed between the players about the game, perspectives and the things that were said during the game.

6.2.2 The evaluation forms

During the test sessions of this game and in discussions with my supervisors we brainstormed on how this game could best be evaluated. As was explained in Chapter 5, after each test session a short evaluation form in Google forms was created with questions to explore the good and less effective elements of the game. This evolved over time, but this would not be enough to be able to describe to what extent the elements of the game did live up to the focus points and therefore to the collaboration requirements.

Therefore, in the fourth test session, the first version of a new (additional) evaluation form was tested, which evolved over time into the final evaluation form that was used.

The final evaluation included three forms. One form had to be filled out before playing the game. This form contains eight questions, which each player has to answer according to their own view, but also with respect to how they expect the other stakeholders to answer the question. This was realised in Google docs with the option 'selectievakraster'. Figure 6.1 shows an example of what these questions looked like (Appendix N shows the complete evaluation form). It shows that it was possible to give multiple answers to a question per stakeholder group. This was done, to give the students the opportunity to nuance their answer. The aim of this first form was to grasp the perspective and perception of others before this serious game was played.

Figure 6.1: An example question of the evaluation form with sample answers. (Source: screenshot Google Forms)

After the game session, the students were asked to fill out the exact same form (Appendix N). In this way, it would be possible to compare their view and perspective before and after the game to evaluate if the game might contribute to a shift in their views.

Apart from these forms, the students were also asked to fill out another evaluation form that was more focused on the game elements, the goals of this game and on the different elements of theory that were incorporated in the game. This form uses a structure in which a closed question is asked first, after which then an open question about the same topic in order to collect more detailed information. This form can be found in Appendix O. It was also made with Google forms, but it used another structure and other question structures as well. It was divided into 5 sections and used questions with the following structures: 'lineaire schaal', 'kort antwoord', 'alinea', 'meerkeuzeraster' and 'meerkeuze'. In the closed questions in this form, unlike the other form, it was not possible to select multiple answers, since the open questions offered an opportunity to elaborate on the answers.

Questions like '*What was the most useful, the most fun, the least useful and the least fun element of the game?*' gave insight in the necessity of certain game elements. An example of a closed question to test elements of the theory was *'I feel like I got to know the other players on a personal level.'*, since the theory mentioned that personal trust would be a necessary element of effective collaboration. To get an answer that would provide useful data, there was no neutral option on this scale. Additional to this question was an open question to explain the answer, a question about which game elements helped to achieve this, and also an important question about whether the players would have more confidence in a next meeting with these players. The other sections were built-up in approximately the same way (Appendix O).

6.2.3 From evaluation to tables

When the Google Forms were all filled in by the participants, these had to be organised to analyse the data. Since the before and after forms had to be compared, a function was used with which all data was directly put into a Google spreadsheet file. The dry results were then combined in different tables for each question in which the answers from before and after could be compared per player and stakeholder group, of which the outline is explained in Chapter 6.3.2.

For the general evaluation form, there was not a before and after version that had to be compared. Therefore, the overview with diagrams of Google Forms itself was already clear enough for most questions. Only question 8, where an open question was used to ask for the most and least useful and the most and least fun elements of the game, needed a different overview. The answers that were given here, were counted per category, with which the diagram of Figure 6.13 was made. The question in which participants could elaborate on certain happenings, were mostly used as quotes in Chapter 6.3.

6.3 Results – analysis of the game

In this chapter, the progress of the final session will be presented, as well as the results of the evaluations. While reading, the players will sometimes be referred to as stakeholder groups, as a designation of both players of that group. It does not mean that the whole stakeholder group which they represent will have the same opinions.

6.3.1 The final sessions

6.3.1.1 Results

In the final sessions, both groups won the game, although the processes to the finish were very different. For instance, in the first session, there was one person who accidentally hit the 'secret task' on almost every throw during the game. Furthermore, during this session, the game was finished at the moment that the last person entered the Finish zone, because every person already had enough stepping cards - unlike most of the test sessions (see Chapter 5.3).

The second session had more 'meadow cards' than 'secret tasks', which made the flow of the game more unpredictable. For instance, one of the players was forced to go back twice, which had the effect that the group had to take longer routes for her to catch up. Unlike the first session, this game had not finished yet either when the last person entered the Finish zone. Two players needed to score more stepping cards to reach the finish, but they were pressured by one player who only had two steps to make before he would be at the finish. Fortunately for them, they managed everything just in time, which made them win the game.

Both sessions included multiple discussions during the game, perspectives that were shared, various descriptions, various drawing skills and players who wanted to win the game and get to know each other during the game. Common (personal) ground was found when two players appeared to live in a farm and when another two players appeared to have the same hobbies. The complete results can be found in the recordings of both sessions, which are not shared in public.

6.3.1.2 Interpretation

To interpret some of the happenings of the sessions, let us start with the minigame of the argumentation round, when players had to agree on a statement and on the argumentation that they put forward (see Figure 5.5 and explanation in Chapter 5.3.3.2 and Figure 6.2). Interestingly enough, both groups found common grounds in 'being in favour of under water drainage' and in 'compensating the agricultural sector for the solutions that affect their income'. The fact that both groups only played this minigame three times and that there were 12 options to choose from, makes it remarkable that two out of three answers were focused on these two statements. Another interesting element of this, is that the circled statement (see Figure 6.2) and argument were filled in during a minigame with all five stakeholders together. Of course, the answer was still a generic result, and some players mentioned that some

conditions would be necessary to completely agree, but finding common ground is the first step to make.

Figure 6.2: The argumentation field at the end of the second session. The circled argument was filled in by all 5 players together. (Source: made by author, screenshot Miro)

As was mentioned in Chapter 6.3.1.1, in the first session, one player landed multiple times on a secret task, more than average during all test sessions that I had done before. Interesting was, that it worked out quite well, since this started and animated the conversation during the game. The ambiance of this session was also a bit lighter and more comfortable than the other session, which can be influenced by many things (such as characteristics of the players) but which might be stimulated by the fun and personal element of the secret tasks.

After the sessions, when the game had been played, the players were given time to evaluate together what had happened and to ask more questions about each other's thoughts. While my expectations were that the game itself would have lasted quite

some time, so that there would not be much interest in or energy for an extending conversation, the opposite was true. Both groups managed to talk for more than 30 minutes about each other's views, situations and about the game. In these conversations, remarkable aspects or statements that were shown during the game were discussed. For instance, there was a discussion about who needed which conditions to agree completely with the circled statement in the Figure 6.2 above.

6.3.2 Analysis of the evaluations

The results of the evaluation forms on the players' own and each other's perspectives from before and after the game were outlined in eight different tables, one for each question. These tables are shown in Appendix P.

The outline of the tables is as follows (see Figure 6.3 to support the explanation):

- On the left in the white space, the question is posed.
- The vertical columns represent the stakeholder groups who answered the question. (The colours match the colours that are used throughout the complete research for the different stakeholder groups.)
- The horizontal rows show for which stakeholder group the answer was given.
- Darker coloured cells show that the answer was given for their own perspective, so those are the cells that the other answers in that row can be compared to.
- Per stakeholder group, there had been two game days, so the dates (07-04 & 08-04) are shown in the third column to mark the distinction between the answers of different players in the same stakeholder group.
- Per stakeholder group, there is one column with the data of the form that had been filled in before the game and one column that was filled in after the game, which makes it possible to see if their perspectives were changed during the game.

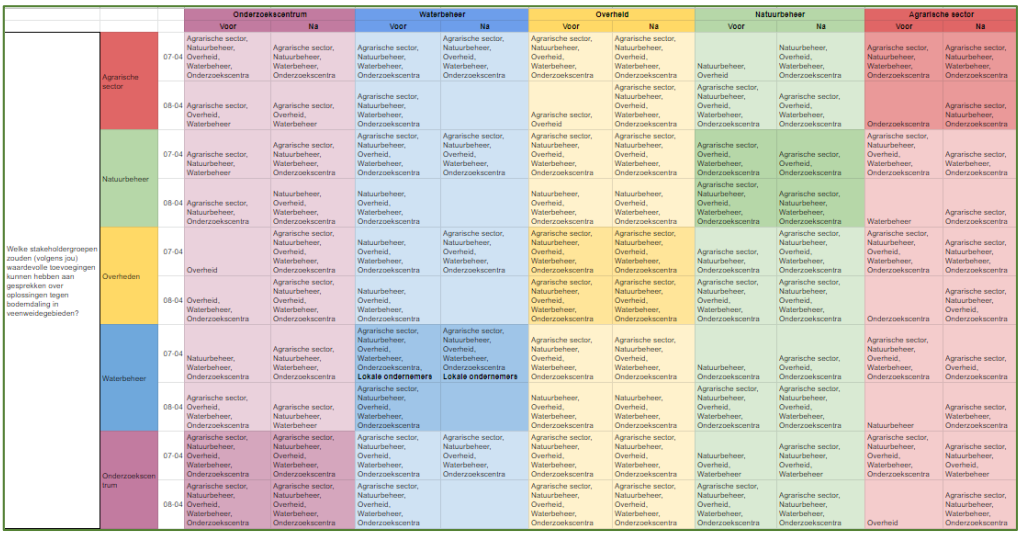


Figure 6.3: Screenshot to support the explanation of the outline of the tables. (Source: made by author, screenshot Excel)

As was mentioned in the Methodology, these tables were organised in spreadsheets with the results from the Google Forms of Appendix N as input. By looking at the answers in these different tables, some remarkable answers and comparisons were noticed and interpreted. In the coming chapters, these elements will be discussed.

6.3.2.1 General analysis

Answering the three evaluation forms might have given the participants a moment of reflection. When looking at the eight different analysis tables, a few interesting things can be concluded. There seem to be two opposing tendencies in the *number* of answers that the players give. For some questions, before the game much less different answers were given than after playing the game. And for other questions, a lot of different answers were given before playing the game and only one or two answers were given after playing the game. This varies per stakeholder per question. For instance, Table P-3 shows that the research organisations give more answers per stakeholder after the game than before playing it, while the agricultural sector gives less answers per stakeholder after the game. In other questions this changes the other way around.

That some players added more answers to a question after the game was played (in comparison with the 'before'-form), might come from a better insight in the perspective of or more empathy for the other stakeholders that was formed during the game. For other topics, some participants have been giving less answers on a question than they did before. This could mean that the stakeholder might not have known much about the view point of another player beforehand and did pick up a strong opinion during the game which made the answer less ambiguous.

Another thing to highlight here, is that the general tendency of the different questions shows that the players do not often make extreme changes in their own perspectives. The view that they had beforehand, did not change after the game, although it sometimes was a bit more nuanced. However, the perception of the answers of other players did indeed change quite often. Every question contains an example of changing perceptions, and Figure 6.4 gives a quite explicit example of such a change. Over all questions together, it can be found that almost each player did at least change their perception of someone into an accurate one.

Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Ja, met eventueel kleine aanpassingen

Figure 6.4: Example of change in perception after the game. This can be found in Table P-2 in Appendix P, in the answer of the player of the nature preservation bodies of the 8th of April, as answer to the research organisation. (Source: made by author, screenshot Excel)

6.3.2.2 Value of stakeholder groups

Table P-1 in Appendix P covers the subject of which stakeholder groups would be of valuable addition in conversations about solutions for the peat meadow areas. What can be seen here, is that the research organisations, the water managements, and the governmental bodies all think that everyone brings value before the game and keep that perspective after the game as well.

The players of the nature preservation organisations and the agricultural sector are different here. They do not see everyone's value before the game. This changes after the game as well, although neither of them thinks that every stakeholder group could be of additional value afterwards. Especially the contribution of the administrative bodies is not seen as very valuable by these two stakeholder groups. This division can also be found in the other evaluation form (Figure 6.5 and Appendix O). Seven out of nine thinks that (almost) everyone was of added value during the game. Only two players did not have that feeling during the game; one of them mentioned that the knowledge about the subject was not equal among the contestants, which was indeed varied (see the quote below). Interestingly enough, there was also one contestant who mentioned that their own contribution to the discussion appeared to be even smaller than he or she had expected beforehand (see for all elaborations on the questions, Appendix Q).

The aspect of having too much varied knowledge did probably occur because of using students of whom some were more intensively concerned with the case study than others.

"Niet iedereen had evenveel kennis over het onderwerp. Er was wel een basiskennis, maar de onderzoekerscentrumpersoon wist eigenlijk zoveel, dat niemand daar echt meer z'n eigen belangen tegenover durfde te zetten."

(Translation: "The knowledge on the subject among the different players was quite varied. Everyone had a basic knowledge, but the player of the research organisations did know so much more, that the other players did not dare to contradict his comments with their own stakes.")

- ***One of the contestants of the final sessions.***

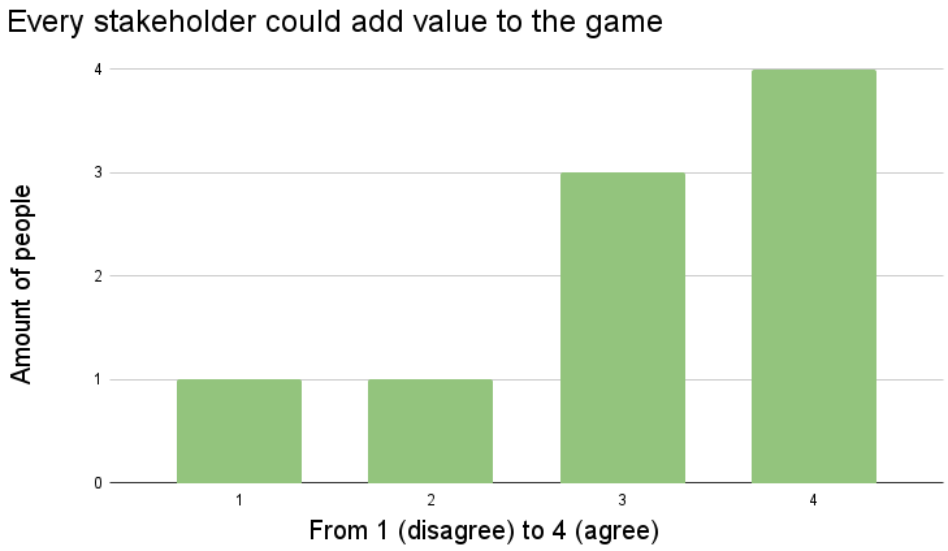


Figure 6.5: Evaluation form shows that almost all players thinks that everyone had something to bring during the game. (Source: made by author, screenshot Google Spreadsheets)

Another interesting tendency here, is that the perception of who other stakeholder groups consider to be valuable in the conversations changes almost everywhere. So, all first columns do not match the second columns, which means that new insights were found during the game on what other stakeholder groups think of the different values. What is especially striking, is that the change that was made, is for almost everyone the insight that other stakeholders consider more people to be important than they thought beforehand. This seems to be a positive sign, because seeing the different values that stakeholders can bring, might give the players a realisation of interdependency -which was one of the focus points for the game-.

Another remarkable thing is that one student added a stakeholder group that was missing in this research according to her. This group would be the local entrepreneurs, who might be of added value in these conversations (at the place of the circle in Figure 6.6).

Furthermore, not one of the players seemed to have expressed themselves completely clearly on this topic, since the perceptions of other players about them do not often match exactly with their own actual view.

Figure 6.6: place in table to look for in Table P-1 in Appendix P.

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6.3.2.3 Future of peat meadow areas

In Tables P-2 to P-6 in Appendix P, multiple questions are posed about different solutions in the peat meadow areas. It can be seen as the vision of the future by the different stakeholders and are therefore all dealt with in this sub chapter.

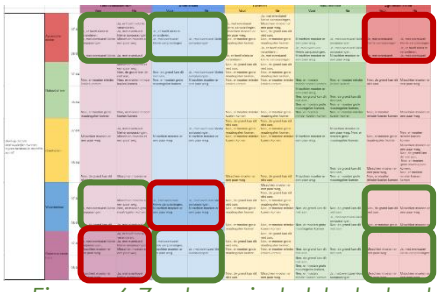


Figure 6.7: place in table to look for in Table P-2 in Appendix P.

Table P-2 shows that the research institutions, the water management and the agricultural sector all believe (both before and after the game) that the farms can stay in the future, although they might need some minor adaptations to make them future proof (red circles in Figure 6.7). It is interesting to see this, combined with the fact that they also seem to assess this quite well of one another as well after playing the game (green circles in Figure 6.7). For example, the vision on the water manager beforehand was estimated to be quite extreme by the research centres and the agricultural sector on demanding big changes and no possibilities for farmers to stay. Afterwards, these answers became more nuanced, showing answers such as 'yes they can stay with some changes', or 'maybe a few should leave the peat meadow areas', which were indeed more in line with the actual vision of the water manager.

Interestingly enough, the nature preservation bodies, and the governmental bodies have the opposite perspective. Both of these groups do not see a way in which the farms can stay in the future before the game, and this has not changed after the game. What stands out here, is that these groups also expect different behaviour from the other groups. Both groups expect the water management and the research organisations to answer that it is not possible to keep the farms in the future, whereas these groups think that the farms can stay with maybe some added conditions.

These two findings together give the idea that people are likely to project their own perspectives on others, which makes the research institutions, the water management and the agricultural sector predict their ideas quite well, while the other two predict the perspectives incorrectly.

Figure 6.8: place in table to look for in Table P-3 in Appendix P.

Table P-3 concerns a question on more variety in the peat meadow areas. Considering the perspective of each stakeholder group itself, it is striking that every stakeholder sees more variety as a good option in the peat meadow areas both before and after the game, except for one player of the agricultural sector. This one player did not see this as a good solution before playing the game and did not change that perspective after the game (red circle in Figure 6.8). This person, however, predicts the other's visions quite well, even though their visions differ completely (unlike the comment of projection with Figure 6.7). Maybe this player does feel alone and a little cornered in these perspectives and therefore projects the complete opposite opinion to everyone else without many nuances.

It is also remarkable that almost everyone predicted each other's answers quite well for this question before and after the game. Only the perspective of the research organisations of the player of the 8th of April seems to be misunderstood (green circle in Figure 6.8). This player claims to be a supporter of more variety (maybe under certain conditions); however, he seems to have communicated a different opinion. This because the three other stakeholder groups of that day changed their perspective of him after the game to a less positive attitude against more variation in the peat meadow areas, where they all thought him to be more positive before the game. He seems to have been not as enthusiastic as he is on this topic during the game, causing the other players to change their prediction to an incorrect one.

Another solution that was tested with the subjects, is a monetary motivation with fines or subsidies on the amount of CO2 emissions. The general tendency here is that most players see potential in both one of them, although there seems to be a preference for subsidies over fines (Table P-4 in Appendix P). Only the agricultural sector does not answer in favour of either fines or subsidies (before and after the game). They also seem to project this vision on the other stakeholders, since their most used answer for the other stakeholders is: 'Emissions are inevitable, money systems do not solve anything'. It is interesting to see that with this answer, they did not predict anyone's answers correctly, which might show a certain bias. They might have noticed hints of the players thinking in line with them, but this appears not to be true for the most part. The other stakeholder groups did not predict each other's answers perfectly either, but most of the time they are closer to the actual answer of each stakeholder group.

The most potential seems to be seen in a future with under water drainage, although it does not suffice as an only solution. In Table P-5, each stakeholder group has some sort of nuance in their answers, that under water drainage (with or without pressure) could be something that they all could agree with. This was also shown during the game session itself in Figure 6.2, when all five stakeholders were able to agree with this solution in some sort of way. It must be mentioned here that the nature preservation bodies seem to have the most conditions here, because they believe that this cannot be a solution for the long term, since the subsidence should be stopped and not slowed down (red circle in Figure 6.9). Most other players seem to have noticed this as well, most of them actually predicted this perspective before the game was played.

Figure 6.9: place in table to look for in Table P-5 in Appendix P.

Besides these elements, a more general tendency can be found in the answers as well. When looking at the different questions, more often than the other stakeholder groups the governmental bodies and the agricultural sector react with monetary answers. This can for instance be seen in questions 4 and 5, where these two groups answer questions such as 'who is going to pay for it'. The other stakeholder groups responded more content wise to these questions, taking the monetary element of the

different solutions less into consideration. Apparently, only the administrative bodies and the agricultural sector feel addressed when it comes to paying for the solutions.

It is also noticeable that these two stakeholder groups do not often agree in their visions (both before and after the game) in all different tables except for the monetary answers in Table P-4 and P-5 in Appendix P. To be specific, they seem to have complete opposite opinions. The agricultural sector seems to be feeling a bit offended because of this difference in important subjects, which can also be seen in the quote below, in which this person explained why she became less open to others after the game, which is also shown in Figure 6.18. Since this friction can also be seen before the game was even played, it seems to be an already existing friction.

"Ik stond open voor een oplossing maar als ik hoor hoe de overheid over de kosten hiervan denkt sta ik er minder open voor."

(Translation: "I was open to a solution, but when I heard what the government thinks about the costs of such a solution, I am less open to it.")

- ***One of the contestants of the final sessions.***

Table P-6 shows what de stakeholder groups think of other solutions. One thing that immediately stands out from the answers, is that the row of the agricultural sector (their own answers as well as other's perception about them) includes far fewer options than all the other rows (red circle in Figure 6.10). Looking at this row into more detail also reveals that no one thinks that the agricultural sector gives the answer of 'all farmers leave the peat meadow areas' (red circle in Figure 6.10). This perception indeed corresponds with their own perspective as well. In the end, not many of the other stakeholders believe that the agricultural sector should leave the peat meadow areas. Only the nature preservation bodies consider this to be a good solution. The same conditions are met for the option of less intensive livestock farming (only one player filled in this option beforehand and not afterwards). But although most stakeholder groups do not think that the agricultural sector would like this, they wanted to see that happening if it were their decision. In other words, some of them gave these answers from their own perspectives (despite the perspective of the agricultural sector).

Figure 6.10: place in table to look for in Table P-6 in Appendix P.

Another solution that the stakeholders visioned quite well, is the fact that the water management bodies see some perspective in 'local water storage'. Almost every group had this perception beforehand and kept it during the game, which matches the actual line of reasoning of these players (green circle in Figure 6.10).

Other solutions that were chosen quite often, are 'growing wet crops' and 'local water storage'. Interestingly enough, a solution that scored high in the analysis of the interviews (Chapter 2.3), 'Apply clay to the peat', does not score very high among the players of the game.

6.3.2.4 Suffering in peat meadow

The last element of which the stakeholders had to predict each other's perspectives, was about who or what would suffer the most from the current situation (Table P-7) and the future situation (Table P-8) in peat meadow areas. This analysis shows that almost every person predicted correctly that the nature preservation bodies, the governmental bodies and the research centres all include at least 'biodiversity' and 'climate' in their answer on the current situation (Table P-7). And in the same line, the perception of almost everyone to include 'water quality' in the answer of the water management bodies was following their own answer as well. The perspective of the agricultural sector was harder to predict, since the answers here vary a lot, even after the game was played, as if the players of this sector did not express themselves clearly enough on this topic.

Remarkable is that the visions of the suffering parties in the future are fairly aligned (Table P-8). In almost every answer and prediction for each group, three elements are mentioned: 'agricultural sector', 'cows' and 'machines on land'.

Figure 6.11: place in table to look for in Table P-8 in Appendix P.

Another thing that is notable here, is that the research organisations give far more answers concerning suffering parties than the other stakeholders. As well as in their perception of others as in their own perspective, they see a lot of parties suffer in the future of peat meadow areas (red circle in Figure 6.11). This probably has to do with them having no personal stake in the areas and researching different solutions for helping different elements and stakeholders here. They seem to project this on all other stakeholder groups. Although none of the other stakeholder groups gave this many answers, most of the answers do match their perspectives here. When the players of the research organisations heard answers quite like their own ideas, they seem to have 'learned' that this is the way in which all stakeholders think.

Only the players of the nature preservation organisations copied this after playing the game. The green circle in Figure 6.11, shows that both players of this group give far more answers after playing the game than before.

6.3.3 Analysis of the game elements

As was mentioned before, the players of the game also filled out another evaluation form after playing the serious game (Appendix O). This form was more closely connected to collaboration requirements, the focus points of the game and the game elements. As was explained in Chapter 6.2.3, the results were mostly presented in the way that Google Forms had presented them with multiple diagrams. Remarkable elements of these results will now be presented and interpreted. All elaborative answers of the evaluation form that are not shown in the figures of this chapter, are shown in Appendix Q.

6.3.3.1 General evaluation

To start with, it was good to see that every player enjoyed the game and that no one thought that it was too hard to play (Figure 6.12). That is a good thing, since the game was not meant to be too complicated, because the focus should be on the playing parties and not on the elements of the game.

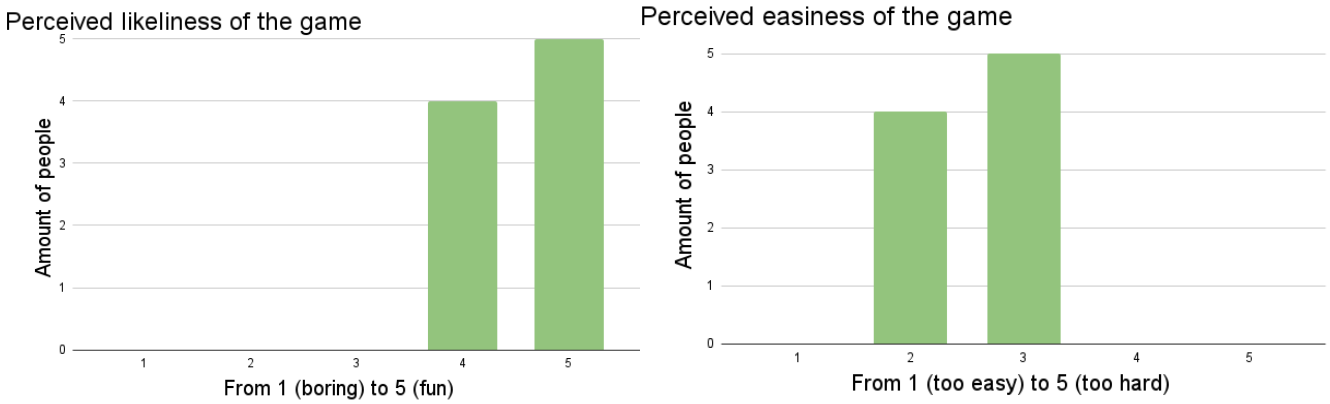


Figure 6.12: Diagrams of the perceived likeliness of the game (left) and the perceived easiness of the game (right). (Source: made by author, screenshot Google Spreadsheets)

Interesting to see was the diagram in Figure 6.13, in which the results from question 8 of the evaluation are shown. For this question, each player could mention which game elements were the most and the least fun and the most and the least useful in the serious game. It is good to see that the 'argumentation round' scored best in the most useful category. This game was added later than the other minigames to generate more discussions about the content. It is also good to see that the 'point of view' round was mentioned here as well, since this was another minigame that was more focused on the content. But since these rounds do also score points at 'least fun', it is clear that these alone could not be a game, since the fun element is important as well.

Fortunately, there are also elements that score on the fun side of Figure 6.13, which means that there were enough elements to keep the balance. For instance, the 'minigames in general' and the 'socialising' in general only scored on the positive side of the scale.

Furthermore, it is good to see that all elements that were mentioned at the negative side of the diagram in 'least fun' or 'least useful', are all also mentioned on the positive side of the diagram in 'most fun' or 'most useful'. For instance, the 'secret tasks', 'name it', 'meadow cards', and 'drawing', keep each other in balance, since some people liked it the most and others liked it the least. They cannot be removed from the game, because you would take away an element that another player valued as most enjoyable or most useful in the whole game. That seems to point at a good balance in the game, where each element contributed fun and usefulness for at least one player.

Looking at the total number of answers, a few players left the option for 'least useful' open. This might show that they also experienced each element as a useful contribution to the game.

Another general remark arising from the last two questions of this evaluation, is that the players enjoyed the game quite a lot and that they have learned quite much. Specifics on what the players have learned, can be found in the rest of this chapter, but also in Question 14, 17, 23 and 24 of Appendix Q. According to the participants, the game could have been even better with more room for discussions and a physical session instead of an online one.

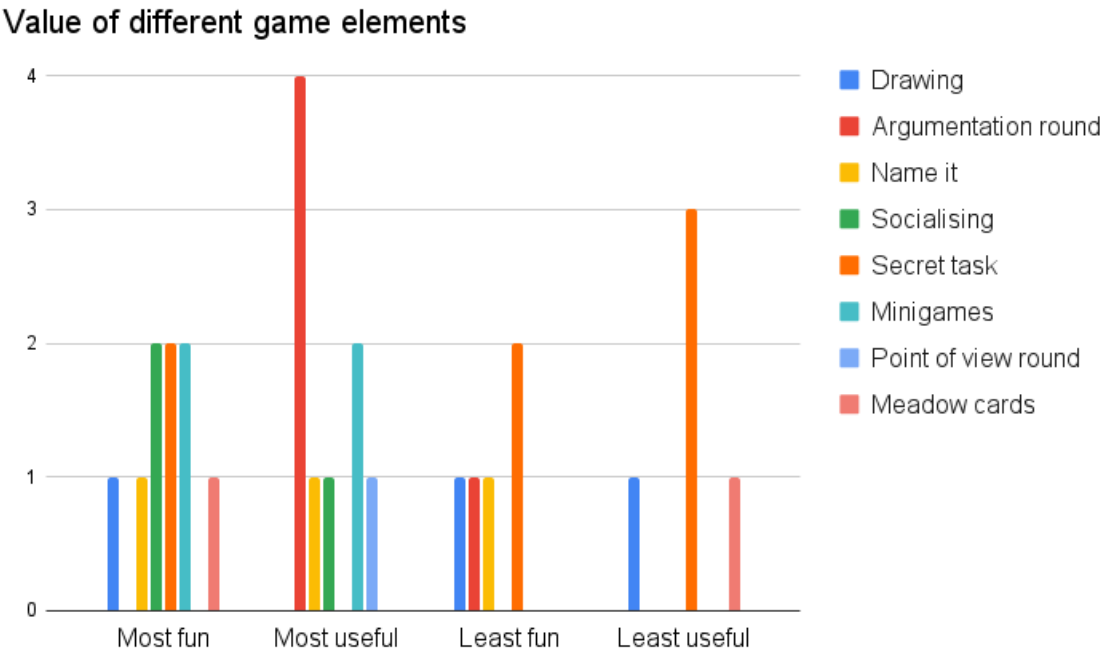


Figure 6.13: Diagram of evaluation of the most fun, most useful, least fun, and least useful game elements. (Source: made by author, screenshot Google Spreadsheets)

6.3.3.2 Getting to know each other personally

One of the focus points for the game (see Chapter 3.3.3.1, Figure 3.2) and the first collaboration requirement of Figure 3.1 in Chapter 3.3.2, was to build personal trust between the different stakeholders. The theory agreed with that by mentioning how personal trust can make people more forgiving and can stimulate effective collaboration (Auch & Pretzsch, 2020; Bulińska-Stangrecka & Bagieńska, 2019; Hara et al., 2003; Kamp et al., 2004; Pieron, 2012; Porter & Birdi, 2018; Rosas & Camarinha-Matos, 2009; Xue et al., 2018). Therefore, it was tested if the stakeholders did indeed build personal trust during the game.

For this analysis, it is interesting to zoom in on the secret tasks, since these were added to the game especially for the element of building personal trust (Chapter 5.3.3.2, bullet point 'secret tasks'). Figure 6.13 shows that the secret tasks are mentioned quite often in total. They are mentioned in all the different categories, apart from the category 'most useful'. Three times, it was even mentioned as least useful. This is quite striking, especially when looking at the other questions in the evaluation, shown in Figure 6.14 and 6.15.

This illustrates that players answer that they got to know each other better on a personal level (Figure 6.14). Additional to this question, more than half of them mention the secret tasks to be the reason for this. Figure 6.15 agrees with this, since every player agreed with the question if trust was built, if understanding of behaviour had grown and if it would be nice to see each other again.

In Figure 6.14 only one player answers not to have got to know the others better on a personal level during the game. This player mentioned that there had not been many personal conversations during the game. Also in Figure 6.15, this same player did not agree with the first question and another player did not agree with the third question. These two less positive players attended the game on the 8th of April, which was the round with less secret tasks than in the round of the 7th of April. This might confirm that the secret tasks have contributed to the formation of trust and personal conversations more than the players realise.

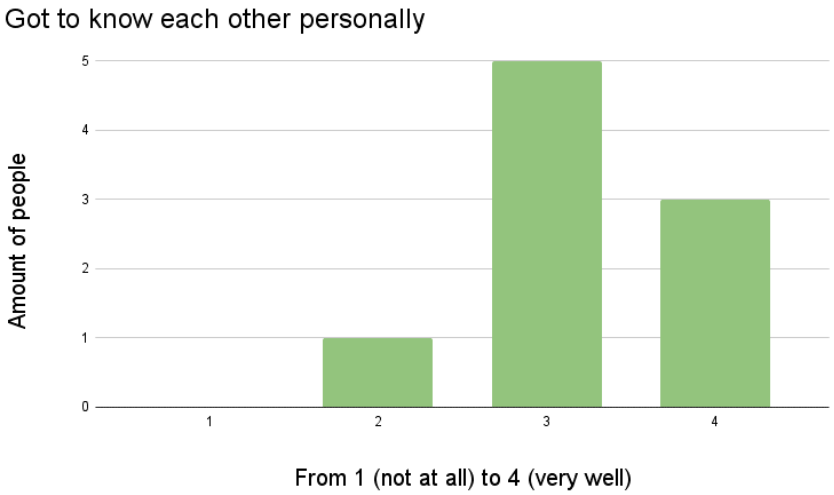


Figure 6.14: Diagram showing to what extent the players did get to know each other personally, from 1 (not at all) to 4 (very well). (Source: made by author, screenshot Google Spreadsheets)

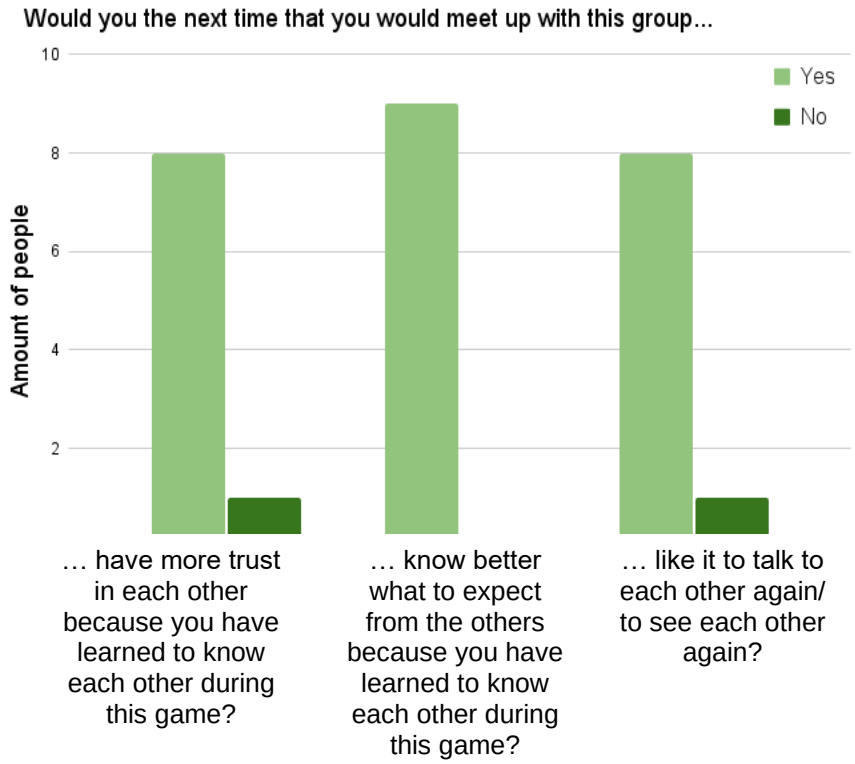


Figure 6.15: Diagrams showing if players have more trust in each other after playing the game (on the left), if players know better what behaviour to expect from each other (middle), and if players would like to see each other again (on the right). (Source: made by author, screenshot Google Spreadsheets)

6.3.3.3 Getting to know perspectives

Another focus point of the game was to gain insight into the different perspectives - without getting lost in endless discussions about who is right and who is wrong- (Chapter 3.3.3.1, Figure 3.2). Most of the minigames were designed to directly (such as the 'argumentation game' or the 'point of view' rounds) or indirectly (such as the 'describing' or the 'name it' rounds) discover each other's perspectives (see Chapter 5.3.3.2 for more details on this).

Looking at Figure 6.16, this focus point seems to be achieved, since all of the players mention to have gained more insight in each other's worldviews, although some more so than others. The former chapter (6.3.2) shows on multiple subjects to what extent the players actually have the correct view of each other. One thing that is notable there, is that people did indeed change their view of the other players after the game. However, they did not always correct it to an answer that was in line with the actual answer of that group.

Figure 6.16: Diagram showing to what extent the players did get to know each other's perspective, from 1 (not at all) to 4 (very well). (Source: made by author, screenshot Google Spreadsheets)

The contestants shared their most remarkable insights that they gained during the game about each other's world views (Question 14 of Appendix Q). What stands out here, is that people did not expect the farmers to be open to solutions beforehand, but they found out during the game that they were (under some conditions). Also, some remarks were made about the governmental bodies and their view of the solutions being an entrepreneurial risk for the farmers. These remarks come from the game of the 8th of April, in which this was mentioned and led to some disagreement. This might be not as remarkable with another group or in a different setting.

The game elements mentioned to be helpful to learn about each other's perspectives (Question 15, Appendix Q), are more or less the same elements that are placed in 'most useful' in Figure 6.13. One thing that was useful for some players as well, was the conversation after the game, when they could go a little deeper into each other's positions and views. A frequently given comment after the game, was that there was not much room for discussion during the game. This was the purpose of this game, to focus on working together with the common goal of reaching the finish together while discovering each other's worldviews. However, the players indicate that they might have learned more if there had been more room to ask questions about the perspectives they had discovered. This could be seen as the achievement of the focus points of the game, because people seem to have become more interested in each other's views and more open to a discussion on this topic (Figure 6.17 & 6.18). All in all, the finish read 'ready for thinking about solutions' because the game would create an open and good environment for a constructive conversation.

Besides insight in each other's perspectives, two other focus points were 'give solutions that would fit other's needs as well' and 'be open to other perspectives'. This needs some sort of understanding of each other's worldview, without necessarily agreeing with it. The game seems to have achieved this understanding for most players as can be seen in Figure 6.17. Seven out of nine contestants answered here that they do indeed understand better why someone has a certain view, although the answering person might not agree with every perspective.

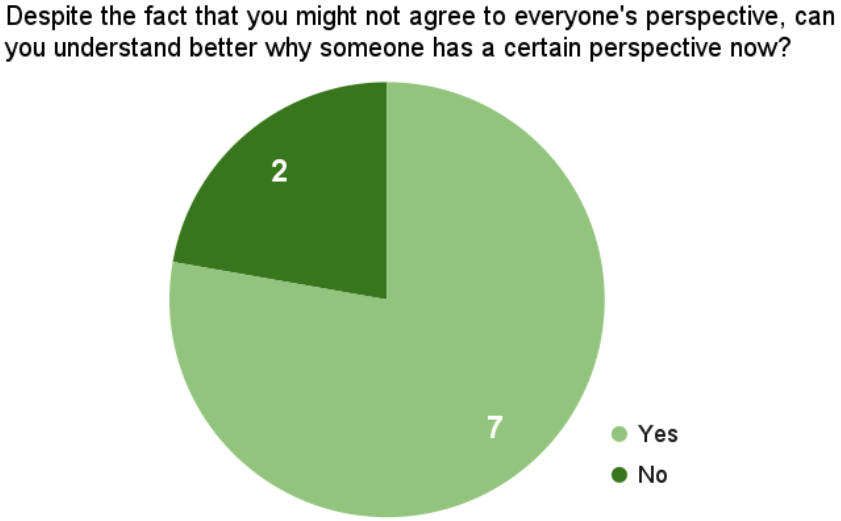


Figure 6.17: Circle diagram showing what number of players does understand other's perspective better after the game (without necessarily agreeing with it). Light green is yes, and dark green is no. (Source: made by author, screenshot Google Spreadsheets)

An example of this understanding without necessarily agreeing with the perspective, was given by one of the contestants in the following quote.

"De overheid ziet een gedwongen verhoging van het waterpeil dus als ondernemersrisico. Hij kon wel goed uitleggen dat het een complex vraagstuk is omdat er veel belangen zijn, en hierin heeft hij natuurlijk gelijk, en dit kweekte begrip."

(Translation: "The player of the administrative bodies sees the forced elevation of the water level as an entrepreneurial risk. He could well explain that this is quite a complex problem in which many interests are at stake, and of course he is right about this which contributed to understanding his perspective.")

- ***One of the contestants of the final sessions.***

6.3.3.4 Their own insights

Becoming more open to other perspectives was one of the focus points of this game, since this is also important for achieving a situation in which an open conversation on solutions for the peat meadow areas can be held. Another (less important), but also interesting focus point of the game was (self) reflection (Figure 3.2 in Chapter 3.3.3.1). This was tested in the evaluation forms as well. Figure 6.18 illustrates that four out of nine contestants did not become more or less open to the ideas of other stakeholders. In the additional explanation (Question 19 of Appendix Q), it becomes clear that these four already had quite an open attitude before the game and they think that this did not change during the game (so they are still open to other ideas). Another four out of the nine players answered to have become more open to other perspectives after the game. The fact that eight out of nine believe to be (very) open to the ideas of the other stakeholders after playing the game, might mean that the focus points of the game were achieved here. However, it is good to look at the one person who became less open after the game. The explanation for this, lies in incomprehension of another one's view on some subjects that matter quite a lot for this person. This was shown in the quote at the end of Chapter 6.3.2.3.

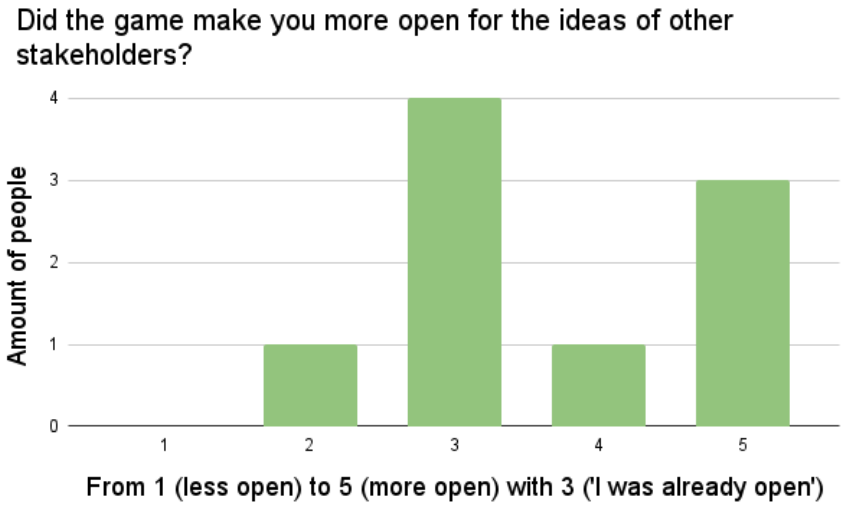


Figure 6.18: Diagram showing to what extent the players became more open to ideas of other stakeholders from 1 (less open than before) to 5 (more open than before). (Source: made by author, screenshot Google Forms)

The goal 'give solutions that fit other's needs as well', is a part of learning to work together that is woven into this game. As was explained in Chapter 5.3.3.2, most minigames are designed to at least make people unconsciously take into account the other's way of thinking. When asking whether the contestants did indeed take each other's way of thinking into account, neither an explicit yes nor an explicit no was given (see Figure 6.19). Fortunately, most players indicated that there were some specific moments when they did things differently because of the other's point of view. According to their explanations, people were mostly forced to take another one's way of thinking into account during the argumentation game. Only two players answered that they did not do this consciously.

In question 22 of Appendix O, some great examples were given by the players that showed their empathy for other players and their point of view and how they tried to take that into account. Figure 6.20 lines up these and other interesting comments.

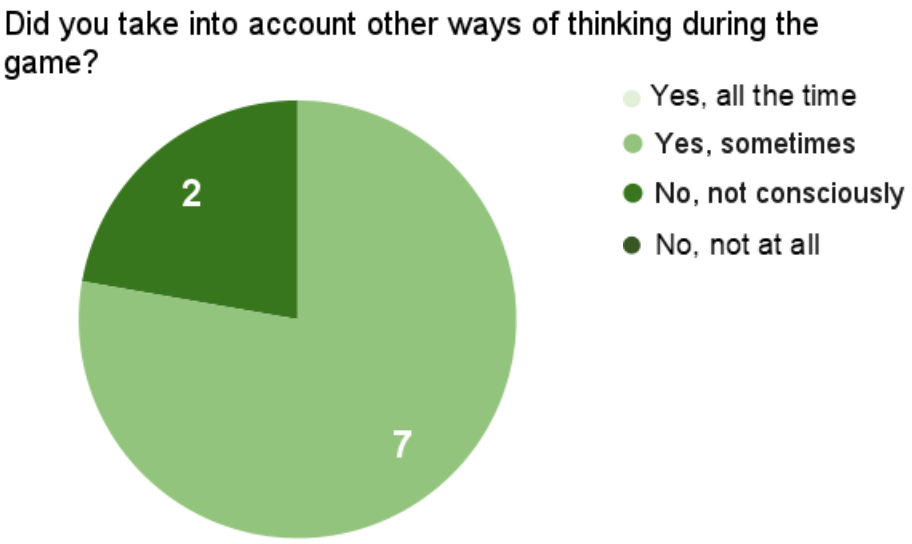


Figure 6.19: Circle diagram showing if players did (un)consciously take other ways of thinking into account during the game. 7 people answer: 'yes, sometimes' and 2 people answer: 'no, not consciously'. (Source: made by author, screenshot Google Forms)

1) Ik kom zelf natuurlijk ook van een boerderij, waardoor mijn mening soms hard overkomt tegenover bijvoorbeeld natuurbeheer of overheid hoe ik over de agrarische sector denk, waardoor ik in mijn uitleg soms wat meer nuance aanbracht om meer begrip te tonen voor andere stakeholders.

2) De denkwijze van mij kan totaal anders zijn, om mijn denkwijze niet meteen te uiten, gaf ik eerst de beurt aan iemand anders om zijn/haar denkwijze te horen.

3) Ik legde inderdaad iets op een andere manier uit zodat het beter begrepen zou worden.

4) Het enige wat ik merkte was dat ik een beetje uitkeek om hele extreme standpunten neer te zetten. De ambiance was meer om genuanceerde posities in te nemen.

5) Bij dat spel (de argumentenronde) kwamen vooral mijn vooroordelen aan bod, omdat ik probeerde te kijken waar ik dacht dat we het beide over eens zouden zijn. Ik bleek het echter behoorlijk fout te hebben.

6) Omdat je bij het post-its zoeken beperkt de tijd had, moest je een voorstel doen voor een stelling waar je dacht dat anderen het ook mee eens konden zijn.

7) Je wilt de toekomst van de melkveehouderij niet negatief laten klinken maar toch ziet de toekomst er wel zo uit...

Translated:
1) Since I live on a farm, my opinion of the agricultural sector can be experienced as quite harsh, especially by the nature preservation organisations and the administrative bodies. Because of that, I tried to add more nuance to my explanations in order to show more understanding for other stakeholders.

2) My way of thinking can sometimes be completely different. Therefore, to not immediately steer people into this way of thinking, I first offered somebody else a chance to explain his or her way of thinking.

3) I did indeed explain some elements a bit differently than I would normally do, so they would be easier to understand for others.

4) I particularly noticed that I was cautious to take a very extreme position in the discussions. The setting was to have more nuanced point of views.

5) During that game (i.e., the argumentation round) I was confronted with my prejudices, since I was (especially looking for common ground) looking for what I thought we would both agree upon. I proved to be seriously wrong about those ideas.

6) Since time was limited during the argumentation round, you had to propose a statement of which you thought that the other stakeholder(s) would be able to agree with.

7) You don't want to make the future of dairy farming sound very negative, although it certainly is…

Figure 6.20: Six different answers to illustrate the ways in which the players did take each other's point of view and way of thinking into account.

6.4 Conclusion and discussion – analysis of the game

The Analysis of the game was the last part of this thesis. In the conclusion, the sub question of this chapter will be answered and, in the discussion, uncertain elements, recommendations and footnotes will be discussed.

6.4.1 Conclusion

The sub question that was central to this chapter was:

- *To what extent does the design of the participatory serious game create a situation in which the different stakeholder groups can achieve double loop learning?*

Looking at the results (6.3) and the theory of Chapter 3.1.2, it can be concluded that both single and double loop learning were achieved to a certain extent when playing the serious game. Important to note concerning this conclusion, is that it was only tested in two sessions with only 10 contestants. This does not make the conclusion significant or decisive, but only gives a first indication of the effect of the game. Quantitative research would be necessary to draw a more solid conclusion on this sub question.

As explained in Chapter 3.1.2, single loop learning could in this case be seen for the stakeholders to learn about the perspectives of other people and to be able to predict how this stakeholder would react on other elements of the case. Double loop learning would occur when the stakeholders are able to understand why this other stakeholder has a certain perspective. If the contestants are able to reflect on this underlying motive and to accept the differences or even adjust their own perspective accordingly, this double loop learning might indeed help in building a more effective collaboration.

For this research, while playing a serious game, which was described to be fun (among other things), the players did indeed learn things from each other (personal knowledge and knowledge about their perspectives), consciously and unconsciously. There are examples where stakeholders learned what the perspectives of the others are and how to predict the answers of the other stakeholders better accordingly, which shows that at least single loop learning did take place. At some points in the results, it is illustrated that stakeholders were also able to understand the underlying reason for the different perspectives and that they were able to reflect on this by accepting it and (slightly) adjusting their own vision accordingly, which means that double loop learning took place to a certain extent as well. Support for this can be found in Figure 6.14 and 6.16 (single loop) and Figure 6.17, 6.18 and 6.19 (double loop) in Chapter 6.3.3 among others. The conclusion can be further supported by zooming in on different elements of single and double loop learning that were analysed.

6.4.1.1 Reflection by predicting perspectives

As the contestants all predicted the perspectives of others and described their own perspectives in the evaluation forms both before and after the game, a reflection moment was included. Collaboration requirement 7 mentions reflection as a

stimulating factor for effective collaboration and reflection also stimulates single and double loop learning as explained by Argyris (1977). So, since the contestants were forced to look back at the game when filling in the evaluation forms afterwards and since they might have thought about the form they filled in beforehand as well while doing that, some single and maybe double loop learning was stimulated here.

In the interpretation of all tables of Appendix P, single loop learning was found as well. The players changed the perception that they had of the other players for some topics, which means they adapted to the worldviews that they learned during the game (apart from doing this correctly or incorrectly). As discussed in Chapter 6.3.2.1, it varied quite often how the players changed their perception of others or their own perspectives. As the number of answers beforehand were sometimes much more or much less than the number of answers after the game had been played, it might be said that players were able to nuance their answer or (to the opposite) were much more convinced of the position of other stakeholders. This could point at single loop learning during the game, since the players (in)directly got to know each other's perspectives better while playing the game.

Another thing that can be inferred from almost all the tables (P-1 to P-8), is that virtually all the players did indeed change their perception of someone into an accurate estimation for at least one topic. An interesting exception to this can be found in the description of Figure 6.8, where one player of the research organisations seems to have expressed himself incorrectly. This is an example of single loop learning that make the perceptions of players less accurate than before. Fortunately, this was the only clear example of such a situation. This might also show that double loop learning was not achieved enough, because if the players would have known the underlying motives of this player, they might have answered it in a different way and more accordingly to this insight.

Next to these interpretations of the tables of Appendix P, a form of reflection was also indicated by the players themselves. Most players responded to have come to know about the other perspectives (Figure 6.16), which illustrates a form of single loop learning. Most players also responded to have come to know the other players personally (Figure 6.14), to have learned to understand better why someone has a certain perspective (Figure 6.17) and to have learned that they have become more open towards ideas of other stakeholders (Figure 6.18). These are examples of a form of double loop learning as well.

6.4.1.2 Learning more from people like you?

An example of gaining more insight into each other's views, was in the description of Figure 6.7, which shows that three groups changed their perspective of each other into an accurate vision. What is interesting here, is that only the groups that think more or less similarly about the topic, make a better estimation about each other's ideas after having played the game. This might point at the conclusion that it is easier to predict the perspective of someone who agrees with your vision than someone who does not think alike.

This trend is found reversed in the analysis of Table P-4 in Chapter 6.3.2.3, where both agricultural players do not see salvation in the monetary solutions of fines or subsidies and project this on the other stakeholders as well, which is incorrect. This situation is also seen in the description of the red circle in Figure 6.11. The stakeholder group of the research organisations seem to see many more victims of the solutions to the subsidence than other groups. They project this view on the other stakeholders as well, although it is not correct.

This might confirm that some double loop learning has occurred, but with the addition that this is easier to achieve when people feel as if the other stakeholders are thinking in the same way. What the examples also show, is that people might interpret other's thoughts through their own lens. So, if they hear something similar to their own view, they seem to learn only about that part of each other. This was, however, not literally confirmed by the players, this has only been interpreted from looking at their answers.

However, this trend does not proceed. From the description of Figure 6.8, it becomes clear that just one player does not share the same vision of more variety in the peat meadow areas. This person, however, predicts the other's visions quite well, even though their visions differ completely. This would not point at the achievement of double loop learning, since it seems to be more like a countermovement because no one agrees with this person.

It might be that most frictions on content can be found in the already existing (this can be seen in the forms before the game) and not changing friction (in the forms after the game) between the governmental bodies and the agricultural sector (see Chapter 6.3.2.3, the explanation of Table P-4 and P-5). In multiple ways it happens that those two groups do not see each other's values and even seem to feel offended by their different opinions. Especially the quote in Chapter 6.3.2.3, confirms this offended feeling, since this player describes how this opposite view of the governmental bodies led to a less open attitude. This seem to indicate that the game did not solve all frictions and that double loop learning was not achieved for completely opposite players in this form of the serious game.

6.4.1.3 Prejudices

The focus points of 'be open to other perspectives' and 'think from other perspectives' might include a realisation that the existing prejudices are not always true, which might stimulate double loop learning. However, in some cases, the prejudices seem to be true after all. There are (among others) two examples that confirm this:

- In the red circle of Figure 6.10, is shown that no one predicted that the agricultural sector would think of leaving the peat meadow areas as a solution, which appears to be in line with their own visions.
    - What seems to be off when expecting double loop learning, is that other stakeholders still provide this as a good solution, although they know that at least one stakeholder is not in favour of that at all. This might show that double loop learning did not occur or did not lead to much change, since the

contestants were not open to adjust their own visions accordingly to what they learned from others.

- In Table P-7, it is predicted by almost everyone that the nature preservation bodies will see that the climate and biodiversity are suffering mostly from the current situation in the peat meadow areas both before and after the game, which is in line with their actual perspective.

There are also examples of moments when the prejudices appeared not to be true, and the focus points might indeed be achieved. For instance, in Chapter 6.3.3.3 and Question 14 of Appendix Q, it is mentioned that quite some players expected the agricultural sector to be far less open to solutions than they appeared to be during the game.

In both cases however, (prejudices true or not) the participants seem to have learned indeed about these obvious and less obvious perspectives in at least a single loop way.

6.4.1.4 Realise the interdependency

As was shown in Chapter 6.3.2.2, the greater part of the contestants saw value in the contributions of all the different stakeholder groups in the game. Even though there were a few players who did not see the value of all the stakeholder groups in the game, their justification was not focused on the perspective of these stakeholders. However, it seems to be positive that the greater part of the stakeholders did indeed see each other's value. As was mentioned before, this realisation of value might have led to a realisation of interdependency -which was one of the focus points for the game-.

It was also mentioned in Chapter 6.3.2.2 that one player saw the value of the contribution of his or her own stakeholder group in the discussion decreasing during the game. This is interesting as well and can also be seen as a confirmation of the inclusion of the focus point 'realise the interdependency' in the game, since this player might have seen how dependent this group is on the other stakeholder groups. This also highlights a reflective moment that was stimulated by the game.

6.4.1.5 The effect of the game elements

When reading Chapter 6.3.3 it can be noticed that all game elements did contribute to the experience of the game. One might also see multiple reasons to confirm that different game elements that were designed to achieve double loop learning, have had some effect.

As Allert et al. (2004) mention, problem-solving and decision-making strategies are included when creating second order learning objects, which stimulate double loop learning. The final design of the game could be seen as such an object, since all sorts of problems and missions are encountered which have to be overcome to win the game. There are also multiple decision elements, which are for instance found in the choosing of your route on the board. These different elements probably also

stimulated double loop learning in the game, although it was not tested in the evaluation forms.

Furthermore, the structure of this game with the minigames probably triggered the players to want to know more about each other which would be a great first step. This is also confirmed by the comments in Appendix Q that mention that the game could have included more room for discussions, so that they could have learned even more. Also, the fact that both groups took more than half an hour to ask more about each other's perspectives after the game (Chapter 6.3.1.2), confirms in some way that the game contributed to starting an animated conversation.

Besides the main lines of the game, the evaluation form on game elements also showed us more details in the game that might have stimulated single and double loop learning. In Figure 6.16, it was shown that all players agree with 'I have learned more about other viewpoints during the game'. In Question 15 of Appendix Q, multiple players mention that the minigames 'argumentation round' and 'point of view' helped to gain insight in other one's viewpoints. This shows the presence of single loop learning, but not clearly the presence of double loop learning.

Furthermore, Figure 6.13, shows that the argumentation round scores the highest on the most useful part of the game. Also, the 'point of view' round and the 'name it' round are seen as useful, which might mean that these game elements contributed to some form of learning during the game according to the players. Fortunately, there are also elements that score at the fun side of Figure 6.13, which probably means that there were enough elements to keep the balance. As was mentioned in Chapter 5.1.2, a serious game needs to balance reality, meaning and play (Harteveld, 2011).

It is interesting that in Figure 6.14 almost all the players mention to have come to know the other players personally. The 'secret tasks' are mentioned as the main reason for this, next to the 'socialise meadow cards' (which can be seen in Question11 in Appendix Q). So, while the players do not see much added value in the secret tasks of the game (Figure 6.13), these seem to have led to more personal trust (Chapter 6.3.3.2). The difference of the session of the 7th of April and the session of the 8th of April, might confirm this as well, since various players from the 8th of April are more negative in Figure 6.14 and 6.15 than the players of the 7th of April. So, the secret tasks seem to have had a contribution at double loop learning, since learning the personal aspects of a person might lead to the underlying understanding of the motives of why people have certain perspectives.

6.4.2 Discussion

As concluded, the game and its different elements did indeed contribute to double loop learning to a certain extent, which would make the game a second order learning object. It might also be said that the creative method of using a game, may have stimulated this learning object as Allert et al. (2004) proposed, however, that should be explicitly tested to be able to confirm this. Since this game has only been

tested in two rounds with only ten players in total, it is hard to draw solid conclusions about the effect of specific elements of the game.

6.4.2.1 Potential further considerations

In Chapter 6.4.1.5, it was mentioned that the influence of the secret tasks might be large, considering the difference between the group with many and less secret tasks in personal trust. However, this should be tested more often with different groups of which some have a lot of secret tasks and of which some do not. Because the difference in groups could also lie in the different personalities or the different knowledge levels of the players in the groups.

Furthermore, some game elements could be added, removed or changed to improve the effect of the game. For instance, Figure 6.6 highlights that one stakeholder would like to see an extra group joining the stakeholder groups: the local entrepreneurs. It should be researched whether this could be of added value to the effect of the game and the environment for a conversation between the stakeholders.

As was mentioned in Chapter 6.3.3.3, multiple comments were given in Appendix Q, in which the participants mention that more room for discussion would have made them learn even more about the other contestants. Although this had not been included on purpose, it might be interesting to see if more room for discussion could give the players even more opportunities for double loop learning by playing the game. This could be studied in further research.

6.4.2.2 Solving the frictions

The friction between the administrative bodies and the agricultural sector might also be softened if other elements were added to the game. Since the feeling of being responsible to pay for the solutions might be a common ground to work on, when taken from a positive perspective instead of moving the burden to the other party. It might also be interesting to experience each other's feeling of being cornered in some sort of way during the game, to gain more respect and to maybe alleviate their expression on sensitive subjects.

This last point could also be seen as a negative point. In the evaluations, some players mentioned to have toned down their strong opinion on certain topics during the game, because the setting was not to clash. (This is what was proposed to achieve in the friction between the administrative bodies and the agricultural sector here.) However, toning down your expression on some subjects during the game might look like all stakeholders could agree, whereas it might lead to serious clashes later. A question for a follow-up research could be if this does indeed happen and whether that would then be dealt with better because of having a stronger bond. Maybe the comments of the players about getting more room for discussion during the game, could be considered here as well. It might help to relieve some of these suppressed views earlier in the process.

6.4.2.3 Potential biases

As said before, it is hard to draw firm conclusions from the two sessions of this game, although the first feeling was quite good. However, the results might have been influenced by multiple factors that could be tested further. One obvious factor to mention, are the players of the game.

- Students might not think like the stakeholder group they represent.
- One person in a stakeholder group might not be representative for the whole group.
- Personal characteristics might influence the attitude of players in the game.
- The educational background of the players might be varying differently in real life than it was for this chosen group.
- Knowledge and experience about the subject were not equally present for all players, which might have a different distribution for the stakeholder groups they represent.

These and more factors concerning the players of the game could be made more stable and predictable when testing the game more often. Then it would be possible to look more quantitively at the data, because all the insecure factors are then stabilised. Other elements that could be tested when increasing the amount of game sessions, are the actual influence of the secret tasks and other elements of the game. Now each element seems to contribute to good results in the game, but maybe some elements contribute less to the game than is assessed now. One factor that might have influenced the results as well, is that the second person of the water management bodies did not fill out the two evaluation forms after the game, despite many reminders. Having the answers of all ten contestants and two to compare in the stakeholder group of the water management, might have changed the results and conclusions slightly as well.

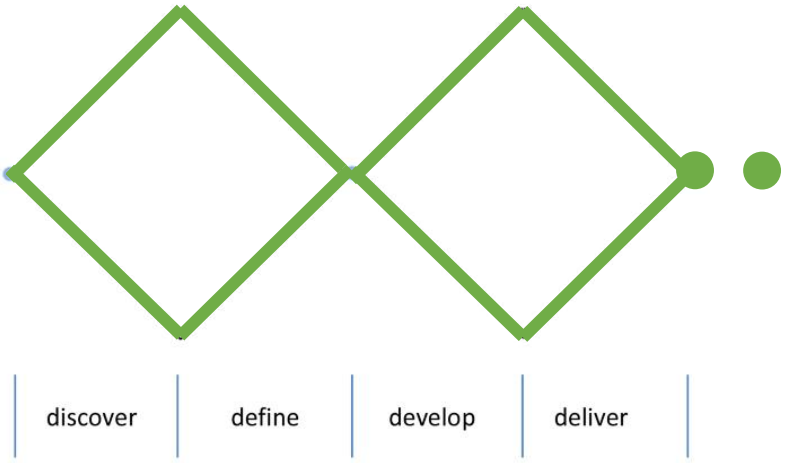
The evaluations themselves could have caused some bias to the results as well, since most answers were prefabricated. To lower the threshold of the evaluations, most questions were multiple choice. Although it was tested, in the test sessions during the development of the game, if some answers are missing here, this will limit the input of the players. Apart from this, it was tried to prevent this bias by giving the opportunity to add answers for some questions and by giving a chance to explain the answers in the evaluation form on the game elements. Still, this could have influenced the results as well, since some players might now have interpreted some answers differently, or since some players might have come up with more or differently formulated answers as well.

An example of a completely open question in the evaluation form was naming the most and the least fun and the most and the least useful elements of the game (Figure 6.13). This had as an advantage that specific elements could be mentioned here, although it also led to general answers such as 'the minigames'. Interesting here as well, was that not all players mentioned an element for the 'least useful' category. This might mean that the game was good and that all elements had some use according to them, but it might also mean that the question was too ambiguous or had too many elements, so that people forgot to answer all parts of it.

7. Main conclusion and discussion

This is the **last** chapter of the study. We now have collected answers on all the sub questions of the research, which will be shortly repeated here. These build then up to the **main research question**, which will then be answered.

In the discussion, there will be a critical **reflection** on the research and a future **perspective** of the outcome. This then ends the thesis, I hoped it was interesting and pleasant to read.



7.1 Conclusion

This chapter will wrap up the complete thesis. It will answer the main research question in the conclusion, and it will discuss and consider different elements of this research in the discussion.

7.1.1 Conclusions of the sub questions

There were multiple sub questions which helped to structure the research and to develop into answering the main research question. In Chapters 2, 3, 5 and 6, these different sub questions were all covered and answered. Since these develop into towards the answer to the main research question, they are summed up here with a short conclusion per question (for the full conclusions, read the corresponding parts):

- *What does the controversy of the peat meadow discussion look like? (Chapter 2.4.1.1)*
    - The case of peat meadow areas in the Netherlands includes multiple different stakeholder groups, who disagree on different levels. There have been multiple sessions on finding solutions, but very few of these led to extensive changes. There are various possible solutions, but the stakeholder groups cannot come to one solution on which everyone could agree. They keep promoting their own opinions without listening to others.
- *What do the epistemic outlooks that the different stakeholder groups have, look like? (Chapter 2.4.1.2)*
    - Five stakeholder groups have been defined in this research, the first of which is the group of the research institutions. This group has a solution focused outlook and not the highest personal stakes in the case.
    - The nature preservation organisations mostly see problems related to the quality and health of the ecology of the areas. This might influence their capacity of seeing other's stakes.
    - The water management bodies have a more practical epistemic outlook. In this outlook, they focus on controlling the quality and amount of water in the areas to which they mirror each solution.
    - The outlook of the agricultural sector can be seen as the most extreme one, since this group has a high personal stake in the areas. Their interest is to still be able to farm the peat lands and to not having to pay a lot of money for the solutions in the peat areas.
    - The group of the administrative bodies has an outlook that is not driven by personal stakes, but mostly by the climate agreement and the wish for a healthy society. They consider different ways to accomplish quite drastic changes in the areas and struggle with groups with which they do not align.
- *When analysing the controversy of the peat meadow areas, what elements of collaboration could be applied to create a situation in which effective collaboration could take place? (Chapter 3.4.1 & Figure 3.1 in Chapter 3.3.2)*

    - A new way of learning should be stimulated.
    - A common goal should be found and highlighted.
    - There needs to be room for knowledge sharing.
    - Trust needs to be built.
    - A reflection moment should also be included.
    - Regular and effective communication is required.
    - Acceptance of different social values, norms and cultures is required.
    - All stakeholders should be included in the participation.
    - The activities should be limited to one area.
    - The group of contestants should not be too big.
- *What participatory intervention tool can be chosen to organise a situation in which the different stakeholder groups can achieve double loop learning? (Chapter 3.4.1)*
    - A serious game can touch upon most of these elements and could work best as a participatory tool.
- *How can a design of a participatory serious game be made that could create a situation in which the different stakeholder groups could achieve a more effective collaboration? (Chapter 5.4.1)*
    - To make a design that is able to stimulate effective collaboration and double loop learning, requirements are needed. The focus points of Figure 3.2 in Chapter 3.3.3.1 can be seen as the requirements for this game.
    - Then, when the 'develop' phase of the double diamond as mentioned in van der Sanden & de Vries (2016) starts, many ideas and inspirations are collected.
    - This can be done by doing brainstorms with various groups of people with different backgrounds to fill in a morphological chart with the focus points as a basis.
    - From this, some potential game designs can be made and elaborated upon.
    - Finally, following the criteria of the focus points and game theories such as triadic game design from Harteveld (2011), a choice is made for the best fitting game design.
    - This is choosing process is the start of the 'deliver' phase, in which this idea will be further developed and tested in many iterations.
    - This leads to a game design which could function as a second order learning object, stimulating double loop learning and effective collaboration.
- *To what extent does the design of the participatory serious game create a situation in which the different stakeholder groups can achieve double loop learning? (Chapter 6.4.1)*
    - This research only tested the learning effect with 10 players in two sessions. Here it was concluded that some single and double loop learning took place, but this has to be quantitatively tested first. A few reasons for this conclusion are given below.

- Problem-solving and decision-making strategies can stimulate second order learning objects (Allert et al., 2004). The game can be seen as such a learning object, since all sorts of problems and missions are encountered which have to be overcome to win the game. There are also multiple decision elements, which are for instance found in the choosing of your route over the board.
- Since all players also have to define their perspectives on their own and other's views on certain topics before and after the game, room for reflection is created, which is a stimulating factor for double loop learning and effective collaboration as well.
- From the analysis of the filled-in forms, it becomes clear as well that single loop learning was achieved to a certain extent, since the players did indeed change their views on other stakeholder groups after the game on some topics. Sometimes, they gained a new and more nuanced insight in their own world view as well, which points at double loop learning too. This learning is confirmed by the contestants as well, as can be seen in Figure 6.14 and 6.16 (single loop) and Figure 6.17, 6.18 and 6.19 (double loop) in Chapter 6.3.3.
- Multiple elements of the game do contribute to creating a situation in which single and double loop learning can take place. For instance, the 'argumentation round' and 'point of view' are mentioned as contributing to learning perspectives (mostly single loop) and 'secret tasks' are mentioned as contributing to learning personal details about the other players (more double loop).

7.1.2 Conclusion of the main research question

The analysis of the sub question then finally leads us to the main research question for this thesis:

- ***To what extent can parties with different epistemic outlooks in the societal controversy of peat meadow areas in the Netherlands, come closer to effective collaboration by using a serious game as a participatory tool that stimulates double loop learning?***

The sub questions already dealt with some elements of the main research question. For instance, it is confirmed with the sub questions that this case includes different epistemic outlooks in a complex controversy. Also, elements of collaboration theory formed the basis for a serious game design which can be seen as a second order learning object with which the players achieved double loop learning to a certain extent. This could mean that the remaining question is: *to what extent did the different stakeholder groups come closer to effective collaboration by playing the game?*

This question can be answered by considering how the game and its evaluations connect to the different collaboration requirements and how the players experienced their learning process during the game. All in all, it can be said that the game indeed has a strong potential of indeed creating a situation in which effective collaboration

between stakeholder groups with different epistemic outlooks in the controversy of peat meadow areas in the Netherlands could take place. Some collaboration aspects are more strongly imbedded than other aspects, and also the evaluations of only two game sessions (with only 10 players in total) is not enough proof to draw firm conclusions yet. However, overall, the potential can be found on different levels.

To support this conclusion, the different collaboration requirements will be taken into consideration. These collaboration requirements of Figure 3.1 in Chapter 3.3.2 formed the base for the iterated focus points in Figure 3.2 in Chapter 3.3.3.1 that created the morphological chart on which the game was built. To support the answer to the main research question, we go back to this literature base of the collaboration requirements. These elements will be held against the goal of creating a situation in which effective collaboration could take place. The effect could be tested by comparing the elements to the results of the evaluations of the participants of the game. A small overview can already be seen in Figure 7.1.

Collaboration requirement	Achieved (--, -, +-, +, ++)	Collaboration requirement	Achieved (--, -, +-, +, ++)
Trust should be built	+	Regular and effective communication should also be included	+
A new way of learning should be stimulated	+	A moment for reflection should be created	+-
Different social values, norms and cultures should be accepted by the participants	+-	A common goal should be found and highlighted	+-
Participation to the tool should be open to all stakeholders	+-	The group of contestants should not be too big	++
Room for sharing of knowledge should be created	+		

Figure 7.1: A small overview of the nine collaboration requirements and the extent to which the design of the game managed to achieve these requirements approximately. The achievement is visualised on a scale from ++ to --. The details on each collaboration requirement are elaborated upon in the sub chapters below. (Source: made by author, screenshot Excel)

7.1.2.1 Building trust

Building trust is one of the elements that is well-known when it comes to collaborating with others. It might therefore not be a big surprise that this was on the list of collaboration requirements in Figure 3.1 in Chapter 3.3.2 (Auch & Pretzsch, 2020; Bulińska-Stangrecka & Bagieńska, 2019; Hara et al., 2003; Kamp et al., 2004; Pieron, 2012; Porter & Birdi, 2018; Rosas & Camarinha-Matos, 2009; Xue et al., 2018). However, different ways in which this can be stimulated are mentioned. Hara et al. (2003) and Rosas & Camarinha-Matos (2009) for instance say that tasks should be performed in a reliable way. The game asks for this kind of dedication throughout all the minigames, since the players who perform the minigame all have to do it right to earn a stepping

card. If one of the players does not perform the task in a reliable way, the whole group is punished in a certain way.

During the game sessions, this could be observed indeed, because people tried to motivate each other to perform well during the minigames. Since the setting encouraged everyone trying hard for every game, it was even more noticeable when one player did not adjust his complete perspective when finding a statement in the argumentation round (Chapter 6.3.3.3). This was then solved when another statement was found on which they could indeed all agree, which might have helped to build even more trust.

Hara et al. (2003) and Xue et al. (2018) claim that informal communication and social mechanisms also help in building trust. This is reflected in the social talks, the fun elements of the game and, for a large part, the secret tasks in which informal ways of communicating were stimulated and used.

In both game sessions, the communication started a bit formal, but with the game forcing the players to actively communicate about their routes, in the minigames and in the social talks and when achieving a secret task, the communication loosened up and became more informal.

Giving the players room for development and giving group rewards was mentioned by Bulińska-Stangrecka & Bagieńska (2019) as another way of stimulating the trust building. By earning stepping cards for achieving a minigame in pairs or with more players, the group reward element had already been included. Winning the game by collaboration can also be seen as a group reward. Giving room for development is harder to measure, but a conclusion might be found in the evaluations of the players.

For instance, in Chapter 6.3.2.1 it is mentioned that some players gave more answers after playing than before playing the game and other players did this the other way around. As was explained in Chapter 6.4.1.1, this might indicate that some players qualified their view of other stakeholder groups and that other players knew more specifically what the other groups think of certain topics. Figures 6.14 and 6.16 in Chapter 6.3.3 also show that the players became better acquainted with the other contestants on a personal and content level. This all may have to do with the development that the players made through the game. However, the fact that none of the contestants made drastic changes in their own point of view, may indicate that there was not that much room for (personal) development.

The last element of building trust in Figure 3.1 in Chapter 3.3.2, was about creating a certain amount of interdependence between the players (Bulińska-Stangrecka & Bagieńska, 2019; Hara et al., 2003; Walsh & Maloney, 2007). In the game, the players are highly interdependent, since the game can only be won when every player contributes to the game. In minigames such as 'name it', it is useful that every stakeholder group has their own perspective on the situation. This ensures the knowledge to be complementary, which in turn makes that contestants do not often want to say the exact same thing.

As Walsh & Maloney (2007) mention, when the interdependency becomes too high, friction may arise between the parties instead of a closer collaboration. It can be concluded that there was some friction in the game sessions between the agricultural sector and the governmental bodies as explained in Chapter 6.3.2.3. However, it is hard to say whether this originated from too much interdependence.

All in all, it can be said that a certain trust was built, as was also confirmed by the contestants in Figure 6.15 in Chapter 6.3.3. Most tasks were performed as reliably as possible, informal communication was stimulated and used on different levels, group rewards were given and formed a motivation, and a certain amount of interdependence was formed due to the design of the game. If this interdependence was not too high and if there was enough room for development, is hard to conclude, but overall, the game encouraged more trust between the players.

7.1.2.2 A new way of learning

Another collaboration element that is addressed here, is that a new way of learning should be stimulated. As explained above, the outlines of the game itself do already include stimulating factors as mentioned by Allert et al. (2004). Lotrecchiano et al. (2016) suggest to include intra- and interpersonal factors. In the situation that is created, there is more focus on the interpersonal, since the whole game stimulates working together and discovering other people's perspectives. Intrapersonal elements can be found in forcing yourself to be more open towards other ideas and being able to change your view on certain stakeholders and certain solutions. The evaluation may help to make this more concrete for the players.

Chapter 6.3.3.4, then shows that one person became less open to other people's world views after playing this game. The others did not change (with the note that they thought they were already quite open) or became more open to other perspectives. Interestingly enough, the prediction of answers of other stakeholder groups did not actually improve after playing the game. But this might also be caused by the expression of these views during the game.

According to Kamp et al. (2004), finding mutual interest, proximity, norms of openness and disclosure and possibly the presence of an intermediary could all stimulate a new way of learning by interacting. A certain form of proximity is also mentioned by Porter & Birdi (2018), as feeling connected to other people because you are all connected by a certain, geographical area that is not too large.

These elements could for instance be found in the secret tasks, some of the minigames and the social talks of the meadow cards, where mutual interest could be found on different levels and unwritten norms were set. Having myself as a game coordinator, made me the independent intermediary that kept the group away from too deep emotional discussions towards more effective conversations, learning and game playing. Furthermore, focusing on the subject of peat meadow areas might have led to some sort of proximity, but since the players were quite different -doing different studies, having different levels of knowledge and living across the country- the proximity was not completely achieved.

To start with, during the game session, some sort of norms of openness en disclosure were set. For instance, every player was indeed trying to actively take part in every element of the game. When the game forced the players to talk about more personal ideas, and listening to other's perspectives, this was done quite enthusiastically, which encouraged a fairly relaxed and open setting. Quote 4 in Figure 6.20 in Chapter 6.3.3 describes the norms that were formed during the game as well. This person was careful in choosing his or her words and perspective, since the setting asked for more nuanced answers. This can be seen as a more closed environment, where people do not feel free to say what they think. However, it can also be interpreted as a positive setting in which people are not only voicing their own opinion but think about how their ideas would be received by others and adapt to the situation as well.

When looking at the session itself, the social talks also found some mutual interests at personal levels when it appeared that players had the same hobbies, or that both lived on a farm. As far as the content level was concerned, mutual interests were compelled to be found in the Argumentation round. Quote 6 in Figure 6.20 in Chapter 6.3.3 confirms that the players were assessing what the other person would agree with. In other words, the players were forced to think from other perspectives, which in this minigame led to a statement and an argument that the players could both agree with.

The conclusion can be drawn that for most players, a new way of learning was stimulated and that prejudices were altered after playing the game, as can be seen in quote 5 in Figure 6.20 in Chapter 6.3.3. Overall, the players learned quite a lot, some of the specifics of what they have learned, can for instance be found in Question 14, 17, 23 and 24 of Appendix Q.

7.1.2.3 Acceptance

As was confirmed in Chapter 2, the stakeholder groups that participate in this game have different social values, standards and cultures. Porter & Birdi (2018) mention that acceptance of these differences is necessary to create an effective form of collaboration. The game did not include elements that are directly focused on acceptance, but there is a lot of room for increasing the acceptance in a more indirect way. As was explained before (Chapter 7.1.2.1), the players complement each other in knowledge and some games will become easier because of these differences. Because the differences help you win the game or minigame, more acceptance might grow for these differences.

At the end of the game, most contestants also thought that every player could contribute something to the game as shown in Figure 6.5 in Chapter 6.3.2. This might also show that some sort of acceptance of the different stakeholders was formed. It might also be that these two groups were more accepting since there were no former conflicts and the students were not as committed to the case as 'real' stakeholders are.

7.1.2.4 Open to every stakeholder

Participating in the serious game should also be open to all the stakeholders to form an effective collaboration (Porter & Birdi, 2018). The game tried to include all stakeholders by adding certain scopes that were specific for the different stakeholder groups. Also, games such as 'name it' ask for different scopes and different stakeholders, because if a group with all the same stakeholders played it, it would be hard to come up with different answers. Also, making the players take turns in going over the board and in the minigames, forces the players to give every stakeholder group room for a contribution.

Of course, the inclusion already starts with the choice for five stakeholder groups. To check whether these five stakeholder groups that were decided to focus upon in Chapter 2 indeed included all the relevant contestants into the game, the evaluation also included room for additions. As can be seen in Figure 6.6 in Chapter 6.3.2, there is only one student who mentioned an extra group of people who could take part in the game: the local entrepreneurs. If this were further explored, this group might turn out to be a good addition to the game indeed. Therefore, it is hard to say if the game is actually open to every stakeholder group. However, the validation of this information as explained in Chapter 2.2.4, has already been checked with two experts of the case. In this validation, the experts could indeed agree with those five main stakeholder groups.

7.1.2.5 Room for sharing knowledge

In Figure 3.1 in Chapter 3.3.2, another collaboration element that was mentioned, was having room for sharing knowledge (Auch & Pretzsch, 2020; Hara et al., 2003; Porter & Birdi, 2018). The game design was meant for sharing perspectives and knowledge of every stakeholder group. Minigames such as 'name it' and 'associating' made every player contribute ideas, since players have to give their answer in turns. The social talks about content questions in the meadow cards or the secret tasks also offered opportunities to share your knowledge or perspective on certain themes.

The evaluation did not include a question about to what extent the players felt as if there was room for sharing their own knowledge or perspective, which would have made it easier to assess this element. However, Figure 6.16 in Chapter 6.3.3 shows how each player got to know the perspective of the other players a little better. This might show that there was indeed room for sharing knowledge during the game. However, although most players changed their view of other players on certain topics as can be read in Chapter 6.3.2, not every player in the game had the same amount of knowledge on the subject. As can be seen in Chapter 6.3.2.2, one player mentioned that the knowledge among the contestants maybe was too diverse. This difference made this player feel that not every player dared to mention his or her own specific interests, because they felt as if this one person with far more knowledge would be more right.

To conclude with, the game attempted to give the players room for sharing knowledge. Looking at the changes in the predictions of the perspectives of other

players, it can be said that some knowledge is shared indeed, since some players changed their perspective on other players. However, the large variation in knowledge might have reduced the room for sharing all knowledge.

7.1.2.6 Regular communication

Another element in Figure 3.1 in Chapter 3.3.2, was having regular and effective communication during the game (Kamp et al., 2004; Porter & Birdi, 2018; Walsh & Maloney, 2007; Xue et al., 2018). The game required players to do this at many levels. All the steps in the game asked for regular communication, since choosing the smartest route and checking if enough stepping cards were collected by all players asked for continuous communication. Games such as describing, drawing, part of a whole and the argumentation game forced contestants to make this communication effective as well, because otherwise, the game would not be won.

Figure 6.19 in Chapter 6.3.3 shows that most players took other ways of thinking into account when playing certain minigames or in general. This means that the players were looking for the most effective way of explaining something to another stakeholder with completely different knowledge. Since a lot of games were completed in a correct way, it can even be said that these attempts of using effective communication did lead to a more successful end of the game.

7.1.2.7 Reflection

Allert et al. (2004) and Lotrecchiano et al. (2016) state that for a collaboration, a moment for reflection is also needed. The game itself did not contain explicit elements for reflection, but the three evaluation forms gave the players room for reflection indeed. Especially since they had to fill in the same form beforehand and afterwards, the contestants were quite aware of their ideas of others. The other evaluation form gave room for reflection as well with questions as in Figure 6.17 in Chapter 6.3.3 and room for elaborating on that answer as well.

7.1.2.8 A common goal

Fitting in with the mutual interest that the former sub chapter ended with, is the collaboration element of finding a common goal and focusing on it as was mentioned in Figure 3.1 in Chapter 3.3.2 (Hara et al., 2003; Kamp et al., 2004; Porter & Birdi, 2018; Rosas & Camarinha-Matos, 2009). The game had a common goal in itself, since the players could only win the game by finishing in the same round. Earning enough stepping cards was also a common goal, which brought the players of the minigames together as well. The common goal behind the game was not addressed explicitly, although the written text on the finish line did read ‘ready to think about solutions’.

During the sessions that the common game goals were indeed mentioned continuously. Since the players won the game in both sessions, these goals were achieved at the end of the game and the players worked together towards earning stepping cards and getting to the finish in the same round. Content wise, it is harder to draw a conclusion. An example as in Figure 6.2 in Chapter 6.3.1, in which all five players of the second session found a statement and an argument with which they could all

agree, might have shown that is indeed possible to think collectively with all stakeholders about solutions and reducing the subsidence in peat meadow areas. Reducing subsidence might indeed be seen as the ultimate common goal that everyone should achieve together, but this was not explicitly stressed in the game. However, the fact that most players find value in the contribution of every stakeholder group as shown in Figure 6.5 in Chapter 6.3.2 and most players would have more trust and expectations if they met again as shown in Figure 6.15 in Chapter 6.3.3, might be seen as a confirmation that they are indeed ready to talk about solutions, which might be the first sub goal to achieve before achieving a reduction of the subsidence.

So, the common goals in the game of earning enough stepping cards to be able to finish the game in the same round, were indeed accepted and worked for during the game and stimulated the collaboration. The further common goals of the case itself were less emphasised, but signs can be found that a first step is made towards finding and achieving the common goal here as well.

7.1.2.9 Small group of contestants

The last collaboration element was mentioned by Sufi et al. (2014) and Walsh & Maloney (2007): the group of contestants should not be too large. A larger group could expose more differences, which would make it harder to achieve all the different collaboration requirements and focus points. As was discussed in some interviews as well, the fact that the session would be online, required a small group of contestants as well. The final design included only five contestants and a game coordinator, which was indeed a distinct group of people who could all contribute actively to the game. Although Chapter 5.4.2 shows that the fifth test session played the game quite successfully in pairs, the players got to know each other better if there were less individuals in the game.

7.2 Discussion

To end this thesis, there will be a critical discussion about the different choices that were made in this report. The research will also be looked at from a broader perspective, and a perspective for future research will be sketched.

7.2.1 General remarks

To start with, this report could have been structured differently. For instance, a more classical structure with one theoretical chapter, one methodology chapter, one results chapter and one conclusion and discussion chapter might have worked as well. Although the current structure enhances the connection between theory, methodology and results for the different sub questions, it might for instance considered to be odd that not every part has a theoretical chapter. A more classical structure would prevent that.

Another general comment to make, is that is hard to answer the main research question more specifically than it has been done now. It is hard to claim that a situation for effective collaboration has been created, because it is hard even to assess when a collaboration is indeed effective. With a more quantitative study or a sequel study in which the game would have been played before having a conversation on solutions, clearer conclusions might have been drawn on the effect of the game on stimulating collaboration.

7.2.2 Effect of the game

As was stated in Chapter 7.1.2, the game seems to have potential in achieving a collaborative situation. An interesting figure that supports this statement is Figure 6.15 in Chapter 6.3.3. Here, it is shown that almost all contestants claim that because of playing the game, they would have more trust, better expectations and would look forward to new conversations if their group would come together in the future. This seems to support the effect of the game for future conversations on the topic of peat meadows.

The effect of the game, however, was only tested twice with two groups of five people and the long-term effects were not measured. This leads to the question whether one game session would be enough. Maybe multiple game sessions would be necessary to build up this situation of effective collaboration. This also connects to the collaboration readiness of Rosas & Camarinha-Matos (2009) which should have been assessed better to estimate from how far the contestants have to come. The students that have played the game now, were quite ready to collaborate, which could mean that for this group, one session would be enough. With the actual stakeholders, it might not be enough. Therefore, a more elaborative sequel of this research should be done with more contestants and a longer period in which the long-term effects of just one session or more sessions could be tested.

Furthermore, it was mentioned in Chapter 5.3.3.3 and 6.4.1.1 that the element of reflection was included in the design of the game mostly in an indirect way. Here it is mentioned that the evaluation forms contributed to a reflection process for the

participants as well. However, these forms were included in this research to analyse the effect of the game. These forms were not planned to be part of the final product of the serious game that could be played with more groups on this topic. However, since it seems to be a valuable addition to the game and the learning process of the participants, it might be considered to include the evaluation forms as a permanent contribution to the game.

The current design of the game makes it hard to play the game twice with the same group, because the answers to most minigames and secret tasks would have been heard in the first session. If you eliminated the cards that were drawn in the first session from the decks for the second session, it would still be possible to play the game, if then enough cards are left. Therefore, if the effect of the game is not enough after playing it once, making a level-up card set should be considered, in which the minigames, secret tasks and meadow cards build on the questions of the current set, with more elaborate questions.

Furthermore, to effectively make a difference in the peat meadow situation, it might be necessary to design more than the game. Even if the effect of the game can be proven to be leading to a collaborative environment, the collaboration should be maintained as well. A strategy should be designed to set the game in a wider scope for it to be the supporting tool in a bigger plan.

Furthermore, playing a serious game might not connect to every lifestyle and might therefore not have a profound effect on all the participants. For instance, a serious game might not be seen as a serious enough tool by some stakeholders. Researching deeper into the different characteristics of the contestants and their preferences, might lead to a different choice than using a game. However, since the more classical discussions might not connect to all lifestyles and characteristics either, it might be the variety of forms that stimulates the group as a whole.

7.2.3 Theory

7.2.3.1 Literature studies in the thesis

For this thesis, three different literature studies were carried out. A study on controversies, collaboration and serious gaming and design formed the basis of this research. Looking back, these theoretical backgrounds could have been more elaborate if the search had been done more thorough. It was nice to receive multiple stepping stones from my supervisors towards relevant literature, but this might also have satisfied me too soon. Of course, it would not have been possible to do more extensive research on all topics within the allotted time, but a bit more research might have given this thesis a more solid substantiation.

For instance, the literature base of single and double loop learning is quite limited in this thesis (Chapter 3.1.2). Although the concept might speak for itself, the role of double loop learning in this thesis is quite large, compared to the literature base. If this research were done again, having multiple articles substantiating the concept would lead to a more solid study. Another example can be found in Chapter 2.1.3,

because although the concept of epistemic outlooks is explained quite substantially here, there is just one main source that supports the explanation, namely that of Spruit (n.d.). The concept of epistemic cultures might have had a richer body if more articles had supported it in the literature study. Also, since the epistemic outlooks in the conclusion (Chapter 2.4.1.2) are not described following the same framework of Knorr Cetina (1999), it would have been better to describe the wider concept of epistemic outlooks and not only by following the study of Spruit (n.d.).

Furthermore, the double loop learning and the collaboration literature might have been led by the concepts of transdisciplinary learning and social learning. These concepts include a form of learning from others in collaborative environments and could have been used as support for the literature base. A fair number of concepts of these theories have already been included in the collaboration requirements, but the specifics of these theories could have been of added value.

7.2.3.2 Loose ends

There are also a few loose ends in this study. Some concepts mentioned in Chapter 2.1 are quite relevant, but not explicitly used elsewhere in this research. An example of this can be found in Chapter 2.1.2, in which the difference in the expression of values as mentioned by Pesch et al. (2017) is explained. As certain groups express themselves on a more emotional base (informal trajectory), other groups following the formal trajectory use facts and legitimacy as a base for their expression. This distinction is not explicitly used in the game, although this is a part of the different world views that the different stakeholder groups have. So, when the players of the game gain more insight in the other player's way of thinking, priorities and visions, they might be unconsciously confronted with the differences in emotion-based and judicial-based expressions as well. It might have helped to make these insights explicit in the game, but this might also have caused some resistance and less acceptance of certain points of view. By not specifically mentioning these differences, maybe the arguments had already been levelled equally for the different stakeholder groups. If this would then all be taken into consideration in a next session when searching for the correct solution for the subsidence, the different groups might all be more willing to accept the outcome as Lorenzoni & Pidgeon (2006) and Roeser & Pesch (2016) describe.

Another element of literature that was not explicitly used in the rest of the study, was the concept of Fløttum et al. (2014), who state that the future vision of different stakeholders is either negative or positive. As Moser & Dilling (2012) mention, this distinction determines the willingness to act more sustainably, since this vision can motivate or demotivate stakeholders. That the stakeholder groups do gain more insight into each other's perspectives by playing the game, provides a stepping stone for this concept. It would have been interesting to have dealt with the explicit future visions of the stakeholder groups before the design of the game, to see if the starting points of the different stakeholders are either negative or positive. The game could then have included elements to give the players with a negative view insight in positive elements, next to the insight in different visions. It might have led to a situation in which even more stakeholders would be willing to accept solutions because of a more intrinsic motivation.

7.2.3.3 Value of the literature and the research

As mentioned before, this research could have included a more elaborated literature study. However, the used literature has already been of considerable value for this study. The literature on controversies and epistemic outlooks (Chapter 2.1) was helpful. These concepts could be used to describe the situation of the peat meadow controversy and to distinguish the different stakeholder groups in this situation.

Of course, these studies all have their limits. Most research on controversies deal with just one opposing group and one proposing group. The epistemic outlooks were described more technically in the literature than in the way it was used in this study. This might mean that it does not include all the elements of this concept. The five different stakeholder groups with various interests and epistemic outlooks that were derived from the research in this study, were therefore hard to assess using the different studies that were found in Chapter 2.1

The collaboration literature (Chapter 3.1) led the rest of the research, since the creation of a situation in which effective collaboration could take place was the goal of this research. The collaboration requirements were formed quite easily, since each requirement was supported by multiple sources. As the game was built-up on these requirements, the success of the game was supported by various studies. It would have been even more supportive, if the literature could have offered a better way of assessing the learning process and its effect. A critical note to make here, is that the search for literature could have been focused more on this specific topic, because it was not a main searching term in this study.

The limits of the collaboration literature can be found in the fact that these studies did not use these concepts in a serious game. The concepts seem quite strong and supported by multiple sources, but the effect of the concepts in the form of a game is not literally mentioned here. That specific combination is probably more included in the literature on serious gaming although that literature was also quite hard to find.

The literature on serious gaming (Chapter 5.1) was the least relevant for this study. As mentioned before, it was hard to find sources that could describe a possible designing process of a serious game; most literature was focused on analysing serious games. This has helped me in finding inspiration for game elements that could be added to the game but has not supported me through the designing process. The actual designing process for this study was eventually based on the skills that I have had learned during the master programme of Science Communication. The theoretical baseline of Design-Based Research of the British Design Council (2019) was retrieved after most of this process had already been executed.

As was mentioned above in the limits of the collaboration literature, I had hoped to find studies which showed how literature could form a base for a serious game, to support the potential effect of the game. Since most literature was focused on analysing the serious games themselves, this can be seen as the limit of the retrieved studies on serious gaming. The link between literature and their resulting

games could have made my process easier but might have led to the same result after all.

The added value of this research to the existing literature is quite minimal, although it created a few new insights indeed. As mentioned in the introduction, this set-up and boundaries fills a knowledge gap in the existing literature. It brings three elements together (1) by discovering the different world views in the peat-meadow case and (2) researching how this information can be deployed to have a chance of mutual understanding and collaboration, which leads to (3) a serious game with the stakeholder groups to bring them closer together.

For the field of Industrial Ecology, this study offers quite a new insight in the salvation of social controversies in ecological topics. A shifting focus from solutions for the peat meadow areas themselves to creating a more effective collaboration between the stakeholder groups, offers another way of tackling such a problem. Also, the use of a serious game as a tool for solving such frictions and creating a more effective collaboration, is quite an unknown subject in this field.

Searching for the underlying problem and designing a supportive tool as a strategy to solve this underlying problem, are not new in the field of Science Communication. However, no tool and designing process are similar. Therefore, this study offers a new type of tool, which could be used as an inspiration for other cases and for the SEC research line of collaboration and co-creation. The process can be seen as socially robust science, to which field a new insight is offered. That the board was made in Miro and the game could be played online, is quite a new concept, which can be improved upon in further research. The unusual way in which the morphological chart was used as a brainstorming canvas, might also inspire others in future serious game designs.

7.2.4 Methodologies

The methodologies used in this thesis are quite different per Chapter. Furthermore, some parts of the research could also have used a different or more elaborate methodology. To start with the expert interviews (Chapter 2.2), the basis for the analysis of the different epistemic outlooks would have been more sophisticated if more interviews had been done. Because of the pandemic, all interviews were done online, which means that time was saved. This time could have been used to have more interviews, which would have been possible in other circumstances. Also, the validation could have been done with more than two interviewees, to support the base of the analyses even more.

Now, simultaneously with the last few interviews, the analyses were already made. And because the general picture became quite clear already, no further research was done for more scopes to include. It might, however, have led to even more nuances and information if more different people had been interviewed. For instance, it would have been interesting to have spoken with someone from a relevant municipality, to have gained more insight into the angle of the administrative bodies.

However, quite some people that were interviewed can be seen as a more general experts, with whose information it was already possible to sketch the general picture.

The iterations in which the collaboration requirements of Figure 3.1 in Chapter 3.3.2 were formed into the prioritised focus points of Figure 3.2 in Chapter 3.3.3.1, did not have an airtight methodology either. Based on my own ideas of the goal of the tool and conversations with students and supervisors, the ten elements were formed. It would have been better if these steps were easier to follow, so that a validation of the choices could be supported.

Another methodology that could have been carried out differently, is the selection of the target group. It is quite clear how the choice was made to search for students of relevant studies, but the selection of which students to include, was more or less done by chance. It would have been better if specific selection criteria had been formulated beforehand. Among the interviewees and stakeholders that I could have found via their connections, a small research could have been carried out about the studies they had followed before ending up in this case study with their angle. This accompanied by some further research on the different stakeholder groups in general, could have led to more specific criteria. It could for instance be possible that most water managers involved in this case are mostly educated at university level, whereas the nature preservation stakeholders might be more often educated at HBO-level. Although I have now checked to make sure to include different educational levels in the overall picture, I did not know exactly which stakeholder group had what education level in general.

Another idea for searching for relevant students, could have been to ask for interns at the organisations of the interviewees or relatives working in the same business as the interviewees. This might also have led to a group of relevant students for this thesis. One observation to make here, is that I, during my search for actual stakeholders, also tried the way of the interviewees, which did not lead me to many relevant people. It is questionable whether this method would indeed have led to enough relevant students.

The methodology of the game design in Chapter 5.2.3 followed mostly the ways of working as were taught in the MSc of Science Communication. Especially courses like C-lab included this type of design thinking. It was therefore that the theory of van der Sanden & de Vries (2016) was used quite unconsciously competent in the design process. It was afterwards that I realised that the ideas of this study guided the greatest part of the process.

As was mentioned in Chapter 5.4.2.2, the use of the morphological chart in this process was not classical. Although it helped me in structuring the outcomes of the different brainstorms, it could have been done with mind maps or other methods as well. Maybe making a causal diagram of the different elements from the brainstorms would have led to a process of the game design that would have been better to follow. But all in all, the game design stays a quite creative process of which not all steps can be completely traceable, since your own way of thinking influences each

step. Having multiple groups of people with different mindsets brainstorming on ideas is however in my opinion a good thing to do, since that creates much more different ideas than what one person could come up with.

The evaluation forms as described in Chapter 6.2.2, were all made in Google forms. This was done because of the easy use and clear results which were experienced in former projects. A programme like Qualtrics would have given me more options and more confidentiality of the results. The consideration of this software was, however, done quite late in the process and since I would have to learn to use the program, too much valuable time would have been lost. Since the Google forms do not ask for personal data such as names or addresses, the confidentiality was well managed with Google forms as well. It would also have been a possibility to carry out the game evaluation in one-to-one conversations with the different students instead of using a form. This would probably have delivered more extensive answers, since the barrier of typing would not have been included. If the same structure of questions had been followed, it would have been possible to analyse these more elaborate results in the same way as well. The choice was made not to do this, however, because of the extra time it would cost to plan the extra meetings and to process the answers into digital results. The planning of the meetings could also have meant that the time lag between the playing of the game and the evaluation would have been too significant for the contestants to answer every question as detailed as it would have been directly after playing the game.

The forms of the prediction of perspectives, would have been even harder to put in a conversational setting. Although the bias of prefab answers would have been overcome, the answers would have been harder to compare and analyse, since ten players of two sessions do not give much base for an analysis of open questions.

7.2.5 The game design

The design of the game already contained quite strong elements. For instance, the fact that players have to listen to each other when it is not their turn or when they are not involved in a minigame, ensures that you hear the different perspectives during the game. And since one also participates in other players' turns, one is to stay alert, and cannot doze off. However, the final design of the game could have looked, as explained before, differently if someone else had made the same design steps (Chapter 5.4.2.3). As long as the collaboration requirements and their iterations into the focus points were used as a base for a morphological chart, similar elements would probably have been included. So, even if the game was made into a card game or another game form, it would probably include game elements that focus on expressing perspectives and having to listen to them. It would also include trust building and team building exercises, and collaboration would have been an essential element in the game.

Potentially, another design would not have needed a game coordinator to guide the players through the game and steer the conversations a bit. For this game, the

coordinator however worked quite well. Collaboration requirement 2.c. in Figure 3.1 in Chapter 3.3.2 mentions having an intermediary could be used as a way of building trust. For this game, I was the game coordinator. It could perhaps have been someone else as well, which might have been even better. Now, I had already developed certain connections with the different players, by having a few meetings beforehand. And although this might have been a positive aspect, since the players would already feel more comfortable in the session, this might also keep people from ventilating too extreme opinions. A new neutral face might have put the focus even more on the other players and would prevent people from feeling a threshold for 'insulting' me or the game. This new coordinator would have to possess a certain basic knowledge of the case study and he or she should also know about the ins and outs of the game and the goal of the game. This would help to steer away from in-depth discussions and to provide more time for certain exercises that are carried out quite extensively.

For this particular design, things could have been designed in another way as well. We could for instance think of perspective differences. For example, the minigame 'part of a whole' as explained in Chapter 5.3.3.2, could have been used the other way around. Now, the players see pictures that relate to a certain extent to their own perspective on the answer. It might, however, also have been interesting to see a picture that relates to the perspective of another stakeholder group. This would have asked for a detailed, skilled description of the picture so that the relevant stakeholder could recognise it. It would also show the value and the relevance of the knowledge of the other stakeholder groups. This tactic could also be used in other minigames, when stakeholders have to mention arguments or perspectives of other players to win the minigame. To place yourself in the position of other stakeholders, might have brought even more understanding during the game.

Another way of showing the different angles, could be to change the board. It would have been connected to reality even more, if for some stakeholders the route to the finish line would have more options to make it easier to control the pace and for other stakeholders the route would have less options to make it harder to control the pace. This could then connect to the different stakeholders in real life, to show the other stakeholder groups the varying degrees in difficulty of their process.

Other ideas that could have improved the game, are mentioned here as well. For instance, a rule could be added that if the double number of answers were given in the 'name it' and 'association' rounds, it would be possible to earn two stepping cards instead of one. Some rounds were finished quite quickly, and the players stopped naming things when the number of answers to the exercise was achieved. To stimulate players to win even more when naming more, a broader view of everyone's perspectives would have been revealed.

The meadow cards could also have been improved. Since there were cards with: 'say what your hobbies are' and 'ask two players what hobbies they have', it occurred that one player had to talk about his or her hobby twice. An extra iteration could have prevented such situations.

Also, the argumentation round was designed quite late in the process and was therefore not tested many times. Since it had a highly useful contribution to the game as was shown in Figure 6.13 in Chapter 6.3.3, it might be worth it to take more time to develop this minigame further. There should be more test rounds, so other designs, other statements, and more of those variations could be tested. It could also be interesting to investigate other ways of giving time pressure that has a good balance between no room for discussions and enough room to find common ground.

7.2.6 The stakeholders

As was explained in Chapter 5.2.2, the choice for students of relevant studies as a target group for the serious game, was not completely voluntarily. Mostly because of the Covid-19 pandemic, connections to actual stakeholders in peat meadow areas were hard to find and most planned sessions were postponed to a future moment. This postponement had partly taken place because some people felt a resistance to having these types of meetings online. However, if I had taken more time to find such a group of 'real' stakeholders or if I had spoken to more people who were connected to the case, I might have succeeded in finding such a group of contestants.

The results of this thesis would indeed have been different if the target group had included a group of stakeholders of one specific location in the peat meadow areas in the Netherlands instead of students. There would probably have been higher personal stakes, since the case affects people's lives directly. This group of people might also have thought more negatively about playing a serious game.

This would both have led to a stronger inclusion of contestants and their perspectives in the design phase of the game, since the statements and elements should be as delicate and as customised as possible to land the game without too much resistance beforehand. It would be important to have knowledge about the history of the group and their knowledge level, to connect the game on all levels. This extra preparation and caution could be explained with the theory in Chapter 3.1.3, since it would be much more relevant and important to make an assessment of the Collaboration Readiness as explained by Rosas & Camarinha-Matos (2009) beforehand.

The game would probably have looked a little differently, for instance the questions in the social talks of the meadow cards and the secret tasks, would have been focused more on more relevant topics and interests instead of studies and hobbies. As was mentioned in Chapter 5.4.2.1, the simultaneous use of Miro, Zoom, PDF and Pickerwheel during the playing of the game, would probably be hard to do for contestants who did not grow up in the digital era. Therefore, the game session would probably have been a physical session with a physical board and physical cards. Most elements of the game could be exactly copied into a physical state, and it could be considered to only have one main pile of secret tasks and meadow cards, instead of giving each player their own. It would also create a more natural way of starting small

conversations and having social talks, since a Zoom meeting makes these elements more static.

The content-related results of a session with actual stakeholders could also have been different as well. A solution such as adding clay to peat grounds for slowing down the subsidence, was quite positively looked upon in multiple interviews, whereas the students did not see much salvation here. A minigame such as the argumentation game would be very interesting. The students indicated that the time slot put pressure on finding agreement, which led to some first steps. For 'real' stakeholders this could be even harder, but maybe offering new insights as well.

Another interesting thing to find out, would be if the same frictions would arise or not. As was explained in Chapter 6.3.2.3, the most noticeable friction was found between the agricultural sector and the administrative bodies. Chapter 1 however predicted that the greatest friction would be between the agricultural sector and the nature preservation organisations. Playing the game with the stakeholders of one area, might reveal these or other frictions.

It might be the case that the 'real' stakeholders of the case are not open to playing such a serious game at all. This situation could know multiple scenarios. For instance, if only one or two stakeholder group(s) do not see value in playing a serious game, it might even enlarge the already existing frictions, so the way of informing each stakeholder group, should be quite delicate to not increase the conflicts in the case. If the majority of the stakeholders think that a serious game is not a serious enough tool, it would be good to be prepared for that. Having examples of the effects of such a game or other strong arguments, might turn these mindsets around. However, it might also be good to have a plan B, in which the main elements of the game could be used in another form. A workshop or a discussion with a coordinator might be a replacement that the stakeholders consider to be more fitting for the situation. A coordinator who could steer the conversation away from the content and who can create multiple exercises in which different stakeholders are encouraged to work together, might already be able to include the same collaboration requirements.

7.2.7 Future perspective

7.2.7.1 Future of the game

The future of 'Samen door het veen' is not quite clear yet but has quite some potential. For the game to make a serious change in the case of peat meadow areas in the Netherlands, the first step would be to play the game with stakeholders of one specific location in the peat areas as explained before. If this brings successes, it might be used in other locations as well to build up more effective collaborations over all peat meadow areas. Creating this collaboration situation, may also lead to new ideas and innovations which would be applicable in more locations as well, which would ease the discussions in general.

Another perspective for the game would be to turn the serious game into a sort of generic template, so every scientist could add his own case study to the cards.

Then, the game could help in creating better collaboration over more case studies than just peat meadow areas. Since all minigames, most secret tasks and most meadow cards now have topics that are all related to this case study, it would ask for quite some changes. On the board however, only the argumentation field would have to be adjusted to the case, except when less or more stakeholder groups than five are involved, then the complete board has to be adjusted with more or less different route colours. It might be nice to be able to switch the different routes on or off, so that you can adjust the board easily to the amount of contesting stakeholders.

As was shown in Test session 5, it is also possible to play the game in pairs, although the players are less required to be alert, since their team mate could do the work for them. Adding elements of pair minigames and methods of keepings everyone's attention, might however make it possible to include more people in one game session.

For future development of the game, it might also be nice to go through the framework of Arnab et al. (2015) as was mentioned in Chapter 5.1.3. Analysing the current design using this framework might lead to an insight of weak, strong, and missing elements. This might strengthen the flow of the game and the individual elements.

The research as a whole could also be followed by different future research. For instance, as was explained in Chapter 2.1.2, visualising the future could help in relating to climate related problems such as this and could help in acting upon these problems (Nicholson-Cole, 2005). It might be interesting to, after playing the game and an environment for collaboration and trust is formed, give the stakeholders room for visualising their perspective of the future. This would help them in supporting their own perspectives, but this could also give more insight and maybe even inspiration when seeing the visualisations of others.

It would also be interesting in future research to discover whether the game could indeed be used as a start for collecting input of all perspectives. As Cuppen (2018) mentioned in Chapter 2.1.2, listening to controversies and using the ideas as actual input for the final solution, leads to more acceptance between all parties; the people feel more connected to the final solution. As the game forces the players to listen to the other players to a certain extent, this research could be a step after playing the game, when you will delve more into the sources of the different perspectives. The emotions that may lay at the base of certain statements, should be taken into consideration as Roeser & Pesch (2016) state. Making allowance for emotions in the participatory search for the accepted solution for the subsidence, could for instance be done with a CTA (constructive technology assessment). Using this framework could be a constructive follow-up session after playing the game.

All in all, the effect of the serious game could be measured more constructively and if this effect is significant, there are multiple ways to organise follow-up sessions or to use the game for other cases as well.

7.2.7.2 A wider scope

The controversy of peat meadow areas has not been specifically helped by this study. Mainly because it was not possible to find the right stakeholders to play the game with, stakeholders have not seen the potential effect of this research. Therefore, this study remains a hypothetical study mostly, with not much direct effect for society. However, since there is potential for this game to be stimulating a more effective collaboration, its concept might be used to stabilise such a controversy in future research. The final game sessions more or less showed (despite the small scale) how the game can bring different epistemic outlooks together to win a game with a common goal. The effect of this collaboration for social controversies, should be tested in the long-term.

Although there are some examples of controversies in which a serious game was used as a tool to find agreement or understanding, not every situation is suitable for such a tool. As was shown in Chapter 6.3, a friction between the agricultural sector and the administrative bodies can be felt. This friction has not completely been solved by playing this game. This might mean that this game alone is not enough to use in such heated discussions. However, the dynamic between 'real' stakeholders might be completely different, since they know better what to expect. It might mean that the game could show a more positive angle between these stakeholders.

In another controversy, a serious game might be of use as well to stimulate a more collaborative environment. However, it depends on the situation, the collaboration readiness and the number of stakeholders, whether the effect of the game can be established and if the effect could be of added value in that controversy.

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Appendices

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Appendix A – Overview literature research

Title of the research	Writers	Cited	Year	Journal name	Search terms used
Energy Research & Social Science The value of social conflicts. Critiquing invited participation in energy projects.	Cuppen, E.	46	2013	Energy Research & Social Science	Retrieved via supervisor
Claims and counterclaims about noise: Epistemic cultures as a lens to understand wind energy controversy.	Spruit, S.	-	n.d.	-	Retrieved via supervisor
Engineers and Active Responsibility.	Pesch, U.	15	2015	Science and Engineering Ethics	Retrieved via supervisor
Energy justice and controversies: Formal and informal assessment in energy projects.	Pesch, U., Correljé, A., Cuppen, E., & Taebi, B.	28	2017	Energy Policy	Retrieved via supervisor
An Emotional Deliberation Approach to Risk.	Roeser, S., & Pesch, U.	27	2016	Science Technology and Human Values	Retrieved via supervisor
Responsible innovation as an endorsement of public values : the need for interdisciplinary research	Taebi, B, Cuppen, E., Dignum, M., & Pesch, U.	80	2014	Journal of Responsible Innovation	Retrieved via supervisor
Bridging the Gap between Social Acceptance and Ethical Acceptability	Taebi, Behnam.	29	2017	Risk Analysis	Snowballing from Pesch et al 2017
Bonding and bridging in capacity development networks to address wicked water challenges.	Pieron, M. M.	-	2012	-	Retrieved via supervisor
Epistemic Cultures: How the Sciences Make Knowledge	Knorr Cetina, K.	557	1999	-	Snowballing from Spruit (n.d.)

Individual understandings, perceptions, and engagement with climate change: Insights from in-depth studies across the world.	Wolf, J., & Moser, S. C.	10	2011	Wiley Interdisciplinary Reviews: Climate Change	TITLE-ABS-KEY ("climate change" AND perception AND individual) AND (LIMIT-TO (SUBJAREA , "SOCI"))
Communicating Climate Change: Closing the Science-Action Gap.	Moser, S. C., & Dilling, L.	30	2012	The Oxford Handbook of Climate Change and Society	Snowballing from Wolf 2011
Public views on climate change: European and USA perspectives.	Lorenzoni, I., & Pidgeon, N. F.	613	2006	Climatic Change	Snowballing from Moser 2012
How science makes environmental controversies worse	Sarewitz	658	2004	Environmental Science & Policy	controversies AND climate change
Diving in magma: how to explore controversies with actor-network theory	Venturini	574	2010	Public Understanding of Science	controversies AND climate change
Representations of the future in English language blogs on climate change	Fløttum, K., Gjesdal, A. M., Gjerstad, Ø., Koteyko, N., & Salway, A.	27	2014	Global Environmental Change	public AND perspective AND on AND future AND climate AND (LIMIT-TO (SUBJAREA, "ENVI"))
Representing climate change futures: A critique on the use of images for visual communication.	Nicholson-Cole, S. A.	212	2005	Computers, Environment and Urban Systems	TITLE-ABS-KEY ("climate change" AND "future" AND communication) AND (LIMIT-TO (SUBJAREA , "SOCI"))
Industrial ecology: engineered representation of sustainability	Michael von Hauff Æ Peter A. Wilderer	14	2008	Sustainability Science	pillars industrial ecology
Spatial Analysis of Soil Subsidence in Peat Meadow Areas in Friesland in Relation to Land and Water Management, Climate Change, and Adaptation	Brouns, K. et al.	10	2014	Environmental Management	peat AND meadow AND area AND netherlands
Potential for nature in peat-meadow areas | Kansen voor natuur veenweidegebied	Verhoeven, J., Barendregt, A., Van De Riet, B.	3	2010	Landschap	peat AND meadow AND area AND netherlands

Toepassing van onderwaterdrains in veenweidegebieden	Van Den Akker, Jan, Hendriks, Rob, Hoving, Idse & Pleijter, Matheijs	5	2010	Landschap	snowballing uit Verhoeven (2010)
Public understanding of climate change as a social dilemma.	Capstick, S. B.	17	2013	Sustainability (Switzerland)	TITLE-ABS-KEY ("Climate change" AND "social dilemma") AND (LIMIT-TO (SUBJAREA , "ENVI"))
Lifelong learning and second-order learning objects	Allert, H., Richter, C., & Nejdl, W.	10	2004	British Journal of Educational Technology	TITLE-ABS-KEY ("Second order learning") AND (LIMIT-TO (SUBJAREA , "SOCI"))
Public participation in environmental policy: Considering scientific, counter-scientific and non-scientific contributions.	Eden, S.	177	1996	Public Understanding of Science	TITLE-ABS-KEY (participation AND "social interaction" AND policy)
An approach to assess collaboration readiness	João Rosas & Luis M. Camarinha-Matos	7	2008	IFIP International Federation for Information Processing	"collaboration readiness"
Notions on learning applied to wind turbine development in the Netherlands and Denmark	Linda M. Kamp, Ruud E.H.M. Smits, Cornelis D. Andriesse	116	2004	Energy Policy	got it via supervisor
Individual motivation and threat indicators of collaboration readiness in scientific knowledge producing teams: a scoping review and domain analysis	Gaetano R. Lotrecchiano, Trudy R. Mallinson a, Tommy Leblanc-Beaudoin a, Lisa S. Schwartz a, Danielle Lazar b, Holly J. Falk-Krzesinski	7	2016	Heliyon	"collaboration readiness"
Software in Reproducible Research: Advice and Best Practice collected from experiences at the Collaborations Workshop	Shoaib Sufi, Neil Chue Hong, Simon Hettrick, Mario Antonioletti, Stephen Crouch, Alexander Hay, Devasena Inupakutika, Mike Jackson, Aleksandra Pawlik, Giacomo Peru, John Robinson, Les Carr, David De	7	2014	Proceedings of the ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)	"collaboration readiness"

	Roure, Carole Goble, and Mark Parsons				
Building a model for virtual collaboration readiness- Determining what factors affect the attitude of Life Science researchers towards Virtual Research Environments	Eva Kalmar	-	2016	-	via supervisor
An Emerging View of Scientific Collaboration: Scientists' Perspectives on Collaboration and Factors that Impact Collaboration	Hara, N., P. Solomon, S. L. Kim and D. H. Sonnenwald	500	2003	Journal of the American Society for Information Science and Technology	snowballing from Kalmar 2016
What People will do: Personality and Prediction	Goldie, P.	12	2004	Richmond Journal of Philosophy	snowballing from João Rosas & Luis M. Camarinha-Matos
Collaboration Structure, Communication Media, and Problems in Scientific Work Teams	Walsh & Maloney	133	2007	Journal of Computer-Mediated Communication	snowballing from Kalmar 2016
Versnelde bodemdaling in veengebieden door warmer weer	Cees Kwakernaak		2015	Lichtkogel - Cahier van Rijkswaterstaat	bodemdaling veen klei
HR practices for supporting interpersonal trust and its consequences for team collaboration and innovation	Bulińska-Stangrecka, H., Bagieńska, A.	4	2019	Sustainability (Switzerland)	TITLE-ABS-KEY ("effective cooperation") AND (LIMIT-TO (SUBJAREA , "SOCI"))
Collaborative innovation in construction project: A social network perspective	Xiaolong Xue, Ruixue Zhang, Liang Wang, Hongqin Fan,Rebecca J. Yang, Jason Dai	7	2018	KSCE Journal of Civil Engineering	TITLE-ABS-KEY ("effective cooperation" AND stakeholders)
Participative Innovation Platforms (PIP) for Upgrading	Eckhard Auch, Jürgen Pretzsch	0	sept 2020	Small-scale Forestry	TITLE-ABS-KEY ("effective cooperation" AND stakeholders)

NTFP Value Chains in East Africa					
22 reasons why collaborations fail: Lessons from water innovation research	James J. Porter, Kamal Birdi	14	2018	Environmental Science and Policy	TITLE-ABS-KEY ("effective collaboration" AND stakeholders) AND (LIMIT-TO (SUBJAREA , "SOCI"))
Triadic Game Design	Harteveld, C.	145	2011	-	Retrieved via supervisor
Serious games for information literacy: a scoping review and design recommendations	Alex C. Urban	1	2019	Library Hi Tech	TITLE-ABS-KEY ("serious game" AND design AND steps) AND (LIMIT-TO (SUBJAREA , "SOCI"))
Mapping learning and game mechanics for serious games analysis	Sylvester Arnab, Theodore Lim, Maira B. Carvalho, Francesco Bellotti, Sara de Freitas, Sandy Louchart, Neil Suttie, Riccardo Berta and Alessandro De Gloria	302	2015	British Journal of Educational Technology	Snowballing from Urban 2019
Exploring the potential impact of serious games on social learning and stakeholder collaborations for transboundary watershed management of the St. Lawrence river basin	Wietske Medema, Alison Furber, Jan Adamowski, Qiqi Zhou and Igor Mayer	41	2016	Water (Switzerland)	TITLE-ABS-KEY ("serious game" AND "collaboration" AND "design") AND (EXCLUDE (SUBJAREA , "COMP"))
ANALYSING THE RELEVANCE OF SERIOUS GAME ELEMENTS FOR EFFECTIVELY TEACHING INNOVATION PROCESSES	Ma, Yiming ; Vallet, Flore ; Cluzel, François; Yannou, Bernard	3	2019	Proceedings of the International Conference on Engineering Design, ICED	TITLE-ABS-KEY ("serious game" AND "design" AND "board game" OR "card game") AND (EXCLUDE (SUBJAREA , "COMP"))
Pattern Oriented Card Game Development	Soska, A., Mottok, J., Wolff, C.	0	2017	IEEE Global Engineering Education Conference, EDUCON	TITLE-ABS-KEY ("serious game" AND "design" AND "board game" OR "card game") AND (EXCLUDE (SUBJAREA , "COMP"))

Do Serious Games Work? Results from Three Studies	R Blunt	36	2009	eLearn	Snowballing from Soska 2017
MDA: A Formal Approach to Game Design and Game Research	Robin Hunicke, Marc LeBlanc, Robert Zubek	675	2004	AAAI Workshop - Technical Report	Retrieved from expert Marvin Soetanto
Innovation in Science and Technology Education and Communication through Design Thinking.	Van der Sanden, M. C. A., & de Vries, M. J.	-	2016	-	Retrieved via fellow student
Productontwerpen, structuur en methoden.	Roozenburg, N. F. M., & Eekels, J.	-	2003	-	Snowballing from van der Sanden 2019
Design-based research and technology-enhanced learning environments	Wang, Feng Hannafin, Michael J.	794	2005	Educational Technology Research and Development	(TITLE-ABS-KEY ("design-based research")) AND (Hannafin) Retrieved via tips from supervisor
Double loop learning in organizations.	Argyris, C.	3373	1977	Harvard Business Review	"double loop learning"

Appendix B – Format questions interviews

I – Kennismaking en toestemming opname

- Student TU Delft
- Corona omstandigheden even benoemen
- Toestemming voor opnemen? Daarna een tweede keer bevestigend in opname vragen, zodat het officieel 'genoteerd' is
- Ik zal later bevestiging vragen voor de transcriptie en samenvatting indien van toepassing

II – Korte introductie onderzoek

- Er zijn verschillende ideeën over de toekomst van veenweidegebieden in Nederland
- Ik wil hier een beter beeld van krijgen
- Niet te veel nu vertellen, open minded blijven

III- Interview

In een interview zou ik onder andere de volgende elementen willen bespreken:

- Welke perspectieven bestaan er over de toekomst van de veenweidegebieden?
- Welke groepen mensen zijn verbonden aan de veenweidegebieden?
    - Welke hiervan hebben belang bij het behouden van de veenweidegebieden?
    - Zijn er ook groepen betrokken die hier geen belang bij hebben?
    - Hoe zijn de onderlinge relaties?
- Ik hoorde dat er al meerdere gesprekken/workshops zijn geweest op verschillende locaties waarin verschillende groepen mensen om de tafel hebben gezeten. Hoe zagen deze eruit?
- Verder ben ik ook benieuwd naar uw persoonlijke visie op de toekomst van de veenweidegebieden.

1. Hoe bent u verbonden aan de veenweidegebieden?
    a. Kunt u kort omschrijven wat uw werk precies inhoudt?
2. Ik heb gelezen dat de bodem in veenweidegebieden ongeveer 1 centimeter per jaar daalt, waardoor wordt dit versterkt of verzwakt?
3. Hoeveel helpen de huidige projecten in de rem tegen bodemdaling en emissies?
4. Hoe worden nieuwe projecten geïnitieerd? Begint dat bij het VIC of bij de boeren en welke route doorloopt het dan?
5. Een aantal projecten lopen al een tijdje nu, *ik zag bijvoorbeeld dat het onderzoek naar waterinfiltratie onder druk op het KTC Zegveld loopt tot en met 2020*, zijn daar al voorzichtige resultaten uit te halen?
6. Wat zijn alle mogelijke oplossingen die nu onderzocht worden?

    a. Onderwaterdrainage lange termijn? Blijft alles onder water dan ook bewaard, of zakt dat deels ook weg? Komen de buizen op gegeven moment bloot te liggen?
    b. Alleen maar voordelen OWD, hoeveel mensen doen/willen het al? Hoe ver is het onderzoek? Heeft het zin met meer dan 40 cm drooglegging?
7. Hoe belangrijk vindt u het dat de boeren kunnen blijven werken op dit land?
8. Ziet u nog andere belanghebbenden voor deze gebieden?'
9. Wat zijn uw eigen ideeën over de huidige staat van de veenweidegebieden?
    a. Wat ziet u als de gevolgen hiervan?
10. Wat zijn uw eigen ideeën over de toekomst van de veenweidegebieden? Wat zouden de gevolgen hiervan zijn?

Mijn onderzoek:

- Verschillende ideeën over een case, in dit geval veenweidegebieden → op zoek naar controverse
- Proberen in 2 groepen te verzamelen
- Beide groepen toekomst laten omschrijven
- Korte termijn 2 jaar over gebied zelf
- Lange termijn 30-50 jaar over überhaupt de toekomst
- Met soort workshop deze beelden gebruiken om samenwerking te initiëren en naar beste oplossing te zoeken

11. Waar kan ik het beste op focussen?
    a. Zijn er locaties waar er echt discussies zijn tussen helemaal onder water zetten en boeren behouden? Of andere discussies?
12. Kent u mensen die hier andere ideeën over hebben?

IV- Afsluiting

- Zou ik u eventueel later nog eens kunnen benaderen voor een tweede interview?
- Ik zal de transcriptie en samenvatting -indien van toepassing- later nog terugkoppelen
- Bedankt voor dit interview

Appendix C – Summaries interviews

Alle samenvattingen geven mijn eigen interpretatie van de interviews weer. Het kan zijn dat de mensen die ik heb geïnterviewd de nuance net anders hadden gelegd in hun beleving en daarom geeft dit niet de exacte standpunten weer van deze mensen en de organisaties waar zij voor werken.

C-1 Samenvatting interview Erik Jansen

14-05-20

Erik Jansen werkt op drie plekken aan de veenweidegebieden. Momenteel is hij mede-oprichter van het Veenweiden Innovatiecentrum, waar hij werkt aan het Nationaal Kennisprogramma Bodemdaling en Meetprogramma Broeikasgassen (STOWA: Stichting Toegepast Onderzoek Waterbeheer).

Veenafbraak

Hij noemt 2 soorten veenafbraak:

- Wegzakken door de slappe structuur van veen.
- Veenafbraak door reactie tussen zuurstof, warmte en bacteriën.

Het afremmen van veenafbraak is urgenter geworden door de doelstelling van 1 Mton minder CO2 uitstoot in 2030. Voor de landbouw spelen alleen nog veel meer problemen mee. Ook de fosfor en stikstof uitstoot moeten omlaag en de biodiversiteit moet omhoog. Ook bestaan er binnen veenweide hele verschillende culturen, sommige plekken in Nederland zijn al extreem intensief gebruikt (vooral westelijk), andere plekken hebben nog veel meer veen over.

Onderzoeken VIC

VIC doet aan systeeminnovaties, hiermee wordt bedoeld dat er niet 1 techniek geïmplementeerd wordt, maar dat er echt vanaf het nulpunt wordt gekeken welke bewegingen er nodig zijn om de uiteindelijke oplossing in te voeren. De meeste modellen worden bij Zegveld getest bij een boerderij. Er moeten namelijk meerdere voordelen zijn om iets in te voeren, zodat het wat oplevert en dus aantrekkelijk is. Zo worden er verschillende kleine extra inkomsten toegevoegd aan het verdienmodel voor boeren, totdat ze helemaal over kunnen stappen op nieuwe modellen.

Zo beginnen ze bijvoorbeeld met visteelt in sloten om te laten zien dat er iets extra's bij kan. Dan kan er eens een veld worden gebruikt voor cranberry teelt, worden de mogelijkheden van lisdoddeteelt ook uitgelegd en worden zo stapje voor stapje nieuwe modellen ingevoerd.

Na de verschillende testen blijkt dat het onder water zetten van de grond zorgt voor meer methaan uitstoot, blijkt dat drainage bijna twee keer zoveel water kost en dat het optimum van het waterpeil 20 cm onder de grond ligt. Eigenlijk heeft elke oplossing voor en nadelen, maar is de informatievoorzienig erg eenzijdig. Zo is er nog weinig kennis van lisdoddeteelt. Dit komt vooral uit Duitsland, waar lisdodde ook geprezen werd als isolatiemateriaal. In de testen in Zegveld, bleek echter dat er veel bemesting

nodig was, dat er gaten ontstonden door het maaien en dat de stengels konden gaan rotten. Ook bleek de productie van isolatiemateriaal niet efficiënt te zijn en dat de isolerende werking niet erg goed was. Deze voordelen maar zeker ook de nadelen moeten open besproken kunnen worden om er iets aan te kunnen doen.

Oplossingen

Er is een aantal bestaande en momenteel gebruikte oplossingen dat Erik Jansen noemt:

- Natte teelten zoals lisdodde of cranberry
- Onderwaterdrainage → passief sturen van helling en bolling van de waterstand
- Drukdrainage → verdere ontwikkeling van OWD, maar nu actief sturen op waterstand

Ook benoemt Erik Jansen dat er veel koeien bij elkaar staan op de veengrond. Als het waterpeil hoger moet, zullen er ook minder koeien per grasland moeten staan. Ook de combinatie met een kleidek zal helpen om de grond iets te verstevigen. Ook kan het slootwater sowieso omhoog om passief het grondwaterpeil te sturen. Er moet ook een plan komen om het water efficiënt te gebruiken. Soms is er wel twee keer zoveel water nodig en daarvoor moet samen met de waterschappen besloten worden hoe dit aangepakt moet worden. Brak water gebruiken zou bijvoorbeeld ook goed zijn voor het veen, aangezien schoon water niet met prioriteit naar veen wordt geleid.

Een manier om de intensiteit van bodemgebruik door bijvoorbeeld heel veel vee op één veld te verminderen, is afwaardering. Als de grond minder waard wordt, kan er meer ruimte gebruikt worden en kan het vee beter verspreid worden over het gebied. Erik Jansen denkt namelijk wel dat er de komende tien jaar zeker nog wel melkveehouders in deze gebieden zullen blijven bestaan. Ideeën als natte teelten zijn niches die uiteindelijk als overgang gebruikt zouden moeten kunnen worden. Voor nu moeten eerst de slootpeilen omhoog en moet er meer variatie komen in het grondgebruik.

Sociale landschap

Er zijn veel sociale belangen in de discussie. Waterschappen hebben drinkwater als prioriteit, dan industrieën, dan irrigatie landbouw en dan pas ergens het vernatten van veen. Zij zullen veel moeten veranderen en dat is misschien wat eng. Ook boeren moeten veel veranderen, maar die hebben geen vertrouwen in de overheid. Ze zien de feiten die de overheid noemt als 'meningen' en voelen zich aangevallen. Zij zijn natuurlijk geen ondernemers en zijn daardoor niet scherp geweest op de voorbodes die dit voorspelden.

Erik Jansen benoemt ook dat veel oude routines zijn 'ingeroest'; zo worden sloten nog steeds geschoond, terwijl dit niet gunstig blijkt te zijn. Ook zijn de adviseurs per boerderij altijd ontzettend bevooroordeeld, waardoor boeren met veel dingen wegkomen. Deze adviseurs staan wel dicht bij de boeren, wat ze een goede ingang maakt voor veranderingen accepteren. In gesprekken laten onder andere boeren hun frustraties enorm gaan. Dat maakt gesprekken vaak lastig te controleren. Verder

benoemt Erik Jansen ook dat het onderwijs vast zit in oude principes, duurzaamheid en oplossingen voor bodemdalingreductie zouden meer onderwezen moeten worden.

Er zijn al meerdere gesprekken geweest voor oplossingen rondom bodemdaling in veengebieden, Erik Jansen noemt de volgende:

- Veenweidevisie Friesland
- Ontwerpend onderzoek NH, ZH, UT
- RIO Reflectief interactief ontwerpen (Uni Wageningen over drukdrainage)
- Het roer moet om

Mogelijkheden die Erik Jansen noemt:

- In Friesland melkveehouders bij elkaar zetten
- OWD voor en tegenstanders
- (On)afhankelijke adviseurs op boerderijen

Wie bepalen/beïnvloeden keuzes van boeren

C-2 Samenvatting interview Roel van Gerwen

10-06-20

Roel van Gerwen is zelf kennis leverancier, hij werkt bij een bedrijf dat vooral heel veel onderzoeken doet naar de mogelijkheden van veenweide. De belangrijkste drijfveer in veenweide is momenteel niet de bodemdaling (dat speelt vooral in stedelijke gebieden). Vooral het klimaatakkoord begint zich nu aan te dringen als reden om afbraak van veenweide tegen te gaan.

Klimaattafels

Er zijn daarvoor op allerlei gebied klimaattafels georganiseerd, waaronder de klimaattafel landbouw. Een sub-tafel hiervan is veenweide. Dit is gebaseerd op de eisen voor veenweide uit het klimaatakkoord (o.a. 1 Mton emissie reduceren voor 2030) en bestaat uit werkgroepen voor alle onderdelen hiervan. Zoek maar eens op wat het klimaatakkoord zegt over veenweide

Zo'n tafel bestaat uit een commissie met vertegenwoordigers van de lokale gemeente, provincie en het rijk die de regie voeren. Ook zitten hier vertegenwoordigers van landbouw, maatschappelijke organisaties, culturele organisaties zoals natuurmonumenten en Staatsbosbeheer.

Uiteindelijk zijn er lokaal allemaal gebiedsprocessen opgestart met verschillende partijen. Het 1 Mton doel is de sturing in dit proces en er zijn al veel bestaande gebieden verbeterd. Ook Urgenda heeft in het 50 punten plan een onderwerp over veenweide.

[Door het grondwaterpeil in veengebieden te verhogen en meer natuur te creëren kan het kabinet 0,2 Mton CO2 besparen voor eind 2020. De kabinetsplannen

voor 2030 om het waterpeil in veengebieden te verhogen kunnen deels versneld worden uitgevoerd. Groot bijkomend voordeel: op korte termijn ontstaat meer habitat voor vele diersoorten die ernstig teruglopen in aantal. Zo worden klimaat en natuurdoelen integraal aangepakt. Nederland telt zo'n 270.000 hectare veenweidegebied. Het grondwaterpeil wordt bijna overal kunstmatig verlaagd, voornamelijk om de landbouw te faciliteren. Het verlaagde peil veroorzaakt zo'n 7 Mton CO2 uitstoot per jaar – 4% van de totale Nederlandse uitstoot. De extra kosten worden voor de natuurgebieden geschat op € 10 per ton CO2-equivalenten. Door de helft al in 2020 te realiseren, scheelt dat zo'n 0,13 tot 0,26 Mton CO2-reductie voor eind 2020. De grootste winst zit in de provincies Friesland, Zuid-Holland, Noord-Holland en Drenthe.]

Alle emissies moeten omlaag, zoals CO2 en methaan. Maar ook stikstofuitstoot moet omlaag, ecosystemen moeten gezond worden en de kwaliteit van het water moet goed onderhouden worden. Want de effecten van vernatting hangen ook sterk samen met de kwaliteit van het water.

Kern van probleem: het verdampingsoverschot van 90 mm per maand in zomer wordt niet gecompenseerd in de rest van het jaar. Het waterpeil in de weilanden zelf zakt soms tot 1,20 m onder grond.

Volgens Roel van Gerwen zit er geen toekomst in onderwater drains, drukdrains met actieve sturing is beter. Ook ziet hij mogelijkheden in natte teelten, de CO2 wordt daarmee vastgelegd, alleen de methaan uitstoot wordt weer hoger. Momenteel wordt met verschillende universiteiten onderzoek gedaan naar de uitstoot van deze verschillende gassen en over hoe dat beter kan.

Nu het onderzoek echt loopt, blijkt geen een aanname eigenlijk volledig te kloppen, zo lijkt het erop dat je momenteel niet meer kan verdienen met natte teelten dan als veehouderij, wat wel aangenomen werd. Omdat alles nog in volle gang is, kan er daarom ook moeilijk voorspeld worden wat de beste oplossingen zouden zijn.

Toekomstvisie

Ideale toekomstsituatie volgens Roel van Gerwen: veenweidegebieden stoten geen broeikasgassen meer uit en er ontstaat een koolstofmarkt. Hier wordt vastgelegde CO2 verhandeld, wat zorgt voor een aanvullend inkomen voor boeren. Er ontstaat zo meer natuur en de boer verdient geld met duurzaam bodembeheer. De koolstofmarkt wordt gezien als volgt: als het doel is om 5% reductie in CO2 uitstoot in 2050 te behalen, dan is reductie de waarde waarmee je geld kan verdienen. Want het heeft waarde als het goedkoper gereduceerd kan worden dan in andere gebieden en daarmee zou je kunnen verdienen.

Dit heeft meerdere voordelen, zoals een betere kwaliteit van natuur. Nu is het een soort graswoestijn, met 1 type gras.

Onderlinge relaties en visies

Boeren zelf willen verder zoals ze gewend zijn, maar ze zullen toch een langzaam proces naar transitie moeten ondergaan van bulkproductie naar duurzame productie. Het is belangrijk om dit samen te doen, omdat elke boer een individu is en organisaties als LTO representeren niet alle boeren.

Hoe boeren dan betrekken? Dit kan via agrarische natuurverenigingen, subsidies voor boeren en bijvoorbeeld via loket dat subsidies aan boeren verleent, want zij hebben sterkere bindingen.

Het opzetten van het veenplan komt bij het LNV (Ministerie van Landbouw, Natuur en Voedselkwaliteit) vandaan. Zij bespraken werkgroepen en maakten daarmee een plan van aanpak voor het veenweidedossier.

Het begint dus met nationale sturing, die delegeren naar provincies, die weer naar gebieden, waardoor gebiedsprocessen op gang komen. Daarin is een ambtelijke stuurgroep, maatschappelijke partijen die actief zijn in het gebed betrokken.

De huidige oplossingen lijken nog niet genoeg om doelen te halen. Zo zijn OWD's niet genoeg en blijkt uit onderzoek de kwaliteit van het water ook heel belangrijk te zijn. Zo heb je bijvoorbeeld aeroob en anaeroob bodemleven en dit krijgt een kans tot groeien afhankelijk van het bodemwater. De groei van deze organismen zou je kunnen verstoren door brak water (licht zout water) te gebruiken. Hier kunnen de organismen namelijk niet tegen. Dit zou in Noord-Holland bijvoorbeeld van het IJsselmeer kunnen komen, daarmee zou het groeiende tekort aan water ook opgelost worden.

Dit levert alleen vaak problemen op met boeren, omdat koeien dat niet lekker vinden. Daarom durven waterschappen het ook nog niet aan, omdat die ook boeren vertegenwoordigen. Alles hiervan is gebaseerd op aannames, want echt onderzoeken is allemaal in volle gang.

Waar het VIC na afloop van onderzoeken geen toekomst in natte teelten ziet, ziet Landschap Noord-Holland daar nog wel iets in, al zijn de onderzoeken hier nog in volle gang. De schaal waarop LNH onderzoekt is vele mate groter dan dei van het VIC. Ook proberen ze er een algehele businesscase van te maken, als het zelf geen geld oplevert maar het bespaart heel veel uitstoot, zou daar nog steeds geld uit gehaald moeten kunnen worden. En dat is nog altijd veel goedkoper dan boeren uitkopen. Boeren zouden dan van veeteelt naar natte teelten over kunnen gaan, wat geld kost, maar dit kan gecompenseerd worden met een koolstofmarkt.

[Het Innovatie Programma Veen is geïnitieerd vanuit een gedeelde nieuwsgierigheid bij stakeholders in Laag Holland naar de vraag: kan veenbehoud in Laag Holland worden gerealiseerd door aanpassing van de huidige landbouwpraktijk? Het IPV is een landbouwpilot, waarin een 'nieuw multifunctioneel bedrijf onder natte omstandigheden' wordt ingericht dat wordt geëxploiteerd door een agrarisch ondernemer en is een lopende pilot van 2016-2021]

Natte veeteelt en natte teelten met 90% bodemdaling reductie als doel. Eerst voor de bodemdaling, nu vooral voor uitstoot verminderen. Zoek reportage hiervan op, komt ergens in juli uit.

C-3 Samenvatting interview Ron Janssen

12-06-20

Ron Janssen is een universitair hoofddocent aan de Vrije Universiteit Amsterdam (VU) en is expert in 'besliskunde' zoals hij het noemt. Zijn werk is het ondersteunen van het maken van beslissingen op het gebied van ruimtelijke ordening, waarvoor hij interactieve workshops doet waarin. In een dergelijke workshop, zitten mensen rondom een grote tablet die interactief is. Hij heeft lang met veenweide gerelateerde projecten gewerkt, maar vanuit kennis over planvorming en niet vanuit inhoudelijke expertise.

Veenweidevisie (Friesland)

Hij is betrokken geweest bij de totstandkoming van de veenweidevisies in onder andere Friesland en Bodegraven. Hiervoor is ook gebruik gemaakt van de interactieve workshop. Er waren meerdere kaarten van de relevante veenweidegebieden gemaakt waarin de deelnemers kunnen werken. Deze waren heel overzichtelijk, hadden telkens dezelfde legenda en uitstraling, en hielpen sterk bij de beeldvorming en het leerproces.
De rol van Ron Janssen was het begeleiden van het beslissingsproces hierin. In de workshop zaten betrokkenen samen met 2 hoogleraren en 2 experts om de tafel; in totaal waren er ongeveer 10 mensen aanwezig, meer past simpelweg niet om de tafel. De mensen hebben hier heel veel van geleerd. Niet zozeer van de aanwezige experts, maar vooral van elkaar.

Mocht het een online situatie moeten worden door de huidige omstandigheden, heeft Ron Janssen nu ook een aantal variaties gebruikt voor andere workshops. Zo heeft hij een goede ervaring met een participatiesessie met 30-50 mensen waarin input gegeven kan worden via een app op de telefoon.
Minder goede ervaringen zijn 8 mensen in een digitale discussie zoals via Skype te zetten. Zelfs mensen die 'professioneel' discussiëren, voeren niet de diepgaande discussie die ze gewoon zijn, omdat er toch een dimensie mist. Ook het praatje vooraf of achteraf mist.

Om mensen sterk betrokken te voelen in een dergelijke workshop, moet de discussie dicht naar huis gebracht worden. Een enorm gebied zal niet tot de verbeelding spreken, maar directe omgeving wel. Voor de veenweidevisie spraken ze daarom ook af bij boeren thuis of in stallen.

Ron Janssen heeft goede ervaringen met het van tevoren opstellen van scenario's, omdat mensen dan vanzelf al iets anders zien dan de huidige situatie (die ze vaak prima vinden namelijk). Zo kan je mensen aanzetten om te bedenken hoe het anders zou kunnen.

Toekomstvisie

Ook ziet Ron Janssen dat er extreem veel invloed is van boeren op deze gebieden. Het grootste deel van de waterschappen behartigt boerenbelangen en daardoor gaan belangen van andere partijen ten onder. Zij voelen over het algemeen nog steeds niet genoeg druk om echt iets te veranderen ('het zal mijn tijd wel duren'). Daarom houden ze oplossingen ook juist erg tegen. Ook de provincie geeft altijd de boeren gelijk.

Workshop bestond uit ideeën verzamelen ver van politieke belangen en conflicten, gewoon zoveel mogelijk ideeën in beeld brengen. Ze zijn het dan niet per se met elkaar eens, maar ze kunnen wel zoeken naar dingen die voor niemand slechter maakt. → Bodem 'ruilen' zodat elke partij de beste oplossing heeft. Zoals natte grond voor Grutto ruilen voor droge grond voor boeren. Maar in gebieden waar 'totale oorlog' heerst, is het heel lastig om tot iets te komen. Er is wel een deel bereidheid nodig.

Het ligt er heel erg aan waar je een project doet. In Friesland was het het geval dat het waterschap samenvalt met de provincie. Dit geeft een hele andere structuur dan in andere provincies, sinds er altijd veel boeren in de waterschappen zitten met bepaalde belangen. In Zuid-Holland is de structuur veel politieker gericht dan in andere provincies.

Het VIC zit vooral op de technische oplossingen. Ron Janssen verwacht niet dat techniek alles op gaat lossen. Hij vindt dat de gehele structuur aangepakt moet worden en dat de boeren weg moeten uit de veenweidegebieden, zodat het waterpeil omhoog kan. Boeren hebben heel erg veel macht, maar eigenlijk is hun belang niet heel groot. Dat is dus heel scheef en moet terug geschaald worden. Ook banken en politiek houden de boeren ook hoog, dus daar zit een sleutel naar een oplossing.

Veenweide is straks op. Dat zijn kosten die boeren niet kunnen dragen. Zie een artikel van Carton over plantvorming in Midden-Delfland.

Jos Verhoeven is goede om te benaderen

C-4 Samenvatting interview Edo Gies

23-06-20

Edo Gies is onderzoeker aan de WUR en doet hier environmental research over transities in landelijke gebieden. Landbouw is hier een van de grootste gebruikers, dit heeft dan ook veel impact op andere functies. Wat betekent dit voor het

ruimtegebruik? Hij bekijkt wat er mogelijk is met de locaties van vrijkomende agrarische bebouwing voor als een boer stopt.

Hij houdt zich bezig met landbouw en de relatie tussen melkveehouders en vraagstukken zoals stikstof en bodemdaling door veenweidegrond. Gerelateerd hieraan in het programma 'Groene cirkels' van 'Kaas en bodemdaling' en dan specifiek het project in Alblasserwaard. Verschillende stakeholders zijn hierbij betrokken, zoals melkfabriek de Graafstroom, provincie ZH, WUR, Rabobank etc. Hier worden maatregelen gezocht die bestendig zijn voor de toekomst.

3 doelen hierin:

- Bodemdaling reduceren
- Biodiversiteit verhogen
- Goed verdienmodel voor boeren

Vormgeven aan sturen met water

Bij het project 'Vormgeven aan sturen met water', zaten verschillende groepen mensen rondom de tafel, zoals boeren, gemeente, agrarische natuurvereniging, lokale cultuurhistorie en het waterschap. Dit speelde in de polder Teckop-Kockengen, want daar speelde nog niet zoveel, er waren geen actuele problemen, dus kon er open overlegd worden. Nu kon de ontwerpende aanpak goed getest worden, dit zou uiteindelijk ook toegepast moeten kunnen worden op probleemgebieden. In deze methode worden in een groep stakeholders agrarische bedrijfssystemen ontworpen, waarin productie, dierenwelzijn etc. mee wordt genomen. Het begint bij het stellen van doelen en het werkt toe naar geschikte oplossingen. Deze methode is gemaakt voor bedrijven, maar wordt dus nu hier gebruikt op gebiedsniveau; aangezien het een testcase is wordt het daarom eerst getest in een relatief rustig gebied zonder problemen. Het leek goed te werken, omdat boeren de ideeën niet direct hoeven uit te voeren. Daarom durven ze buiten de beperkingen te denken.

Er was wel spanning, bijvoorbeeld tussen de productiestakeholders zoals boeren en de mensen van natuurbeheer. Maar gelukkig waren de boeren vaak enthousiast, al was het waterpeil omhoog zetten minder enthousiast ontvangen. Bram Bos en Edo Gies leidden de sessies samen, om te zorgen dat de betrokkenen eerst doelen gingen verkennen en niet al meteen naar de oplossingen zouden gaan; de methode heet Reflexief, interactief ontwerpen (RIO). Doelen kwamen vanuit elke hoek wel; boeren willen verdienen en toekomst hebben, maar ergens voelen ze druk van de bodemdaling en bespreken ze daarin ook doelen.
Toen het waterschap uitlegde tegen welke beperkingen en problemen het opliep, kregen de boeren daar ook een beter beeld van en begrip voor. Ook werd de urgentie mooi blootgelegd met concrete voorbeelden die ook de boeren aanspraken. Zo bleek dat afkalven (de sloot oever die erodeert) nu al 5% van de boerengrond had gekost. Dit gaf de boeren een goede reden om hier wat aan te doen, want oppervlakte is geld. Andere belangen waren dat het waterbeheer voor de waterschappen steeds duurder wordt en dat de natuurvereniging meer

biodiversiteit en goede waterkwaliteit wilde, natuurhistorie wilde het karakteristieke landschap behouden.

Helaas heeft de sessie nog geen navolging gekregen (er is nog geen probleem, dus er hoeft niets 'opgelost' te worden).

Toekomstvisie

Edo Gies ziet een groot probleem in bodemdaling, broeikasgassen en waterbeheer; dit gaat veel geld kosten. Hij heeft één duidelijk punt: we moeten stoppen met het waterpeil verlagen. Ondertussen wordt de urgentie hiervoor ook landelijk, aangezien het ook is opgenomen in het klimaatakkoord. Eerst waren er ideeën om het peil helemaal omhoog te gooien en dan natte landbouw of natuur te creëren. Maar veenweide en het landschap worden zeer gewaardeerd, en Edo Gies hoopt ook een toekomst te behouden voor landbouw en melkveehouderijen. Hij ziet wel oplossingen in OWD's zodat het peil beheerd kan worden. Ook denkt hij dat de melkveehouderij minder intensief moet worden, maar dus wel behouden moet worden, omdat dat meer gewaardeerd wordt dan een moeras in het groene hart. Vooral in droge tijden moet er betere watertoevoer komen.

Hij heeft wat aanknopingspunten om met boeren in contact te komen:

- Boeren binnen groene cirkel vragen, zoals Ad van Rees (boer in veenweidegebied)
- Bert de Groot, van het waterschap hoogheemraadschap Stichtse Rijnlanden

C-5 Samenvatting interview Jos Verhoeven

26-06-20

Jos Verhoeven is een bioloog en hoogleraar landschapsecologie. Hij richt zich veelal op interacties tussen ecosystemen in het landschap, denk aan uitwisselingen van voedingstoffen en zaden van planten. Een voorbeeld van zo'n interactie is het effect van bemesten van landbouwgebieden waarmee niet alleen de gewassen harder groeien, maar ook planten in de natuur die via bijvoorbeeld grondwater in aanraking komen met deze voedingsstoffen. Hoe kan je dit verminderen? Bijvoorbeeld door het maaien van natuurgebieden of hydrologische oplossingen zoals het anders leiden van waterstromen.

Jos Verhoeven heeft voor zijn pensionering in 2014 ook gewerkt aan toepassingsgerichte projecten, zoals Kennis voor Klimaat (KvK) (met o.a. Ron Janssen van de VU) tussen 2009 en 2015/2016. Hij was de coördinator van op het programma 'ondiepe wateren en veenweidegebieden', waarin oplossingen gezocht moesten worden om deze gebieden klimaatproof te maken. Hiervoor werd, in direct contact met de gebruikers, gezocht naar adaptatiestrategieën voor de veenweidegrond en de ondiepe veenplassen.

Veenweidevisie

In de jaren na 2010 heeft de provincie Friesland een Veenweidevisie ontwikkeld. Het onderdeel van KvK geleid door Jos Verhoeven paste destijds goed in het traject van die provincie om deze visie naar de praktijk te vertalen. De kennis van het programma was een mooie ondersteuning en werkte stimulerend voor de veenweidevisie. In het KvK-project werden in drie verschillende gebieden scenario's van klimaatverandering en maatregelen om nadelige effecten te voorkomen geanalyseerd. De gebieden verschillen in dikte en gelaagdheid van de veenbodem. De analyses werden gedaan door boeren, betrokken waterschappen en de provincie met behulp van een grote touch table met kaarten.

Begonnen werd met een scenario 'we doen niets anders dan nu' (business as usual). Hierbij kwamen veel nadelen naar boven en deelnemers bedachten daarop soms wilde ideeën die meteen 'getest' konden worden op de touch table. Deze sessies werden vooral voorbereid en geleid door Ron Janssen, terwijl Jos Verhoeven vooral data aanleverde en resultaten hielp interpreteren. De andere rol van Jos Verhoeven was het begeleiden van een AIO die wetenschappelijk onderzoek deed naar de relatie tussen grondwaterstanden en de afbraak van veen, om zo de achtergronden achter de veenbodemdaling beter te begrijpen.

De mensen die deelnamen aan de sessies hadden eerder wel eens nagedacht over de toekomst en haar oplossingen op de veenweidegebieden. De meeste grondeigenaren vonden eigenlijk dat de provincie er wat aan moest doen. Tijdens deze sessie kwam er veelal een omslagpunt waarin deze mensen het inzicht kregen dat zij hier zelf ook actief in kunnen zijn. Dit was erg lastig, want de 'default' stand van mensen is altijd 'nee we willen niets veranderen' en 'we hebben al genoeg sessies gehad'.

De provincie had zelf al bijeenkomsten georganiseerd waarin zij de toekomstplannen gingen bespreken met ongeveer 100 boeren die aanwezig waren. Dat leidde vaak tot massale tegenstand en bracht niemand verder. Deze opzet met de kleinschalige scenario-analyses werkte veel beter en de betrokkenen konden veel vrijer denken.

De grootste uitdaging was om de boeren mee te krijgen in het proces. Hiervoor werden ze zo nauw mogelijk bij de discussies te betrekken. Zo werden de workshops meestal bij boeren thuis gehouden, wat een positief effect had, aangezien je echt een inkijkje kreeg in het boerenleven terwijl je nadacht over de toekomst ervan

Verder was Friesland in het KvK-programma een extra uitdaging ten opzichte van andere provincies zoals Noord- en Zuid-Holland. De polders in Friesland zijn nieuwer en de veenlagen zijn relatief dunner, dus de weilandpercelen konden breder gemaakt worden, waardoor de afstand tussen de sloten aanmerkelijk groter is. Hierdoor is het nodig om het grondwaterpeil op een nog lager peil te houden. In de andere provincies is er minder diepe ontwatering en zijn er meer kleinschalige afwisselingen tussen weilanden en natuurgebieden, waardoor er ook een betere, natuurlijke balans is. Als boer heb je dan al meer contact met andere

belanghebbenden zoals Natuurmonumenten. In Friesland liggen veel grote boerenbedrijven naast elkaar, terwijl de natuurgebieden eveneens groot en aaneengesloten zijn en een hoger waterpeil hebben. Er is daarom minder contact en gezamenlijk belang tussen agrariërs en natuurbeheerders.

In de sessie zijn weinig echte wrijvingen geweest, dit kan te maken hebben met het feit dat de mensen die meewerken aan een dergelijke sessie ook waarschijnlijk meer bereid zijn om mee te denken. Ook was de schaal klein en waren er veel verschillende belanghebbenden. Hierdoor kon er sowieso meer begrip voor elkaar opgebouwd worden. Ook was de insteek niet directe implementatie, maar opties en problemen bloot leggen, waardoor mensen niet direct tegen de borst gestoten werden, maar mee wilden denken.

Jos Verhoeven heeft ook met een Wageningse collega ORAS (Opties Regionale Adaptatie Strategieën) opgezet om alle kennis over veenweiden te ontsluiten en bijeen te brengen. Op de ORAS-website zijn verslagen van eerdere workshops te vinden samen met een overzicht van alle opties die tot nu toe zijn bedacht en getest.

Methode veenweidevisie

De methode die door de provincie gebruikt werd tijdens hun bijeenkomsten begon met een sessie waarin, samen met alle deelnemers, een factsheet werd gemaakt waarin alle feiten die bekend en belangrijk waren voor de deelnemers op 1 vel samen werden gebracht. Zo kwam er een duidelijk overzicht van de opgaven en had iedereen dezelfde basiskennis. Elke stakeholder heeft namelijk andere belangen, zo wil de landbouw zo gunstig mogelijke condities voor het boerenbedrijf, wil natuurbescherming de Natura 2000 gebieden behouden en willen culturele partijen misschien wel toerisme aantrekken.

Met de factsheets kregen de deelnemers een beknopt overzicht waarmee ze geïnformeerd werden over de problemen. Dit bracht iedereen naar de situatie waarin ze vrijuit konden discussiëren zonder zich meteen te committeren aan compromissen.

Om te beoordelen hoeveel er uiteindelijk is bereikt door deze bijeenkomsten, is het het beste om met de provincie of het waterschap te praten. Het belang van een duurzame toekomst voor het veenweidegebied is groot bij deze partijen en zij hebben ook veel in deze sessies geïnvesteerd.

Jos Schouwenaars zit bij waterschap Friesland, van oorsprong hydroloog. Hij heeft jaren bij dit waterschap gewerkt en heeft veel in gang geprobeerd te zetten. Hij heeft bijvoorbeeld alle bodemdaling sinds WOII in kaart gebracht. Hij heeft veel ervaring met deze gebiedsprocessen.

Toekomstvisie

Er zijn al heel veel rapporten, sessies en andere initiatieven geweest over het veenweidegebied. De onderhandelingen en gesprekken lijken vast te zitten en het is niet duidelijk of voorgaande resultaten daadwerkelijk iets hebben veranderd, er is namelijk nog vrijwel geen directe implementatie geweest van deze resultaten.

Uiteindelijk blijven de boeren eigenaar van de grond en die zullen pas bewogen worden door subsidies (belonen) of boetes (straffen) of een combinatie van beide. In de waterschappen zijn ook veel boeren betrokken, waardoor ze nog meer inspraak hebben, vanaf verschillende kanten. Dit kan goed zijn, maar het kan ook bepaalde processen tegenwerken.
Agrariërs zien vaak niet eens wat ze allemaal al 'krijgen', omdat lang niet alle kosten voor hun rekening zijn. Zo betaalt de provincie Friesland (met alle inwoners) mee aan het op peil houden van het waterpeil in de sloten bij weilanden. En hebben de waterschappen hele grote kostenposten aan waterkeringen, drainages en bemaling die voor de agrariërs nodig zijn. De agrariërs zelf hebben daardoor een onrealistisch beeld van hun inkomen in relatie tot de maatschappelijke en kosten en baten en blijven daardoor vaak vasthouden aan de bestaande situatie.

In de ideale toekomst zou Jos Verhoeven zien dat commerciële melkveehouderijen wegtrekken uit gebieden met dikke veenpakketten. Deze grond moet behouden worden door dan de waterpeilen hoog te zetten. Wellicht kan er nog wel een vorm van landbouw komen, zodat het landschap wel de vertrouwde culturele weilanden blijft houden. Dit landschap is namelijk wel heel populair en misschien kunnen met nieuwe initiatieven wel meer toeristen getrokken worden als nieuwe inkomstenbron. In andere gebieden zouden melkveehouderijen wel kunnen doorgaan.

In Nederland hebben wij de meest intensieve melkveehouderij van de wereld en dat kost ons ook heel veel. Het zou vooral ook belangrijk zijn om de gehele landbouw duurzamer te maken. Dit zou kunnen door CO_2 te beprijzen, zodat iedereen gemotiveerd wordt om de uitstoot omlaag te brengen. Belonen van ecosysteemdiensten is ook een manier om mensen te motiveren. Agrariërs kunnen dit dan aan hun verdienmodel toevoegen. Als boeren dan meer natuur-inclusief gaan werken, waarin biodiversiteit en het bodemleven versterkt wordt, levert dit heel veel meerwaarde op. Ook zouden boeren zelf moeten kunnen kiezen om verschillende verdienmodellen te kunnen combineren.

In toekomst ziet Jos Verhoeven ook nog wel gebeuren dat er voor de dikke veenpakketten op lange termijn energiegewassen verbouwd kunnen worden, zoals natte teelt. Dan ontwikkel je biomassa die ook echt duurzaam is. Een andere oplossing met potentie ziet hij in het vermarkten van weidevogels; boeren kunnen dan beloond worden als zij een hogere grondwaterstand aanhouden, zodat er meer weidevogels kunnen vestigen.

C-6 Samenvatting interview Ad van Rees

20-08-20

Ad van Rees is een boer in veenweidegebied en zit tevens in het bestuur van Deltamilk. Dit laatste is een bedrijf dat een zuivelfabriek beheert waar 177 melkveehouders bij zijn aangesloten. Als melkveehouder is Ad van Rees zich bewust

van de uitdagingen die door het klimaat worden gesteld. Hij heeft dan ook meerdere duurzame oplossingen geïmplementeerd in zijn boerderij, zoals zonnepanelen.

Bodemdaling kennis

Ad van Rees heeft veel kennis van de bodemdaling in Nederland (en dan vooral op veenweidegrond). Hij noemt hiervoor vier redenen:

- Kanteling tektonische platen
- Zetting
- Oxidatie veen
- Mineralisatie

De kanteling van tektonische platen is een reden van bodemdaling in het westen van Nederland die verder niets te maken heeft met veengrond. De breuk tussen twee tektonische platen ligt namelijk in de zee ten westen van Nederland en de plaat waar ons land op ligt, helt langzaam maar zeker steeds verder richting zee, waardoor de bodem zo'n centimeter per jaar lager komt te liggen.

Een andere reden van bodemdaling die Ad van Rees noemt, is zetting. Dit fenomeen zie je voornamelijk in stedelijke gebieden. Aangezien veen een natte en hele zachte grondsoort is, kan je het zien als het materiaal als van een spons. Wanneer je een steen op een spons legt, zakt deze in op die plek. Dat is wat er op grote en langzame schaal ook gebeurt bij steden en dorpen die op veengrond gebouwd zijn. De bebouwing vormt een zware belasting voor de grond en deze zakt hierdoor langzaam in. Dit is op sommige plekken in Nederland, vooral waar de grond uit puur veen bestaat, soms wel met ongeveer 2 cm per jaar. Op andere plekken, waar bijvoorbeeld ook nog wat klei in de grond zit, kan dit meer tussen de 3 en 5 mm zitten.

De laatste reden van bodemdaling die genoemd is, is de oxidatie van veen in de weilanden. Dit fenomeen is er een waar de boeren daadwerkelijk iets aan kunnen verbeteren. Door het droogleggen van de grond om het geschikt te maken voor vee, verteren de plantenresten (waar veen uit bestaat) verder, vertelt Ad van Rees. Door de aanraking met warmte en zuurstof, oxideert een groot deel van het veen, wat CO2 en methaan uitstoot. Het heeft ook goede aspecten, want hierdoor komen meer mineralen vrij, waardoor het gras beter kan groeien. Dit moet alleen niet te veel zijn, want dan heeft het juist een negatief effect.

Er is nog een extra effect dat bij kan dragen aan de bodemdaling, dat is mineralisatie. Stoffen komen door dit proces vrij uit de grond, waardoor er openingen achterblijven, waardoor de grond verder inzakt. Dit effect is alleen kleiner dat de andere drie.

Huidige ingrepen

Aangezien de bodemdaling door oxidatie actief verminderd kan worden en Ad van Rees hierin geïnteresseerd is, heeft hij drainage laten installeren in zijn weilanden. Met deze buizen kan het slootwater beter verdeeld worden onder de weilanden en blijft het grondwaterpeil hoger. Hierdoor kan er minder veen oxideren en remt de bodemdaling.

Een oplossing waar hij minder enthousiast over is, is het verhogen van het waterpeil in de sloten. Dit helpt heel beperkt voor een hoger waterpeil onder de weilanden. Het

slootwater komt namelijk maar ongeveer een meter het weiland in en heeft daardoor beperkte invloed op de natuurlijke holling en bolling van het grondwaterpeil. Ook is dit moeilijk te behalen in west Nederland en helpt het dus minder effectief dan de drainage.

Als we de klimaatdiscussie serieus willen nemen, zo stelt Ad van Rees, is het overwegen van natte teelten eigenlijk geen optie. Dit concept van het onder water zetten van alle veengrond en hier natte teelt zoals lisdodde en cranberry verbouwen, stopt dan wel de uitstoot van CO2, maar het verhoogt sterk de uitstoot van methaan, wat zelfs een zwaarder broeikasgas is dan CO2. Ook lachgas wordt geproduceerd met vernatting, wat net als methaan een zwaarder broeikas is dan CO2 (tot wel 300%). Sowieso meent hij dat er weinig markt is voor lisdodde en cranberry teelt, wat betekent dat het verdienmodel voor een boer niet aantrekkelijk genoeg is. De beste optie zou dan nog zijn om biomassa te kweken en dit als duurzame brandstof te verkopen, maar dat is ook niet heel erg aantrekkelijk.

Het is belangrijk om ons te realiseren dat het huidige systeem goed functioneert, daarom moeten we voorzichtig zijn met bepaalde maatregelen. Als we het grondwaterpeil erg hoog zetten, is er bijvoorbeeld minder ruimte voor wateropname bij regenbuien (vooral in de wintermaanden). Dit zou kunnen leiden tot wateroverlast bij de omgeving, als een soort badkuip die overstroomt en ergens het water kwijt moet. Over al deze effecten moet goed nagedacht worden als we zoeken naar geschikte oplossingen.

Veenweidevisie

Om een goed toekomstbeeld voor te stellen, kijkt Ad van Rees eerst eens naar het verleden. Hij vertelt dat er in Nederland al 800 jaar landbouw is geweest en dat de invulling hiervan erg wisselend is geweest. Zo is er akkerbouw geweest, maar dat bleek minder goed te werken dan graslanden voor vee. Ook hebben we vroeger veel aan turfwinning gedaan, waar veengrond werd uitgestoken, gedroogd in droogmakerijen en daarna als brandstof werd gebruikt. Ook zijn we in Nederland goed in waterbeheer, zo hebben we ook diepe polders gecreëerd die wel bijna 7 meter onder zeeniveau kunnen liggen.

Door deze historie is Ad van Rees ervan overtuigd dat veenweide ook in stand kan worden gehouden in de toekomst. Bijvoorbeeld met proeven waarin klei over het veen wordt gestrooid en doormiddel van drainage, kan de oxidatie van het veen drastisch verminderd worden.

In Nederland heerst momenteel veel droogte en draineren kan daardoor lastig zijn. Ad van Rees denkt dat een uitdaging gevonden kan worden in het zoeken van efficiëntere benutting van zoet water dat naar zee stroomt. Bijvoorbeeld het water van de Merwede zou standaard benut kunnen worden voor drainage in veenweide, zo blijft het peil stabieler en fluctueert het minder tussen zomer en winter.

Helaas zijn lang niet alle boeren op veenweidegrond bereid om oplossingen als drainage toe te passen in hun weides. Dit komt omdat de investering erg hoog is en

de terugwinning erg marginaal is. Het seizoen wordt wel iets langer van drainage, maar deze winst weegt niet op tegen de investering momenteel.
Als er echter een maatschappelijk belang komt kijken bij het terugdringen van CO2 uitstoot, zou er een maatschappelijke beloning kunnen komen voor boeren die investeren. Zo zou er bijvoorbeeld een systeem met CO2 credits gemaakt kunnen worden, waarin boeren hun investering echt iets waard zouden vinden. Een andere minder populaire en minder positieve aanpak zou de 'license to produce' zijn, dat is een systeem waarin een boerderij alleen mag produceren als het aan de juiste klimaatmaatregelen voldoet. Op die manier kunnen er eisen van een lage footprint gesteld worden aan de producten.

Ad van Rees ziet geen oplossing in het verminderen van de boerderijen in Nederland. Wereldwijd vermindert de vruchtbare grond gestaag. Daarom zou het niet wijs zijn om onze vruchtbare grond zelf niet meer te gebruiken. Als dit niet wordt gebruikt, komt er namelijk wel een bos, natuurgebied, woningwijk, zonneweide of industriegebied voor in de plaats en wordt de vruchtbaarheid helemaal niet meer gebruikt.

Wat beter zou zijn, is om de kringlopen kleiner te maken. Momenteel zijn wij het meest efficiënte land om bepaalde aardappelen te produceren, waardoor wij meer aardappelen produceren dan dat we in Nederland nodig hebben. Andere landen maken bijvoorbeeld vooral tomaten of andere producten. Deze worden in enorme kringlopen nu uitgewisseld, zodat elk product op de meest efficiënte manier wordt gemaakt. Ad van Rees ziet meer in kleinere kringlopen die binnen een land kunnen blijven. Dit is misschien net iets minder efficiënt waardoor er juist meer ruimte nodig is, maar levert wel een onafhankelijkheid op die hij liever zou zien.

Gebiedsprocessen

Ad van Rees is met regelmaat te vinden bij gebiedsprocessen waarin verschillende belanghebbenden om een tafel zitten. Hij is van mening dat dit goed is, omdat de analyse dan helder gemaakt kan worden voor veel mensen. Er ontstaat namelijk een zekere stress wanneer de term bodemdaling valt, zonder dat de achtergrondinformatie mee wordt gegeven. Het is goed om in dergelijke sessies aan te kaarten dat dit ontstaan is door het cultiveren van de grond, wat 800 jaar geleden begonnen is en om de verschillende redenen van bodemdaling uit te leggen.

Toch hebben mensen in een dergelijke sessie vaak een dubbele agenda, waardoor niet iedereen dezelfde oplossing beoogt. Daarom is het soms ook gewoon nodig dat er proefondervindelijk aangetoond wordt wat het beste werkt. In Zuid-Holland is nu bijvoorbeeld 22 miljoen euro vrijgemaakt om de bodemdaling in veenweidegebieden te stoppen/af te remmen.

Er zijn ook altijd wel mensen die voorstellen om alles onder water te zetten en er een moeras van te maken. Dit levert alleen weer hele andere problemen op, zoals de eerdergenoemde methaan uitstoot, maar ook een mindere financiële waarde voor woningen met uitzicht op weilanden die nu opeens in moeras veranderen. De

weilanden worden ook gewaardeerd qua uitzicht namelijk en een moeras levert een hele andere woonomgeving op.

Een gemixt model met een lappendeken van natuur, moeras, weiland en stedenbouw zou misschien nog wel een oplossing zijn, al is hier vroeger al voor gekozen en zou in stand houden waarschijnlijk beter werken. De weilanden trekken ook weidevogels en winterganzen aan, naast nog meerdere andere natuurlijke kwaliteiten. Daarom moeten we niet te makkelijk denken over het verminderen van het aantal veenweidegebieden.

C-7 Samenvatting interview Soet Huijbregts

03-09-20

Soet Huijbregts werkt voor het hoogheemraadschap Delfland en is een paar jaar geleden een beetje betrokken geweest bij de bodemdaling door veenoxidatie. Zij heeft namelijk deelgenomen aan het 'Deltaplan agrarisch waterbeheer'. Vanuit de waterschappen dacht zij mee aan oplossingen voor verschillende problemen omtrent water op boerderijen. Zo werd er gezocht naar een ecologisch verantwoorde manier om de sloten te baggeren rondom de landerijen. Verder werden er oplossingen voor verontreiniging van het oppervlaktewater gezocht in bijvoorbeeld herinrichtingen van het boerenerf. In plaats van dat er ideeën bedacht worden die gecheckt moeten worden met de regelgeving van het watersysteem, wilde Delfland in dit geval juist samen zoeken naar de juiste oplossingen, zodat er meteen de juiste randvoorwaarden in acht werden genomen.

In alle eerlijkheid is Soet Huijbregts misschien niet gespecialiseerd genoeg om alle vragen over veenweide vanuit het perspectief van de waterschappen te beantwoorden. Toch is er nog redelijk wat nieuwe informatie vergaard.

De rol van waterschappen

In de discussies en oplossingen voor veenweidegebieden in het gebied van Delfland, waar de veenweidegebieden vrij versnipperd liggen verspreid, zet het hoogheemraadschap een aantal randvoorwaarden neer. Zo zijn er bijvoorbeeld peilbesluiten die elke tien jaar worden vastgelegd om het waterpeil onder het veen en in de sloten eromheen zo hoog mogelijk te houden. Dit instrument kan gelden voor een gehele polder of voor alleen delen uit de polder. Zo worden lage en ongelijke gronden beter gereguleerd en worden er oplossingen bedacht voor hoogteverschillen zoals het peilvlak opdelen in kleinere vakken. Hierin worden allerlei afwegingen gemaakt, aangezien het onhandig is als het gebied te versnipperd raakt. Uiteindelijk moet alles namelijk toch op elkaar afgestemd worden.

Het belangrijkste voor de waterschappen is de vraag: 'wat betekent bodemdaling voor ons watersysteem?'. Het water dat zij beheren hoort bij de rivierdelta van de Rijn en de Nieuwe waterweg. Zij kijken naar wat bodemdaling betekent voor de boezemkeringen en de kades die het water in de rivieren houden. Soet Huijbregts

noemt ook het VIC meerdere malen als belangrijke speler; zij experimenteren met nieuwe oplossingen en zoeken uit hoe het systeem werkt en kijken hier dan samen met de waterschappen naar. Op die manier worden de nieuwe ideeën direct getest met het bestaande watersysteem en kunnen eventueel randvoorwaarden worden aangepast. Want waterschappen besturen niet, maar geven randvoorwaarden.

Oplossingen

Volgens Soet Huijbregts hoeft waterpeilverhoging onder het maaiveld niet per se water te kosten. Het ligt eraan welke gewassen erop komen te staan. Zij ziet hierin bijvoorbeeld ruimte voor meer cranberry teelt op nattere delen. Altijd zullen er droge periodes blijven, die opgevangen moeten worden met voldoende water toevoer. Soet Huijbregts is niet hierin gespecialiseerd en weet niet om hoeveel water het ongeveer gaat. Desondanks denkt ze dat extra water toevoer ook voordelen oplevert en dat de waterschappen er juist blij mee kunnen zijn om dit beter te reguleren. Zo kan er met het graven naar water ook meer ruimte ontstaan voor het opvangen van regenwater als berging voor later gebruik. Dat is iets wat belangrijk is voor de waterschappen.

Minder heil ziet zij in een oplossing waarin ook brak water gebruikt wordt voor de vernatting van het veen. Dit kan namelijk zorgen dat zoet water vermengd wordt met zout water en dat is niet gewenst. Het liefst is er zo min mogelijk uitwisseling tussen de verschillende watersystemen.

Helaas is Soet Huijbregts verder niet genoeg betrokken om andere oplossingen te kunnen evalueren. Ook is zij niet eerder bij gebiedsproces gesprekken geweest over de veenweidegebieden en kan dus weinig zeggen over de onderlinge relaties. Zij verwijst mij door naar het VIC en naar het UVW (unie van waterschappen, of naar hoogheemraadschap Rijnland.

Kantelpunt

Tenslotte benoemt Soet dat we in Nederland op een kantelpunt staan. Voor oplossingen moeten er nu dingen gebeuren, want anders is het veen lastig te redden en gaat het extreem veel geld en water kosten. Er zitten tradities en cultuur in de klassieke veenweiden, maar die lopen tegen de grenzen aan. Kunnen we nog iets behouden? Moeten we naar ander grondgebruik kijken zoals cranberry teelt? Alles moet in ieder geval in acht worden genomen, van koeien tot weidevogels en er zou naar een kringlooplandbouw gezocht moeten worden om het samen met de natuur in te richten.

C-8 Samenvatting interview Daan Henkens

10-09-20

Daan Henkens is beleidsadviseur bij de Unie van Waterschappen (UVW) en is altijd betrokken geweest bij bodem- en waterprojecten. Dit interview geeft hij op

persoonlijke titel, waardoor hij dus niet het standpunt van de unie uitdraagt. Hij is het aanspreekpunt voor bodemdaling issues, die nu een zetje hebben gekregen door de specifieke eisen in het klimaatakkoord. Hij houdt zich maar met een klein deel hiervan bezig. Bij de discussies rond CO2-reductie is hij niet heel nauw betrokken, hij kijkt vanuit de waterschappen vooral naar peilbeheer en de kosten en voordelen die bij bepaalde oplossingen komen kijken. Strategieën worden voornamelijk door het rijk en de provincies gevormd, de waterschappen moeten er vooral voor zorgen dat het watersysteem daarin past. Ook werkt hij aan een nieuwe versie van een position paper dat uit hoe de waterschappen in de discussie staan en wat de bijdragen kunnen zijn. Uiteindelijk moeten alle belangen bij elkaar gelegd worden om samen verder te komen.

Daan omschrijft zijn werk eigenlijk als het verlengde van zijn scriptie, dat hij ook over veenweide heeft geschreven. De invalshoek van zijn scriptie lijkt erg monetair te zijn, aangezien hij meerdere kosten-batenanalyses heeft uitgevoerd om meerdere scenario's te testen. In het interview legt hij echter uit dat hij juist ook naar persoonlijke motivaties en relaties heeft gekeken in zijn onderzoek, maar dat hij er cijfers aan had moeten hangen om dingen met elkaar te kunnen vergelijken. Hij geeft aan dat hij vindt dat door het kijken naar de kosten en baten, de emoties in een dergelijk onderzoek onderbelicht worden, waardoor op basis van de verkeerde dingen beslissingen worden genomen.

Een goed voorbeeld dat op een andere manier kijkt naar de veenweide discussie, is het project RE:PEAT. Dit project -geleid door een van zijn voormalige scriptiebegeleiders- heeft een serious game ontworpen over de besluitvorming in de veendiscussie. Zo wordt gesimuleerd hoe de bodem gestaag blijft dalen, zolang er veel gesprekken zijn maar er niets ondernomen wordt en krijgen deelnemers inzicht in elkaars belangen.

Rol van waterschappen

Anders dan Soet Huijbregts, denkt Daan Henkens niet dat het de rol van de waterschappen betreft om randvoorwaarden te stellen. Er ligt eerder een rol om te proberen te voldoen aan alle randvoorwaarden die de maatschappij stelt. De waterschappen proberen het watersysteem zo aan te passen dat alle belangen behartigd kunnen worden. Aangezien de waterschappen geen direct belang hebben bij reductie van bodemdaling, komen de oplossingen verder niet van de waterschappen. Daarom hebben de waterschappen een wat passievere rol -waarin ze natuurlijk wel kunnen meedenken- en kunnen ze alleen de grenzen van bepaalde plannen op praktisch gebied aangeven

Dit is misschien iets gechargeerd, om het verschil aan te geven tussen de nieuwere invalshoek en de 'ouderwetse' kijk van de waterschappen, waarbij de waterschappen leunen op een hele functionele rol. Die zie je nu alleen nog maar terug bij de conservatiefste flank in de politiek van de waterschappen. Inmiddels zijn waterschappen veel meer gericht op hun maatschappelijke verantwoordelijkheid. Zeker na de droge zomers de afgelopen jaren beginnen waterschappen duidelijker grenzen te trekken, niet alles kan meer technisch worden opgelost. En met onder

andere het ondertekenen van het klimaatakkoord trekken we ook een bredere verantwoordelijkheid naar ons toe. Waterschappen mogen best ver gaan in het inzichtelijk maken van de grenzen van het systeem en het oplossen van bredere vraagstukken, maar moeten wel altijd rolzuiver blijven. Dus geen verantwoordelijkheden naar je toe trekken die niet bij je taak als waterbeheerder passen.

Toekomst veenweide

Daan Henkens denkt dat er geen universele oplossing bestaat voor alle veenweide in Nederland. Hij is van mening dat er lokaal per gebied een oplossing gezocht moet worden en dat nationale inmenging daardoor niet de beste oplossing is. Zo zijn er plekken waar de polders al zo diep liggen, dat er al zout water omhoog komt dat zich mengt met het zoete water. Dit watersysteem is daardoor al niet meer zuiver en hier zou brak water zeker een oplossing kunnen zijn. Op andere plekken kan het zonde zijn om brak water te gebruiken omdat er sowieso zoet water genoeg is en omdat het zonde is om dit te mengen met zout water.

Op de vraag of er überhaupt ook een tekort aan zoet water dreigt te komen – zoals Ad van Rees aangaf in het interview- kan Daan niet direct een antwoord geven. Hij geeft aan dat bepaalde waterschappen, zoals Rijnland hier specifieke onderzoeken naar hebben gedaan. Wel geeft hij aan dat het vooral een uitdaging is om water vast te houden om te kunnen gebruiken in de droge periodes. Dit is nooit eerder het geval geweest en is daarom een nieuwe invalshoek die de waterschappen moeten aannemen: waar vroeger alleen water zo efficiënt mogelijk werd afgevoerd, moet er nu ook naar toevoer en berging gekeken worden. Daan denkt dat er wel genoeg water beschikbaar is -ook in de droge periodes- maar dat het zich niet altijd op het juiste moment op de juiste plek bevindt. De oplossing hiervoor moeten we verder zoeken dan het hermeanderen van rivieren dat nu ook al wel gebeurt. Een voorbeeld hiervan zou het vergroten van de sponswerking van de bodem, zowel in landbouwgebieden als in stedelijke gebieden, kunnen zijn.

**Belangrijk bij het lezen van onderstaande twee alinea's: dit is een manier om het gedachtegoed te prikkelen. Het is een persoonlijke opvatting van Daan en niet iets wat de UVW uitdraagt. Het staat hier heel zwart wit, terwijl dat in het echt veel genuanceerder ligt. **

Als we naar belanghebbenden kijken voor de veenweidegebieden, ziet Daan Henkens eigenlijk maar één bepalende actor: de boeren. Hij is van mening dat als deze er niet of minder waren geweest, dat er nooit tegenwerking was geweest tegen het waterpeil omhoog schalen en andere oplossingen. Dan werden de weides voor andere invullingen gebruikt, waardoor de bodem überhaupt niet zo hard was gezakt. Als we inderdaad zouden zoeken naar een nationaal gestuurde oplossing, ziet hij de meeste verbetering in het verminderen van het aantal en de intensiteit van de boerderijen op veenweidegrond.

Naast de boeren, zullen er ook specifieke locaties zijn waar bijvoorbeeld huiseigenaren of recreatiegebieden de bepalende belanghebbenden zijn, maar over het geheel genomen denkt hij dat dit de boeren zijn.

Gebiedsprocessen

Het algemene statement van Daan is dat de processen zo lokaal mogelijk moeten worden verbeterd. Alleen op die manier kunnen de meest specifieke en praktische oplossingen gevormd worden. Hij is zelf niet direct betrokken geweest bij lokale gebiedsprocessen, wel heeft hij bij de klimaatakkoord-overleggen (klimaattafels) gezeten. Ook heeft hij deelgenomen aan testrondes voor de serious game RE:PEAT, maar ook hier hield hij zich redelijk afzijdig, omdat hij geen persoonlijk belang had bij de discussie.

Zijn ervaring met mensen samenbrengen is dat sommige partijen een vertegenwoordiger sturen die daadwerkelijk mee wil denken voor een oplossing. Andere partijen hebben vertegenwoordigers die juist alleen maar hard blijven tegenwerken, waardoor sommige gesprekken zinloos worden. Daan Henkens omschrijft dit als 'meestribbelen': wel actief aanwezig zijn, maar alleen maar vragen blijven stellen over details die niet beantwoord kunnen worden, waardoor de tijd verloren gaat aan zinloze elementen.

Het is uiteindelijk echt een belangenspel waarin er geen universele oplossing bestaat. Helaas zien sommige partijen überhaupt geen belang in het stoppen van de bodemdaling, waardoor ze de motivatie niet voelen om er iets aan te doen. Een bijkomend nadeel is dat geld uiteindelijk een van de weinige dingen is die stiekem iedereen kunnen bewegen om iets te doen. Zo voelen de melkveehouders zich momenteel vooral nog slachtoffer en zullen ze minder doen dan wanneer er financiële voordelen te halen zijn, zoals een hogere melkprijs. Nu is er alleen nog niemand bereid om te betalen, ook niet voor het belasten of belonen voor CO2 uitstoot of reductie. Belonen vindt Daan zelf een beetje gek voelen, alsof je een pizzakoerier beloont om voor een rood stoplicht te stoppen, terwijl dit normaal zou moeten zijn. Hij hoopt dat er een manier wordt gevonden om CO2 op een aantrekkelijke manier te verhandelen. Maar daarvoor moeten nog heel veel dingen veranderen en duidelijk worden.

Tips voor samenbrengen mensen

Hoe lokaler hoe beter, dus zoek naar een proces voor een klein gebied. Dan zijn de belangen persoonlijker en daardoor hoger, waardoor er meer wrijving zal ontstaan. Daan denkt dat het het beste is om aan te sluiten in een proces dat al loopt, omdat er al veel gaande is. Iets nieuws opzetten levert misschien niet veel medewerking op. Ik zou via een waterschap hier verder in kunnen komen omdat de volgende waterschappen bij dit soort gesprekken betrokken zijn: Friesland, Hollands Noorderkwartier, Rijnland, Krimpenerwaard, HDSR.

C-9 Samenvatting interview Nanette Elfring

22-10-20

Nanette Elfring is project- en procesmanager bij APPM Management Consultants met als specialisatie erfgoed en gebiedsontwikkeling Ik benader haar omdat zij momenteel betrokken is bij een pilot Bodemdaling van het hoogheemraadschap van Rijnland. Voor haar is het werken met de agrarische sector en problematiek van veenweidegebieden nieuw, maar zij brengt haar expertise van integrale gebiedsprocessen met de publieke en private sector in, om in het gebied rondom de Kaag te kijken naar een toekomstbestendige oplossing voor de maatschappelijke opgaven in het veenweidegebied daar. Daarvoor moet inzichtelijk worden gemaakt hoe de boeren in dit gebied zelf tegen het spanningsveld aankijken die bodemdaling remmende maatregelen van nature hebben met agrarische bedrijfsvoering. Dat proces brengt zij op gang en voert zij uit. Inhoudelijk wordt ze hierbij ondersteund door experts van Rijnland.

Project de Kaag

Het veenweidegebied rondom de Kaag is een pilot die door het hoogheemraadschap van Rijnland is opgezet. De bedoeling is om kansen in beeld te krijgen die ondernemers, belangenorganisaties en overheden zien in dit gebied. LTO heeft ook meegeholpen om het project mogelijk te maken en om boeren te benaderen die graag iets toekomstgerichts willen doen.

Dit project zal ook een algemenere aanpak opleveren, omdat dit een veel breder probleem is. Ook kadaster is onder andere betrokken bij het project om meer data gericht naar de situatie te kijken. Er kan bijvoorbeeld gekeken worden naar verschillende functies voor gebieden met verschillende diktes van het veenpakket. Zo zou een dunne laag veen misschien al als verloren kunnen worden beschouwd, waardoor oplossingen overbodig zijn. Bij een dikke laag veen, zou je bijvoorbeeld een onderscheid kunnen maken tussen delen met landbouwkundig perspectief en zonder. Op basis daarvan zou de functie dan bepaald kunnen worden. Zeker voor gebieden zonder landbouwkundig perspectief zal er een flinke transformatie moeten plaatsvinden. Zo kunnen we denken aan andere gewassen, een verandering in vee samenstelling, waterberging, of zelfs het afkopen van de grond om bijvoorbeeld de natuur meer kans te geven. Dit is lastig voor ondernemers die daar verder geen kennis van hebben en die zich hieraan moeten aanpassen.

Dit zal vooral voor jonge boeren vooral interessant zijn, omdat zij nog een hele toekomst hebben. Ook voor oudere boeren die richting pensioen gaan, kunnen kansen liggen omdat het geld juist in de grond en in de machines zit. Hopelijk leidt dit tot een toekomstperspectief voor verglijkbare gebieden.

Om dit te bereiken is veel samenwerking en bereidheid tot samenwerking nodig. Aan de ene kant is die er al zeker wel, bijvoorbeeld bij LTO en jonge agrarische collectieven. Zij willen graag betrokken worden en niet degene zijn bij wie het

gedumpt wordt. Vragen als 'van wie is dit probleem?' en 'wie gaat het betalen?' zijn dingen die ook uitgezocht moeten worden. De economische belangen zijn namelijk groot en daardoor zijn de risico's die meekomen ook groot.

Omstandigheden voor een goed gesprek

Om te beginnen hangen goede omstandigheden af van de situatie; is het één op één of is het een sessie met een groep? Maar voor de basis van een gesprek zijn er in ieder geval bepaalde waarden nodig. Hiervan zijn er een aantal opgesomd:

- Vertrouwen opbouwen
- Relatie opbouwen
- Nakomen van afspraken
- Transparantie over het proces
- Geef duidelijke kaders aan
- Geef aan wat het doel is van de sessie en naar welke informatie je zoekt
- Geef aan hoe en door wie de beslissingen genomen worden
- Geef aan of er nog iets aan veranderd kan worden daarna
- Onderscheid input vanuit expertise of belang van een mening (vaak vanuit emoties)
- Er moet wel ruimte zijn voor emoties tot op zekere hoogte
- LSD (luisteren, samenvatten, doorvragen) en ANNA (altijd navragen, nooit aannemen)
- Eerlijk zijn
- Neem iedereen serieus

Het gesprek/ workshop zal waarschijnlijk online plaatsvinden en daarin is heel veel mogelijk. Je kan digitaal heel veel doen, het hangt wel van de aard van de bijeenkomst. Nanette vertelt bijvoorbeeld over ervaringen van mensen om haar heen. De ene vertelt dat het lastig is om online echt ruzie te maken, maar een ander vertelt dat mensen zich wel vrijer voelen om zich te uiten, dus dat er juist meer uit komt. Om ruzie op te lossen heeft het dan wel weer een goed effect. Wat in haar ervaring wel erg lastig is, is om een vertrouwensrelatie op te bouwen. Zij doet dit in ieder geval graag nog fysiek.

Toekomst veenweidegebieden

Aangezien Nanette niet eerder een project over veenweidegebieden heeft gedaan, heeft ze niet per se een sterke mening over hoe de toekomst eruit zou moeten zien. Oplossingen hangen volgens haar ook heel erg van de ondernemer af, het moet bij elkaar passen. Als een gebied bijvoorbeeld geschikt is voor recreatie, betekent dat niet dat de ondernemer daar ook echt behoefte aan heeft. Er zou eigenlijk een soort toolbox moeten komen met meerdere kansrijke opties in dat gebied, zodat er met de ondernemers samen gekeken kan worden wat het beste past.

Mijn project

Als laatste bespraken wij de mogelijkheden die ik eventueel kon gebruiken voor mijn project. Aangezien mijn scriptie zich onderzoekend ontwikkelt, waren er wellicht

ideeën die ik kon gebruiken voor mijn onderzoek. Nanette gaf bijvoorbeeld aan dat het zou leuk zijn om mensen in elkaars schoenen te plaatsen en om elkaar te stimuleren om naar elkaars perspectief te kijken. En als de deelnemers ook echt een persoonlijk belang hebben, komt er nog meer los. Ook zou ik kunnen kijken of mensen ook er zelf iets aan hebben als ze met jouw onderzoek meedoen. Of als ik een socialer model wil testen, zou dat ook algemener kunnen zijn en hoeven het bij wijze van spreken niet eens betrokkenen te zijn in de veenweide kwestie.

C-10 Samenvatting interview Marieke Desmense

13-11-20

Marieke Desmense is omgevingsmanager bij het waterschap van Rijnland. Zij is de verbinding tussen de projecten en de buitenwereld (zowel binnen Rijnland, als bewoners en gebruikers van gebieden waarmee ze aan de slag gaan). Voor het watergebiedsplan, waarin ze kijken naar het functioneren van het watersysteem in een polder, werkt ze al vrij lang. Daarin kijken ze niet naar achterstallig onderhoud, maar meer naar 'wanneer is een polder een goede polder', hoe is de waterkwaliteit etc.

Naast de rol van omgevingsmanager, is zij strategisch adviseur van het bestuur om te bepalen hoe Rijnland positie gaat innemen tegenover bodemdaling.

Ervaring met gesprekken

Het peilbesluit is eigenlijk de basis van de meeste gesprekken. Dit is een wettelijke opgave en het houdt een voornamelijk een grote belangenafweging in. Er zijn altijd zeer verschillende belangen die aan het licht komen en die moeten in beeld gebracht worden. Er spelen ook steeds meer ongrijpbare belangen mee zoals CO2 uitstoot en natuurbeheer. Daarom is het goed om ook onderling begrip te hebben voor de verschillende belangen, want uiteindelijk moet alles afgewogen worden om een keuze te maken voor het peilbesluit.

Deze gesprekken zijn vaak ingericht als een inloopavond waar betrokkenen met ideeën kunnen komen en waar ze ook op elkaar kunnen reageren. Vaak zitten er vaak veel belangen ook in de zaal en anders pakt Rijnland bepaalde belangen op. Met een onderwerp als bodemdaling zie je binnen bepaalde groepen al grote verschillen. Zo zijn er onder de veehouders mensen die er heel veel mee hebben en die graag ruimte geven aan bijvoorbeeld weidevogels op hun land, terwijl er ook veehouders zijn die alleen zoeken naar het maximaliseren van hun opbrengst. Dus zo is het heel lastig om groepen over één kam te scheren. Zo is dat ook per gebied en per cultuur weer verschillend: wat zijn ze eigenlijk al gewend?

In deze gesprekken wordt de input uiteindelijk meegegeven aan Rijnland om er iets mee te doen. Als er ondanks alle moeite om frustraties te voorkomen toch boosheid ontstaat, ziet Marieke vooral vaak dat deze frustraties op Rijnland gericht zijn. Ergens

is dat wel fijn voor de stakeholders, omdat ze dan samen onderling nog wel door één deur kunnen. Deze frustraties ontstaan vaak vooral als er grote dingen veranderen.

Wat Rijnland zelf ook merkt is dat niet iedereen echt wil meedenken. Je hebt soms juist wel groepen die er onderling uit denken te komen, maar die dan voorbijgaan aan de belangen van Rijnland of aan algemene maatschappelijke belangen. Ook de belangen van mensen binnen Rijnland zelf verschillen, door politieke invalshoeken.

Projecten en gesprekken

Marieke geeft aan dat projecten in zekere zin wel dezelfde opbouw hebben. Zo beginnen ze altijd met een knelpuntenanalyse om erachter te komen hoe de huidige situatie eruitziet en wat er wel en niet klopt. Daarna wordt deze analyse dan getoetst in de omgeving en dan wordt er een overzicht gemaakt van de overeenkomsten om als definitief mee te nemen. Ook wordt er een overzicht gemaakt van de onderdelen waar nog geen consensus over bestaat, zodat hier opnieuw naar gekeken kan worden. Met een aantal varianten en knelpunten hierop gaan ze dan weer terug om bij een inloopavond deze te toetsen. Ook worden er nog wat aparte gesprekken gehouden met specifieke stakeholders die uit een stakeholderanalyse kwamen met een groot belang, zodat deze stem ook goed gehoord wordt. Op een paar uitzonderingen na, worden alle gesprekken ongeveer zo uitgevoerd.

En qua groepen mensen die aanwezig zijn bij dit soort gesprekken, ziet ze wel een terugkerend patroon. Zo zijn er vaak agrariërs die door hun grote oppervlak een groot belang hebben. Ook zitten er vaak boomkwekers, natuurverenigingen, huiseigenaren en agrarische natuurverenigingen. Ook de gemeenten worden altijd benaderd, maar deze zijn niet altijd aanwezig. Wie er daadwerkelijk aanwezig zijn, dat is elke keer heel erg verschillend en niet te voorspellen.

Het belangrijkste voor een goed gesprek, is om van tevoren te weten met wie je te maken hebt en wie er betrokken zijn. De voorbereiding is in dit geval heel belangrijk, ook om te weten hoe de historie eruitziet, om de reactie van stakeholders beter te kunnen inschatten en begrijpen. Ook is het goed om te weten of er al andere initiatieven spelen waar je op kunt inhaken.

Toekomst veenweide

Marieke geeft aan dat er uiteindelijk niet heel veel oplossingen zijn om de bodemdaling echt tegen te gaan. Uiteindelijk moet gewoon het peil omhoog en daar zijn maar een paar manieren voor bedacht nu. Verder gaat het vooral om de veranderingen daaromheen, dus aanpassingen die voornamelijk veehouders zullen compenseren voor het verhogen van het peil. Hierin gaan ze nu een pilot starten bij Rijnland, om erachter te komen welke oplossingen goede compensatie zijn voor de boeren. Deze mensen zijn enorm gehecht aan hun eigen bedrijf (dat vaak al doorgegeven is van generatie op generatie), waardoor de grond een grote emotionele waarde heeft. Daarin heb je verschillende categorieën boeren, oudere boeren zonder opvolging die geen moeite meer willen steken in oplossingen. En daar

tegenover heb je juist de jonge boeren die nog een hele toekomst voor zich hebben. Zij zijn vaak wel bereid om mee te denken over oplossingen. En daarom is het ook goed om mee te denken met de boeren, omdat zij ook heel weinig inkomen hebben.

Appendix D – Overview analysis interviews

Out of each interview, problems, goals and solutions in the case of peat meadow areas in the Netherlands were taken. These are all ordered and shown in the following tables. Here, the legend is shown to understand the colours throughout the tables.

Legenda kleuren
Grond overbelast, minder intensieve belasting nodig
Onderwijs is verouderd, principes in duurzaamheid en bodemdalingreductie moeten ook onderwezen worden
Drukdrainage is oplossing om bodemdaling tegen te gaan
Natte teelten gebruiken als oplossing tegen bodemdaling
Watersysteem moet hoge kwaliteit hebben en water moet efficient benut worden
Er moet een CO2 markt komen, zodat er geld verdiend kan worden met bodemdalingreductie
Bodemdaling tegengaan door boeren te laten wegtrekken uit veengebieden
Geld als motivatie voor bodemdalingreductie, subsidies voor oplossingen of boetes voor niets doen
Waterpeil is te laag, waardoor oxidatie ontstaat, waterpeil moet omhoog
Boeren vormen onbeweegbaar front, het front moet kleiner, minder invloedrijk en enthousiaster worden
Urgentie voor verandering moet blootgelegd worden door confrontatie met gevolgen

D-1 Table of problems

Problemen			
Technisch	Economisch	Grondgebruik	Sociaal
- Nutteloos om vaak sloten te schonen	- Natte teelten lijken niet genoeg op te leveren - Ook fosfor en stikstof moeten omlaag, veel tegelijk	- Biodiversiteit in veengebieden is laag - Onder water zetten veen zorgt voor methaan uitstoot	- Mensen laten hun frustraties vaak gaan - Oude routines vastgeroest ook in onderwijs - Veel verschillende culturen - Informatievoorziening is erg eenzijdig - Veranderen is eng
- Vernatting verslechtert waterkwaliteit	- Oplossingen kosten veel geld	- Ecosystemen zijn niet heel gezond	- Klimaatakkoord eist minder veenoxidatie
- Verdampingsoverschot van de zomer wordt niet gecompenseerd			- Boeren zijn niet bereid naar iedereen te luisteren
			- Waterschappen behartigen vaak belangen van boeren
			- Lastig om belanghebbenden betrokken te laten voelen - Problemen lastig te verbeelden - Boeren hebben in veel partijen invloed en houden vanuit verschillende kanten oplossingen tegen - Per provincie en gebied liggen de verhoudingen anders
	- Oplossingen gaan veel geld kosten		- Weinig onderling begrip
			- Weinig gevoel van urgentie om te veranderen
			- Gesprek heeft niet tot actie geleid omdat er geen directe problemen waren

- In Friesland bredere weilanden, waardoor grondwater extremer daalt	- Hoe moet het geld besteed worden? - Agrariërs beseffen niet dat ze niet voor alles betalen - Boeren bewegen vaak alleen voor geld	- Er zijn gebieden met dik veen, dun veen en veen met klei, hierdoor is een universele oplossing lastig	- Weinig gevoel van urgentie om te veranderen - 'Taak van provincie om te veranderen' - Standaard houding is: 'we willen niets veranderen' en 'we hebben al genoeg sessies gehad' - Grote groep boeren bij elkaar vormt sterk en tegenwerkend front - Elke belanghebbende ziet andere problemen
- Bodemdaling door oxidatie veen	- Weinig markt voor natte teelten	- Natte teelt verhoogt methaan uitstoot	- Niet genoeg kennis over bodemdaling
- Bodemdaling door zetting	- Drainage kost vooral heel veel geld voor boeren	- Meer water nodig door meer droogte	- Belanghebbenden hebben vaak dubbele agenda
- Bodemdaling door kanteling tektonische platen	- Uitzicht op moeras is slecht voor waarde woningen		
- Slootwater omhoog is minder effectief dan drainage en lastig			
- Watersysteem moet niet te versnipperd raken - Door brak water kan de waterkwaliteit achteruit gaan			- Waterschappen geven normaal alleen randvoorwaarden
	- Alleen geld kan mensen motiveren		- Emoties in discussies onderbelicht
			- Geen universele oplossing mogelijk
			- Zonder boeren geen tegenwerking van plannen
			- Er zijn altijd mensen die 'meestribbelen'
			- Meerdere partijen hebben geen motivatie om te veranderen

D-2 Table of goals

Doelstellingen			
Technisch	Economisch	Grondgebruik	Sociaal
- Techniek als systeeminnovatie invoeren - Optimum waterpeil is 20 cm onder de grond	- Meerdere voordelen om techniek in te voeren - Extra verdienmodellen toevoegen om melkvee houden anders in te delen	- Biodiversiteit verhogen	- 1 Mton minder CO2 uitstoot in 2030 - Meer informatie verschaffen
- Waterkwaliteit moet omhoog	- Er moet economisch voordeel te halen zijn uit oplossingen	- Ecosystemen moeten gezond worden	- Doelstellingen klimaatakkoord moeten gehaald worden
	- Algehele businesscase van oplossing maken		
			- Discussie dicht bij huis houden - Problemen en mogelijkheden in beeld brengen - Open mindset creëren - Invloed en macht boeren moet omlaag
- Bodemdaling reduceren	- Goed verdienmodel voor boeren creëren	- Biodiversiteit verhogen	- Urgentie blootleggen
	- Tot een compleet agrarisch bedrijfssysteem komen	- Behoud boerderijen	- Doelstellingen klimaatakkoord moeten gehaald worden

- Gehele landbouw verduurzamen	- Economische motivatie creëren voor boeren	- In Friesland net als andere provincies meer balans creëren met afwisselende natuur	- Urgentie blootleggen - Inzicht geven in mogelijkheden van persoonlijke veranderingen - Belanghebbenden meer verdelen, zodat boeren minder een front kunnen vormen - Uitdagingen op een rijtje zetten
- Bodemdaling door oxidatie reduceren	- Natte teelten economisch aantrekkelijk maken	- Zoet water beter benutten	
	- Drainage economisch aantrekkelijk maken		
- Watersysteem blijven reguleren			- Kennis waterschappen gebruiken
- Bodemdaling reduceren			- Lokale oplossingen zoeken
- Water vast houden voor droge periodes			
- Toevoer en berging van water reguleren			

D-3 Table of solutions

Oplossingen			
Technisch	Economisch	Grondgebruik	Sociaal
- Slootwater omhoog - Onderwaterdrains - Drukdrainage - Brak water is goed voor veen	- Visteelt in sloten - Afwaardering grond, waardoor variatie mogelijk wordt en vee verspreid kan worden	- Minder koeien bij elkaar - Cranberry en lisdodde teelt - Meer variatie in grondgebruik	- Onderwijs in nieuwe principes - Meer onderzoeken doen om kennis te verzamelen - Vertrouwde personen gebruiken om verandering te starten
- Drukdrainage	- Natte teelten		- Nationale sturing naar provincies naar gebieden
- Brak water om organismen te stoppen	- CO2 markt	- Boeren uitkopen	
	- Subsidies voor boeren via loket		
- Waterpeil omhoog		- Bodem ruilen, om beste oplossing voor beste plek te hebben - Boeren weg uit veenweidegebieden	- Directe omgeving bespreken - Bij belanghebbenden thuis zitten - Scenario's en kaarten gebruiken voor verbeelding - Minder boerenbelangen meewegen vanuit politiek en banken
- Stop waterpeil verlagen			- Niet direct over persoonlijk gebied praten, maar over algemene case om conflicten uit te stellen
- Onderwaterdrains/ drukdrainage		- Melkveehouderij minder intensief	- Reflexief interactief ontwerpen gebruiken (doelen stellen en oplossingen bedenken)
- Betere watertoevoer			- Concrete voorbeelden van (economische) urgentie noemen om motivatie te creëren
			- Onafhankelijke sessieleiders

- Waterpeil omhoog	- Boetes voor niet reduceren bodemdaling - Subsidies voor maatregelen reductie bodemdaling - Meer toeristen trekken als inkomstenbron - CO2 beprijzen - Belonen ecosysteemdiensten - Vermarkten van weidevogels	- Voorbeeld van 3 grondtypes gebruiken en zoeken naar passende oplossingen - Commerciële melkveehouderijen weg uit veenweidegebieden met dik veen - Andere vorm van landbouw - Bij dik veen biomassa creëren van bijvoorbeeld natte teelt - In Friesland net als andere provincies meer balans creëren met afwisselende natuur	- Fysieke tool gebruiken zoals touch table met kaarten van gebied - 'We doen niets anders dan nu'-scenario schetsen voor motivatie - Belanghebbenden meer verdelen, zodat boeren minder een front kunnen vormen - Meer contact met andere belanghebbenden door afwisselender landschap - Factsheet samenstellen met alle belanghebbenden samen als basis
- Drukdrainage	- CO2 credits om investeringen terug te winnen	- Biomassa creëren van natte teelt	- Gebiedsprocessen voor kennis en analyse situatie
- Waterpeil omhoog	- License to produce	- Water uit rivieren doorsturen naar drainage voor stabieler waterpeil	
- Klei inbrengen in veen		- Kringlopen kleiner maken, meer variatie in teelt	
		- Gemixt model met lappendeken van grondgebruiken	
		- Natte teelten - Ruimte voor waterberging in natte periodes creëren - Kringlooplandbouw, samen met natuur inrichten	- Waterschappen direct betrekken in oplossingen
- Diepe polders kunnen met brak water werken	- CO2 verhandelen	- Minder boerderijen op veenweidegebied	- Tool zoals re:peat, een serious game gebruiken
- Hermeanderen rivieren		- Minder intensieve landbouw	
- Waterpeil omhoog			

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Appendix E – 22 reasons why collaborations fail

The complete list of 22 factors that influence collaboration by Porter & Birdi (2018).

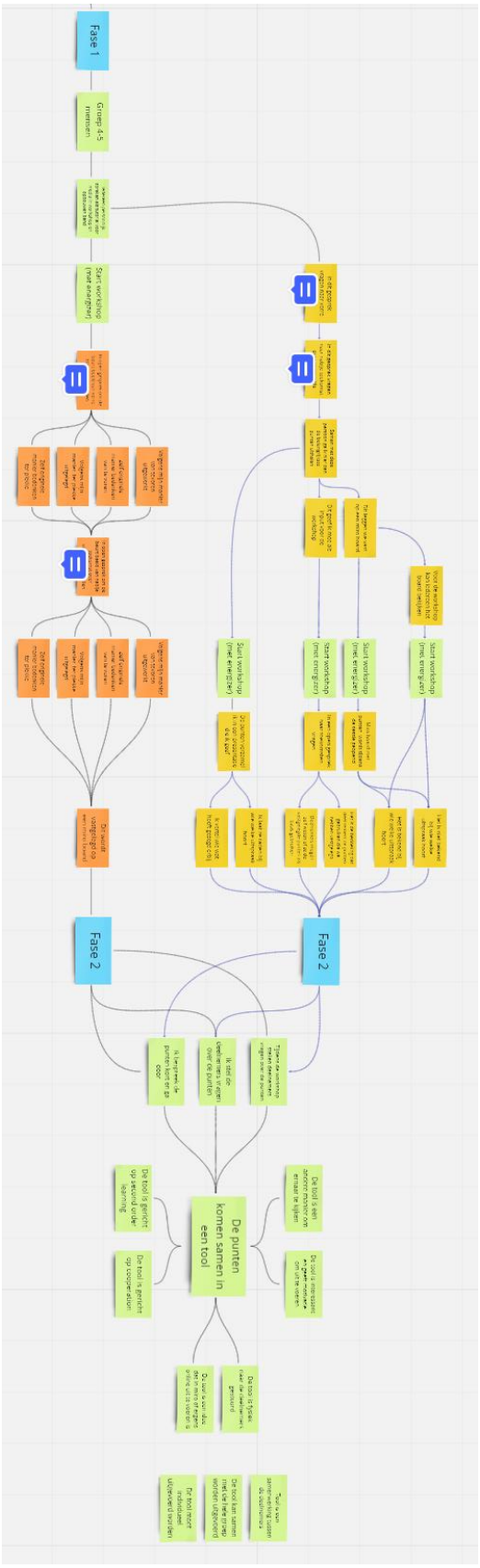
1. Stakeholders have the capacity to enact change
2. Clear roles and responsibilities
3. **Acceptance of different social values, norms and cultures**
4. A strong or clear vision
5. **Participation is open to all stakeholders**
6. Funding
7. **Trust**
8. An effective coordinator or bridging organisation
9. Strong leadership
10. Low risk or high willingness to experiment
11. Sensitivity to power imbalances
12. Introduction of new government legislation, regulation or policies
13. **Activities are bounded by a small geographical area**
14. Sustained participation
15. Clear methods for evaluating and measuring outcomes
16. Adequate time to plan and execute actions
17. **Effective communication, data sharing**
18. Clear and accessible scientific information
19. Low costs or investment required
20. Low or medium levels of conflict
21. **All actors are fully committed**
22. Clear decision and process rules

Appendix F – Intermediate steps of iterations

Iteration between collaboration requirements and focus points in the process of choosing a tool.

Appendix G – First ideas of the workshop

Overview of the complete flowchart



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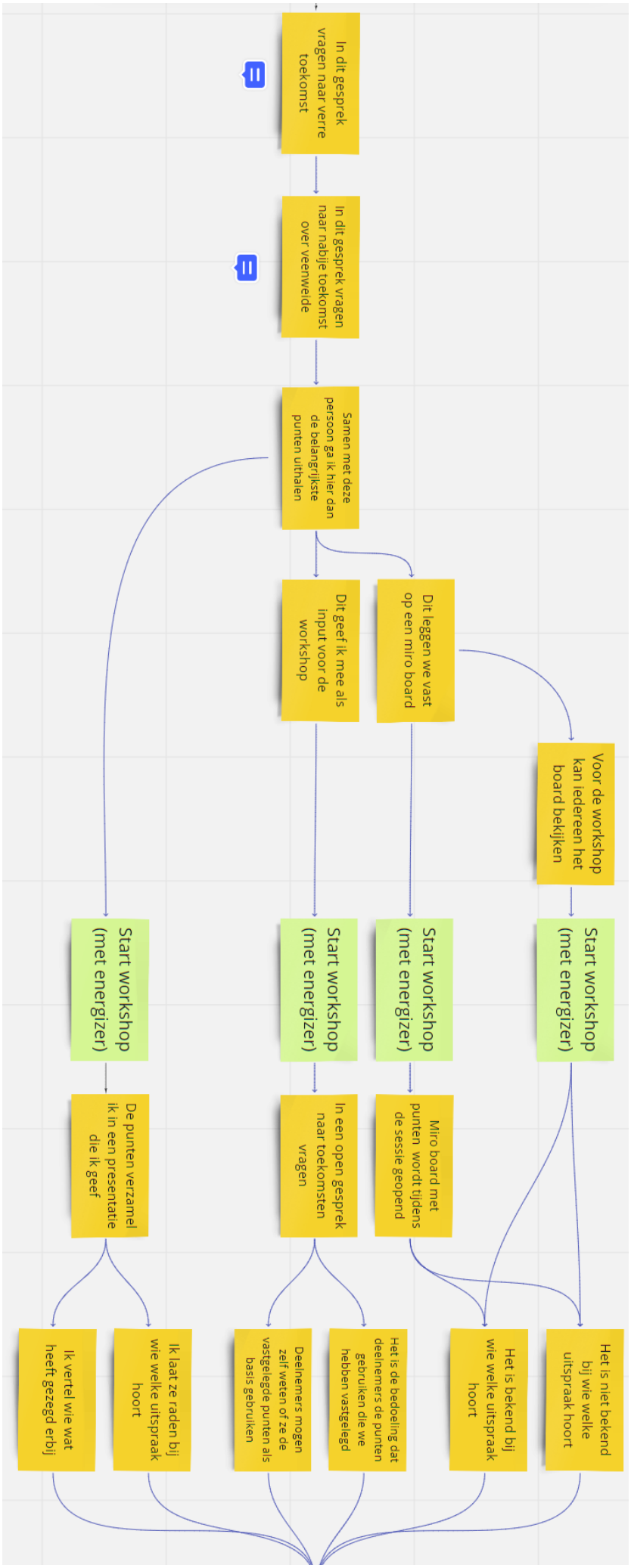

Part 1 of the flowchart

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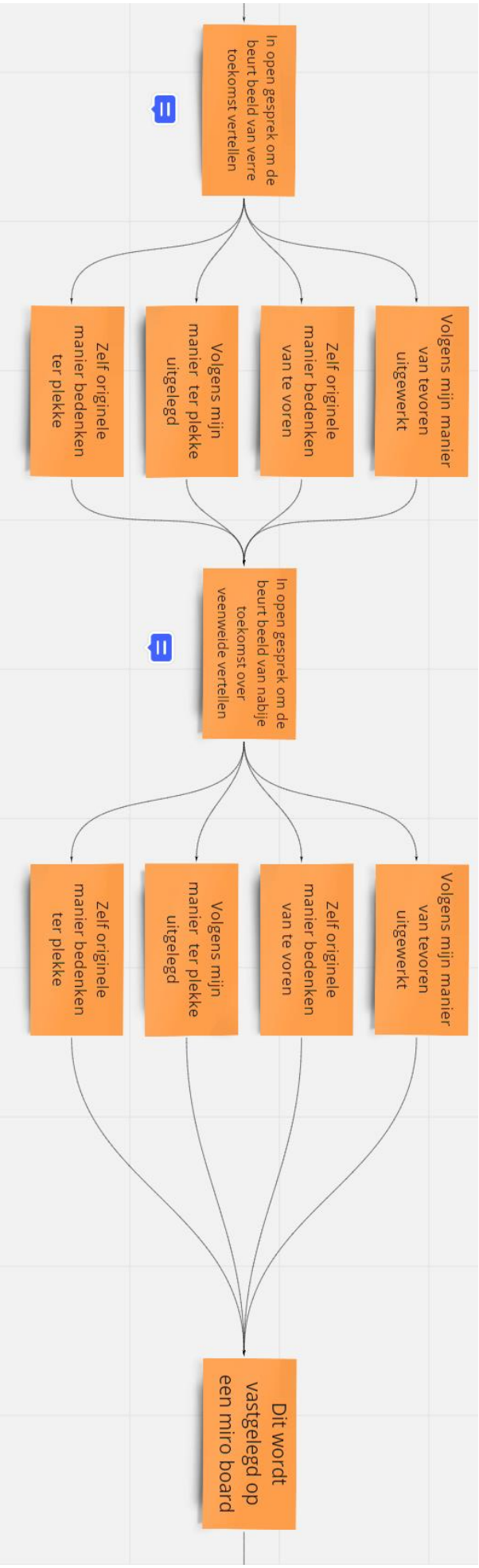

Part 2 of the flowchart

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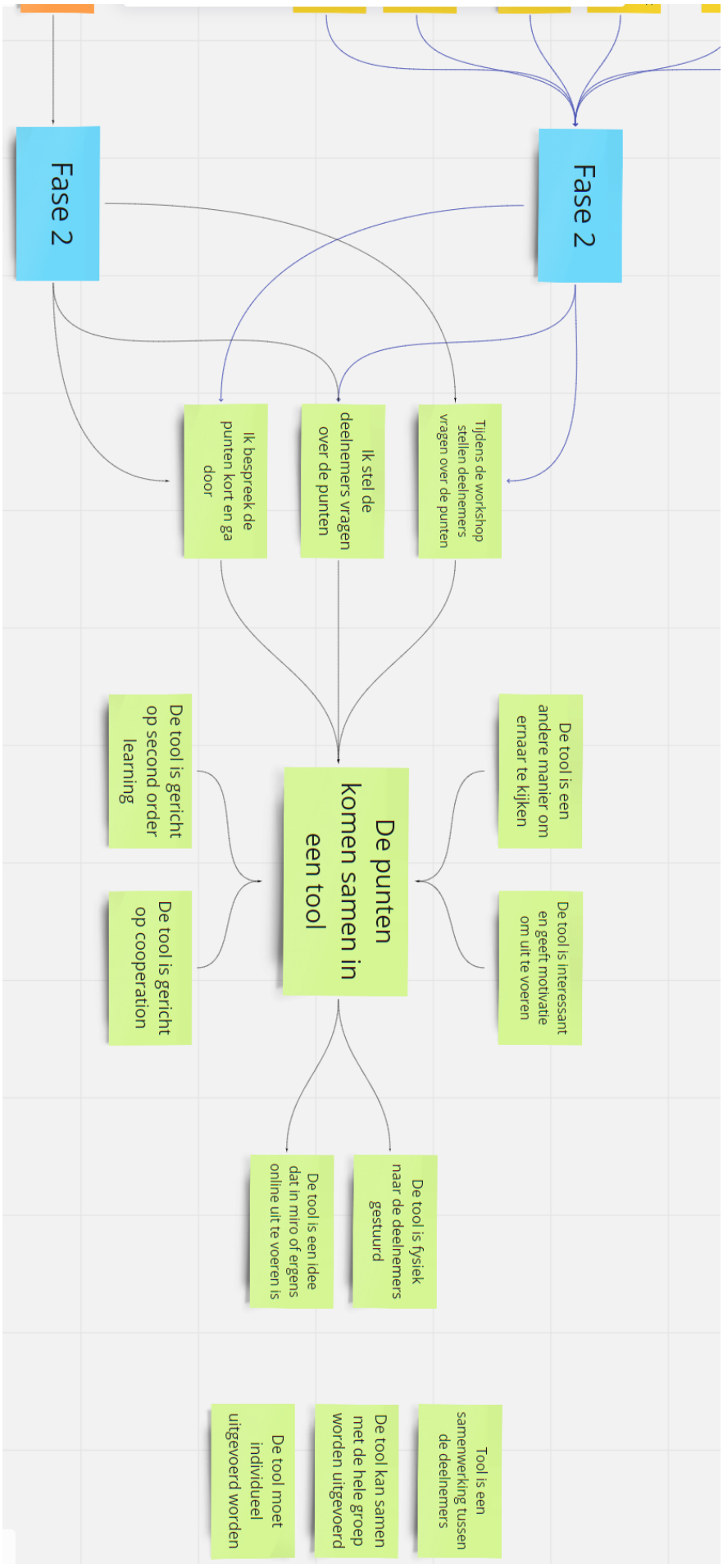

Part 3 of the flowchart

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Appendix H – Pattern-oriented card games

Game design patterns for goals for academic learning (Soska et al., 2017, Table 4).

- Alignment
- Capture
- Collection
- Conceal
- Configuration
- Connection
- Gain ownership
- Guard
- Herd
- King of the hill
- Last man standing
- Overcome
- Stealth
- Survive
- Traverse

Appendix I – Glossary for the contesting students

Begrippen veenweidegebieden algemeen:

Veenweidegebied: Gebied van voornamelijk veehouderijen die op veengrond gebouwd zijn (op het plaatje groen gemarkeerd). Het veen wordt vaak gedroogd om vee erop te laten lopen, maar hierdoor ontstaat oxidatie.

Oxidatie: Proces waar bacteriën in de grond reageren met lucht en warmte en verdwijnen uit de grond, waardoor bodemdaling ontstaat.

CO2 en methaan: Broeikasgassen die slecht zijn voor het milieu, die komen vrij door oxidatie maar ook als we alles onder water zetten. Hoe dan ook willen we de uitstoot verminderen, maar hoe?

Slootwaterpeil: De hoogte van de waterstand in slootjes langs de weilanden. Dit beïnvloedt onder andere hoe nat of hoe droog de grond van de weilanden is.

Begrippen in mogelijke oplossingen:

Onderwaterdrainage: Een systeem waar buizen onder de weilanden gelegd worden om het waterpeil onder de grond nog directer aan de sloten te verbinden. Zo kan tot vlak onder de oppervlakte de grond nat worden gehouden, zodat de bodemdaling minder snel gaat.

Drukdrainage: Bijna hetzelfde als onderwaterdrainage, maar hiermee kan je handmatig de grondwaterstand beïnvloeden. Hiermee kan je de vernatting onder de grond dus nog beter reguleren.

CO2 markt: Een systeem waar je geld kan verdienen met minder CO2 uitstoot. Dus je kan bijvoorbeeld boetes uitdelen als iemand meer uitstoot dan dat er is toegestaan. Maar je kunt ook subsidies/beloningen uitdelen voor goede oplossingen tegen de CO2 uitstoot of als je minder uitstoot dan je had voorspeld.

Meer variatie: Nu liggen er veel veehouderijen naast elkaar op de veenweidegebieden. Daardoor is er weinig afwisseling en weinig biodiversiteit. Er zijn ideeën waar je variatie creëert door een deel van de weilanden om te bouwen tot natuurgebieden, broedplekken voor weidevogels, moerasachtige gebieden (oorspronkelijke veengrond) etc.

Vernatten: In plaats van het drogen van de grond zodat koeien erop kunnen lopen, kan je ook de grond helemaal onder water zetten. Dan stopt de oxidatie van het veen (dus geen CO2 uitstoot meer), maar komt er wel meer methaan vrij.

Natte teelt: Bepaalde gewassen (zoals lisdodde en cranberry) kunnen goed groeien als de grond onder water staat, er zijn ideeën om dus over te stappen van veehouderijen naar het telen van natte gewassen om daarmee geld te verdienen.

Biomassa: Van deze natte teelt zou bijvoorbeeld biomassa gemaakt kunnen worden. Door het verbranden van organische stoffen die snel aangroeien, kun je op een vrij duurzame energie opwekken. Daar kun je bijvoorbeeld geld mee verdienen.

Het **natter maken van de grond** zit in veel ideeën om de oxidatie tegen te gaan. Er is alleen nog geen goed watersysteem om water naar de veengebieden te leiden en daarbij wordt water ook steeds schaarser. Daarom zijn er nog wat oplossingen over waterefficiëntie bedacht.

Brak water: Zo wordt er gekeken naar het gebruik van brak (zoutig) water voor het nat houden van de grond. Bij gebieden vlak bij zee of met veel zoute kwel zou het een oplossing zijn, al gaat de waterkwaliteit van het grondwater dan achteruit.

Wateropslag: Een ander idee is om water in de wintermaanden op te vangen in een wateropslag, zodat in de droge zomermaanden hiervan gebruik kan worden gemaakt.

Hermeanderen van rivieren: Om de watertoevoer makkelijker en efficiënter te maken, zou je nabijgelegen rivieren kunnen hermeanderen, zodat ze watertoevoer kunnen zijn voor de veenweidegebieden.

Als veehouderijen **minder intensieve veehouderij** moeten hebben, zullen ze minder verdienen. Om deze boeren een beetje te compenseren, zijn er ook compenserende ideeën bedacht.

Veenweidetoeristen: Toeristen trekken met workshops, rondleidingen, overnachtingen en andere bezigheden en daar extra geld aan verdienen.

Visteelt: In de sloten vissen gaan kweken om ook met visteelt wat geld bij te verdienen.

Appendix J – Goals and game in the morphological chart

J-1 Goal 1: collect most points during the game

Insight in each other's worldviews	Possible game elements					
Realisation of interdependency	Solve puzzles where other one's knowledge is needed	Literally having only one piece of the puzzle	Seeing only part of the whole situation alone	Think of Colonisten van catan --> you often need to make deals to win	Think of Cluedo --> find the solution together	
Think from other perspective	Roleplay: pretend you are another stakeholder	Put on different glasses (/perspectives)	Try to predict the next move of another player	Get points for getting to know each other	Tell personal stories	
Give everyone an opportunity to bring value to the game	Make sure each expertise is highlighted	A game where each player has their turn	Send emoji/ statement cards that can be brought on camera to express yourself	pass it on -->cooking something in a chain, one player starts and the next one continues etc		
Be open for other perspectives	Listening needed to solve puzzle	Tell what someone told accurately to score points	Try to solve a puzzle from multiple perspectives	Show 3D object that looks completely different from each angle	Do something like the elephant cartoon and solve it together	
Learn to see the common goal	A game without explanation before the start	Solve the puzzle by revealing pieces of common goal	Discuss what common goal could be and reflect on it	pass it on -->cooking something in a chain, one player starts and the next one continues etc		
Learn working together	Working together to solve puzzles	Work towards one (common) goal	Have one common enemy	Escape from situation all are trapped in	Forced working together with support from independent person	
Give solutions that fit other's needs as well	List solutions that are suitable for more than just you to earn points	Lose time/points when you do not serve other one's needs	The goal of individual game is to reach the finish exactly all at the same time	Get points for getting to know each other	Simultaneously answering 1 question and try to give the same answer as you team mate	
Build trust	A form of catch me if I fall	Solve puzzles by being open about yourself	A step-based game where you learn to know each other better each round	Play games/ do fun things together each week to build a bond	Get points for getting to know each other	
Active ways for communicating	Search who your card belongs to by asking questions	Searching the twin game element of the one you received	Have a discussion starter after each phase/ step/ turn of the game	Get points for getting to know each other	Try to obtain information for your secret task from other players	
Reflection	Have a discussion starter after each phase/ step/ turn of the game	Discussion after the game	Connections made to real life during the game	Try to make the same reflection as your team mates without talking about it	Try to think who said what to score points --> why do I think that	

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Insight in each other's worldviews						
Realisation of interdependency	You can have Monopoly 'kanskaarten' in which players are linked together	Portal --> to solve the puzzle both of you are needed				Connection main goal game
Think from other perspective	In 30 seconds, you are forced to think how to explain it so your team mate gets it	Try to think who said what to score points				Connection potential part of game
Give everyone an opportunity to bring value to the game						
Be open for other perspectives	Common interest/ common goal	Respect				
Learn to see the common goal						
Learn working together	Pandemic --> together against the game	Cluedo you collect clues and you want to solve it together	Each teams sport has one goal	Realise when someone is stuck and know how to help		
Give solutions that fit other's needs as well	Pandemic --> together against the game	Working together makes you earn more points than working alone	Make connections and small cooperations with certain players to win	In secret hitler you have to propose something that works for you and for others as well		
Build trust	Make connections and small cooperations with certain players to win	The game Among us is the exact opposite				
Active ways for communicating	Send emoji/ statement cards that can be brought on camera to express yourself					
Reflection						

J-2 Goal 2: finish the game first

Insight in each other's worldviews	Possible game elements					
Realisation of interdependency	Solve puzzles where other one's knowledge is needed	Literally having only one piece of the puzzle	Seeing only part of the whole situation alone	Think of Colonisten van catan --> you often need to make deals to win	Think of Cluedo --> find the solution together	'k
Think from other perspective	Roleplay: pretend you are another stakeholder	Put on different glasses (/perspectives)	Try to predict the next move of another player	Get points for getting to know each other	Tell personal stories	In
Give everyone an opportunity to bring value to the game	Make sure each expertise is highlighted	A game where each player has their turn	Send emoji/ statement cards that can be brought on camera to express yourself	pass it on -->cooking something in a chain, one player starts and the next one continues etc		
Be open for other perspectives	Listening needed to solve puzzle	Tell what someone told accurately to score points	Try to solve a puzzle from multiple perspectives	Show 3D object that looks completely different from each angle	Do something like the elephant cartoon and solve it together	C
Learn to see the common goal	A game without explanation before the start	Solve the puzzle by revealing pieces of common goal	Discuss what common goal could be and reflect on it	pass it on -->cooking something in a chain, one player starts and the next one continues etc		
Learn working together	Working together to solve puzzles	Work towards one (common) goal	Have one common enemy	Escape from situation all are trapped in	Forced working together with support from independent person	
Give solutions that fit other's needs as well	List solutions that are suitable for more than just you to earn points	Lose time/points when you do not serve other one's needs	The goal of individual game is to reach the finish exactly all at the same time	Get points for getting to know each other	Simultaneously answering 1 question and try to give the same answer as you team mate	
Build trust	A form of catch me if I fall	Solve puzzles by being open about yourself	A step-based game where you learn to know each other better each round	Play games/ do fun things together each week to build a bond	Get points for getting to know each other	M
Active ways for communicating	Search who your card belongs to by asking questions	Searching the twin game element of the one you received	Have a discussion starter after each phase/ step/ turn of the game	Get points for getting to know each other	Try to obtain information for your secret task from other players	S
Reflection	Have a discussion starter after each phase/ step/ turn of the game	Discussion after the game	Connections made to real life during the game	Try to make the same reflection as your team mates without talking about it	Try to think who said what to score points --> why do I think that	

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Insight in each other's worldviews						
Realisation of interdependency	You can have Monopoly 'kanskaarten' in which players are linked together	Portal --> to solve the puzzle both of you are needed				Connection main goal game
Think from other perspective	In 30 seconds, you are forced to think how to explain it so your team mate gets it	Try to think who said what to score points				Connection potential part of game
Give everyone an opportunity to bring value to the game						
Be open for other perspectives	Common interest/ common goal	Respect				
Learn to see the common goal						
Learn working together	Pandemic --> together against the game	Cluedo you collect clues and you want to solve it together	Each teams sport has one goal	Realise when someone is stuck and know how to help		
Give solutions that fit other's needs as well	Pandemic --> together against the game	Working together makes you earn more points than working alone	Make connections and small cooperations with certain players to win	In secret hitler you have to propose something that works for you and for others as well		
Build trust	Make connections and small cooperations with certain players to win	The game Among us is the exact opposite				
Active ways for communicating	Send emoji/ statement cards that can be brought on camera to express yourself					
Reflection						

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J-3 Goal 3: reach the finish in the same round

Collaboration elements	Possible game elements					
Realisation of interdependency	Solve puzzles where other one's knowledge is needed	Literally having only one piece of the puzzle	Seeing only part of the whole situation alone	Think of Colonisten van catan --> you often need to make deals to win	Think of Cluedo --> find the solution together	
Think from other perspective	Roleplay: pretend you are another stakeholder	Put on different glasses (/perspectives)	Try to predict the next move of another player	Get points for getting to know each other	Tell personal stories	
Give everyone an opportunity to bring value to the game	Make sure each expertise is highlighted	A game where each player has their turn	Send emoji/ statement cards that can be brought on camera to express yourself	pass it on -->cooking something in a chain, one player starts and the next one continues etc		
Be open for other perspectives	Listening needed to solve puzzle	Tell what someone told accurately to score points	Try to solve a puzzle from multiple perspectives	Show 3D object that looks completely different from each angle	Do something like the elephant cartoon and solve it together	
Learn to see the common goal	A game without explanation before the start	Solve the puzzle by revealing pieces of common goal	Discuss what common goal could be and reflect on it	pass it on -->cooking something in a chain, one player starts and the next one continues etc		
Learn working together	Working together to solve puzzles	Work towards one (common) goal	Have one common enemy	Escape from situation all are trapped in	Forced working together with support from independent person	
Give solutions that fit other's needs as well	List solutions that are suitable for more than just you to earn points	Lose time/points when you do not serve other one's needs	The goal of individual game is to reach the finish exactly all at the same time	Get points for getting to know each other	Simultaneously answering 1 question and try to give the same answer as you team mate	
Build trust	A form of catch me if I fall	Solve puzzles by being open about yourself	A step-based game where you learn to know each other better each round	Play games/ do fun things together each week to build a bond	Get points for getting to know each other	
Active ways for communicating	Search who your card belongs to by asking questions	Searching the twin game element of the one you received	Have a discussion starter after each phase/ step/ turn of the game	Get points for getting to know each other	Try to obtain information for your secret task from other players	
Reflection	Have a discussion starter after each phase/ step/ turn of the game	Discussion after the game	Connections made to real life during the game	Try to make the same reflection as your team mates without talking about it	Try to think who said what to score points --> why do I think that	

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Collaboration elements						
Realisation of interdependency	You can have Monopoly 'kanskaarten' in which players are linked together	Portal --> to solve the puzzle both of you are needed				Connection main goal game
Think from other perspective	In 30 seconds, you are forced to think how to explain it so your team mate gets it	Try to think who said what to score points				Connection potential part of game
Give everyone an opportunity to bring value to the game						
Be open for other perspectives	Common interest/ common goal	Respect				
Learn to see the common goal						
Learn working together	Pandemic --> together against the game	Cluedo you collect clues and you want to solve it together	Each teams sport has one goal	Realise when someone is stuck and know how to help		
Give solutions that fit other's needs as well	Pandemic --> together against the game	Working together makes you earn more points than working alone	Make connections and small cooperations with certain players to win	In secret hitler you have to propose something that works for you and for others as well		
Build trust	Make connections and small cooperations with certain players to win	The game Among us is the exact opposite				
Active ways for communicating	Send emoji/ statement cards that can be brought on camera to express yourself					
Reflection						

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J-4 Final game in the chart

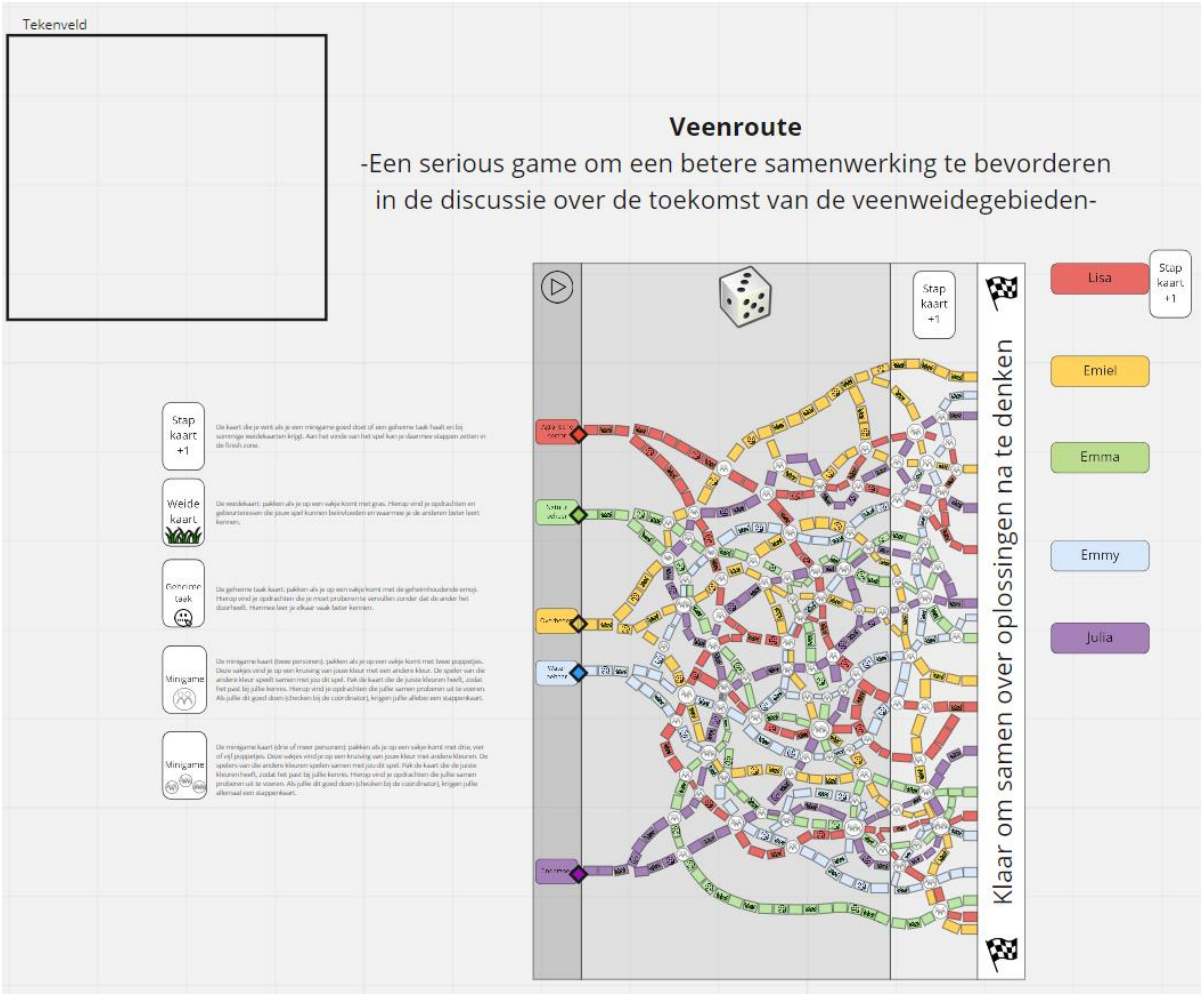
	Link with main goal of the game
	Link with minigames
	Link with secret tasks
	Link with meadow cards

Insight in each other's worldviews					Poss
Realisation of interdependency	Solve puzzles where other one's knowledge is needed	Literally having only one piece of the puzzle	Seeing only part of the whole situation alone	Think of Colonisten van catan --> you often need to make deals to win	
Think from other perspective	Roleplay: pretend you are another stakeholder	Put on different glasses (/perspectives)	Try to predict the next move of another player	Get points for getting to know each other	
Give everyone an opportunity to bring value to the game	Make sure each expertise is highlighted	A game where each player has their turn	Send emoji/ statement cards that can be brought on camera to express yourself	pass it on -->cooking something in a chain, one player starts and the next one continues etc	
Be open for other perspectives	Listening needed to solve puzzle	Tell what someone told accurately to score points	Try to solve a puzzle from multiple perspectives	Show 3D object that looks completely different from each angle	
Learn to see the common goal	A game without explanation before the start	Solve the puzzle by revealing pieces of common goal	Discuss what common goal could be and reflect on it	pass it on -->cooking something in a chain, one player starts and the next one continues etc	
Learn working together	Working together to solve puzzles	Work towards one (common) goal	Have one common enemy	Escape from situation all are trapped in	
Give solutions that fit other's needs as well	List solutions that are suitable for more than just you to earn points	Lose time/points when you do not serve other one's needs	The goal of individual game is to reach the finish exactly all at the same time	Get points for getting to know each other	
Build trust	A form of catch me if I fall	Solve puzzles by being open about yourself	A step-based game where you learn to know each other better each round	Play games/ do fun things together each week to build a bond	
Active ways for communicating	Search who your card belongs to by asking questions	Searching the twin game element of the one you received	Have a discussion starter after each phase/ step/ turn of the game	Get points for getting to know each other	
Reflection	Have a discussion starter after each phase/ step/ turn of the game	Discussion after the game	Connections made to real life during the game	Try to make the same reflection as your team mates without talking about it	

	Link with main goal of the game
	Link with minigames
	Link with secret tasks
	Link with meadow cards

Insight in each other's worldviews	ossible game elements				
Realisation of interdependency	Think of Cluedo --> find the solution together	You can have Monopoly 'kanskaarten' in which players are linked together	Portal --> to solve the puzzle both of you are needed		
Think from other perspective	Tell personal stories	In 30 seconds, you are forced to think how to explain it so your team mate gets it	Try to think who said what to score points		
Give everyone an opportunity to bring value to the game					
Be open for other perspectives	Do something like the elephant cartoon and solve it together	Common interest/ common goal	Respect		
Learn to see the common goal					
Learn working together	Forced working together with support from independent person	Pandemic --> together against the game	Cluedo you collect clues and you want to solve it together	Each teams sport has one goal	Realise when someone is stuck and know how to help
Give solutions that fit other's needs as well	Simultaneously answering 1 question and try to give the same answer as you team mate	Pandemic --> together against the game	Working together makes you earn more points than working alone	Make connections and small cooperations with certain players to win	In secret hitler you have to propose something that works for you and for others as well
Build trust	Get points for getting to know each other	Make connections and small cooperations with certain players to win	The game Among us is the exact opposite		
Active ways for communicating	Try to obtain information for your secret task from other players	Send emoji/ statement cards that can be brought on camera to express yourself			
Reflection	Try to think who said what to score points --> why do I think that				

Appendix K – Versions of the game board



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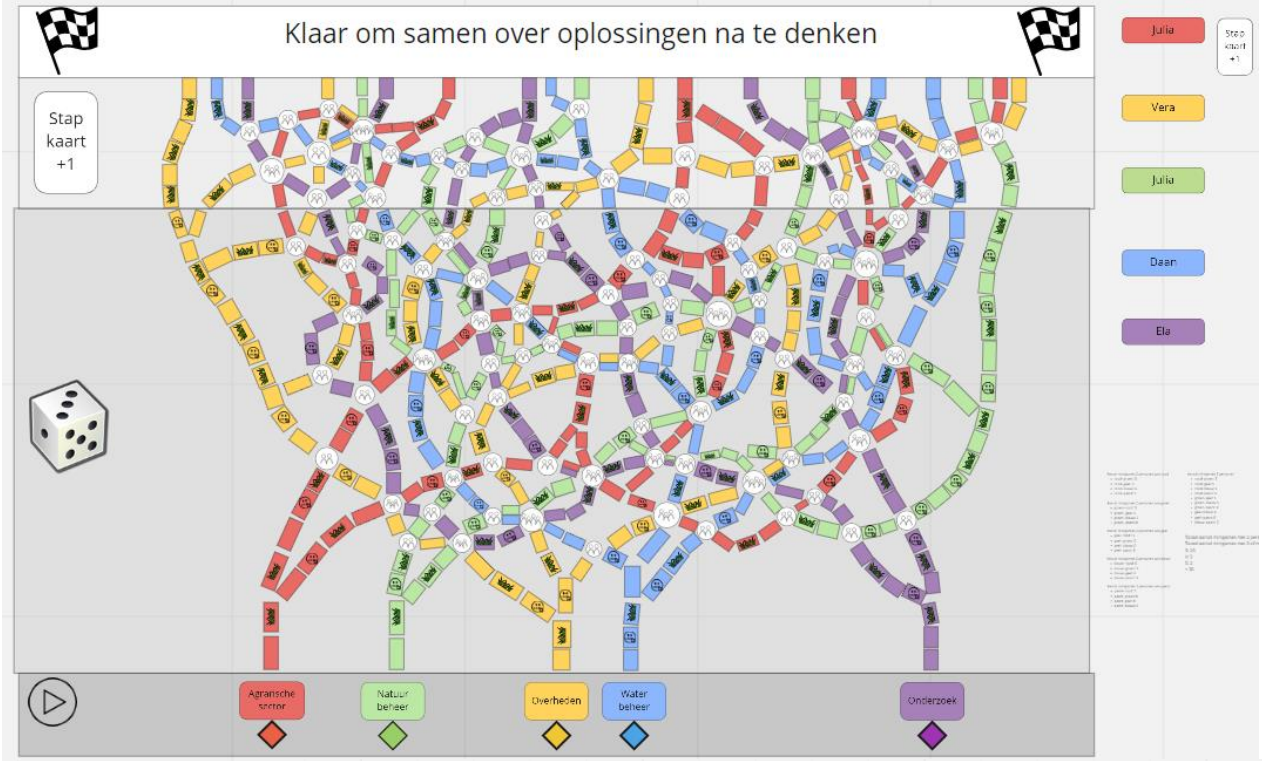
23-02-21

Veenroute

-Een serious game om een betere samenwerking te bevorderen in de discussie over de toekomst van de veenweidegebieden-



Aantal minigames 2 personen van rood
- rood- groen: 3
- rood- geel: 5
- rood- blauw: 6
- rood- paars: 5

Aantal minigames 2 personen van groen
- groen- rood: 3
- groen- geel: 5
- groen- blauw: 5
- groen- paars: 8

Aantal minigames 2 personen van geel
- geel- rood : 5
- geel- groen: 5
- geel- blauw: 6
- geel- paars: 8

Aantal minigames 2 personen van blauw
- blauw- rood: 6
- blauw- groen: 5
- blauw- geel: 6
- blauw- paars: 5

Aantal minigames 2 personen van paars
- paars- rood: 5
- paars- groen: 8
- paars- geel: 8
- paars- blauw: 5

Aantal minigames 2 personen
- rood- groen: 3
- rood- geel: 5
- rood- blauw: 6
- rood- paars: 5
- groen- geel: 5
- groen- blauw: 5
- groen- paars: 8
- geel- blauw: 6
- geel- paars: 8
- blauw- paars: 5

Totaal aantal minigames met 2 personen: 56
Totaal aantal minigames met 3 of meer: 36
3: 29
4: 5
5: 2
= 36

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26-02-21

Tekenveld

Veenroute

-Een serious game om een betere samenwerking te bevorderen in de discussie over de toekomst van de veenweidegebieden-

Aantal minigames 2 personen van rood
- rood- groen: 3
- rood- geel: 5
- rood- blauw: 6
- rood- paars: 5

Aantal minigames van 3 of meer personen waar rood aan meedoet: 23

Aantal minigames 2 personen van groen
- groen- rood: 3
- groen- geel: 5
- groen- blauw: 5
- groen- paars: 8

Aantal minigames van 3 of meer personen waar groen aan meedoet: 22

Aantal minigames 2 personen van geel
- geel- rood : 5
- geel- groen: 5
- geel- blauw: 6
- geel- paars: 8

Aantal minigames van 3 of meer personen waar geel aan meedoet: 19

Aantal minigames 2 personen van blauw
- blauw- rood: 6
- blauw- groen: 5
- blauw- geel: 6
- blauw- paars: 5

Aantal minigames van 3 of meer personen waar blauw aan meedoet: 23

Aantal minigames 2 personen van paars
- paars- rood: 5
- paars- groen: 8
- paars- geel: 8
- paars- blauw: 5

Aantal minigames van 3 of meer personen waar paars aan meedoet: 21

Aantal minigames 2 personen
- rood- groen: 3
- rood- geel: 5
- rood- blauw: 6
- rood- paars: 5
- groen- geel: 5
- groen- blauw: 5
- groen- paars: 8
- geel- blauw: 6
- geel- paars: 8
- blauw- paars: 5

Totaal aantal minigames met 2 personen: 56
Totaal aantal minigames met 3 of meer: 36
3: 29
4: 5
5: 2
= 36

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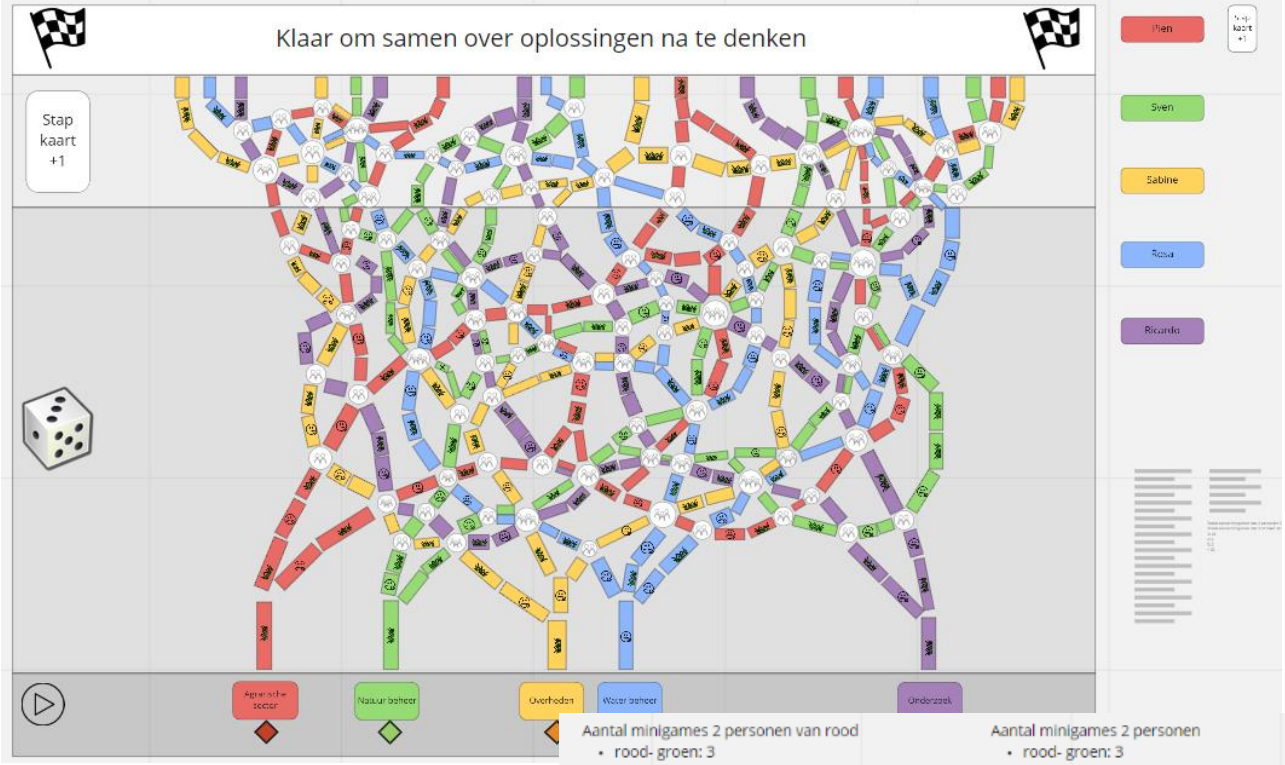
09-03-21

Tekenveld

Samen door het veen

-Een serious game om een betere samenwerking te bevorderen
in de discussie over de toekomst van de veenweidegebieden-



Aantal minigames 2 personen van rood
- rood- groen: 3
- rood- geel: 5
- rood- blauw: 6
- rood- paars: 5

Aantal minigames van 3 of meer personen waar rood aan meedoet: 23

Aantal minigames 2 personen van groen
- groen- rood: 3
- groen- geel: 5
- groen- blauw: 6
- groen- paars: 8

Aantal minigames van 3 of meer personen waar groen aan meedoet: 22

Aantal minigames 2 personen van geel
- geel- rood : 5
- geel- groen: 5
- geel- blauw: 6
- geel- paars: 8

Aantal minigames van 3 of meer personen waar geel aan meedoet: 19

Aantal minigames 2 personen van blauw
- blauw- rood: 6
- blauw- groen: 6
- blauw- geel: 6
- blauw- paars: 5

Aantal minigames van 3 of meer personen waar blauw aan meedoet: 23

Aantal minigames 2 personen van paars
- paars- rood: 5
- paars- groen: 8
- paars- geel: 8
- paars- blauw: 5

Aantal minigames van 3 of meer personen waar paars aan meedoet: 21

Aantal minigames 2 personen
- rood- groen: 3
- rood- geel: 5
- rood- blauw: 6
- rood- paars: 5
- groen- geel: 5
- groen- blauw: 6
- groen- paars: 8
- geel- blauw: 6
- geel- paars: 8
- blauw- paars: 5

Totaal aantal minigames met 2 personen: 57
Totaal aantal minigames met 3 of meer: 36
3: 28
4: 6
5: 2
= 36

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Aantal minigames 2 personen

- rood- groen: 5
- rood- geel: 5
- rood- blauw: 5
- rood- paars: 5
- groen- geel: 5
- groen- blauw: 7
- groen- paars: 7
- geel- blauw: 6
- geel- paars: 7
- blauw- paars: 5

Totaal aantal minigames met 2 personen: 57
Totaal aantal minigames met 3 of meer: 32
3: 22
4: 8
5: 2
= 32

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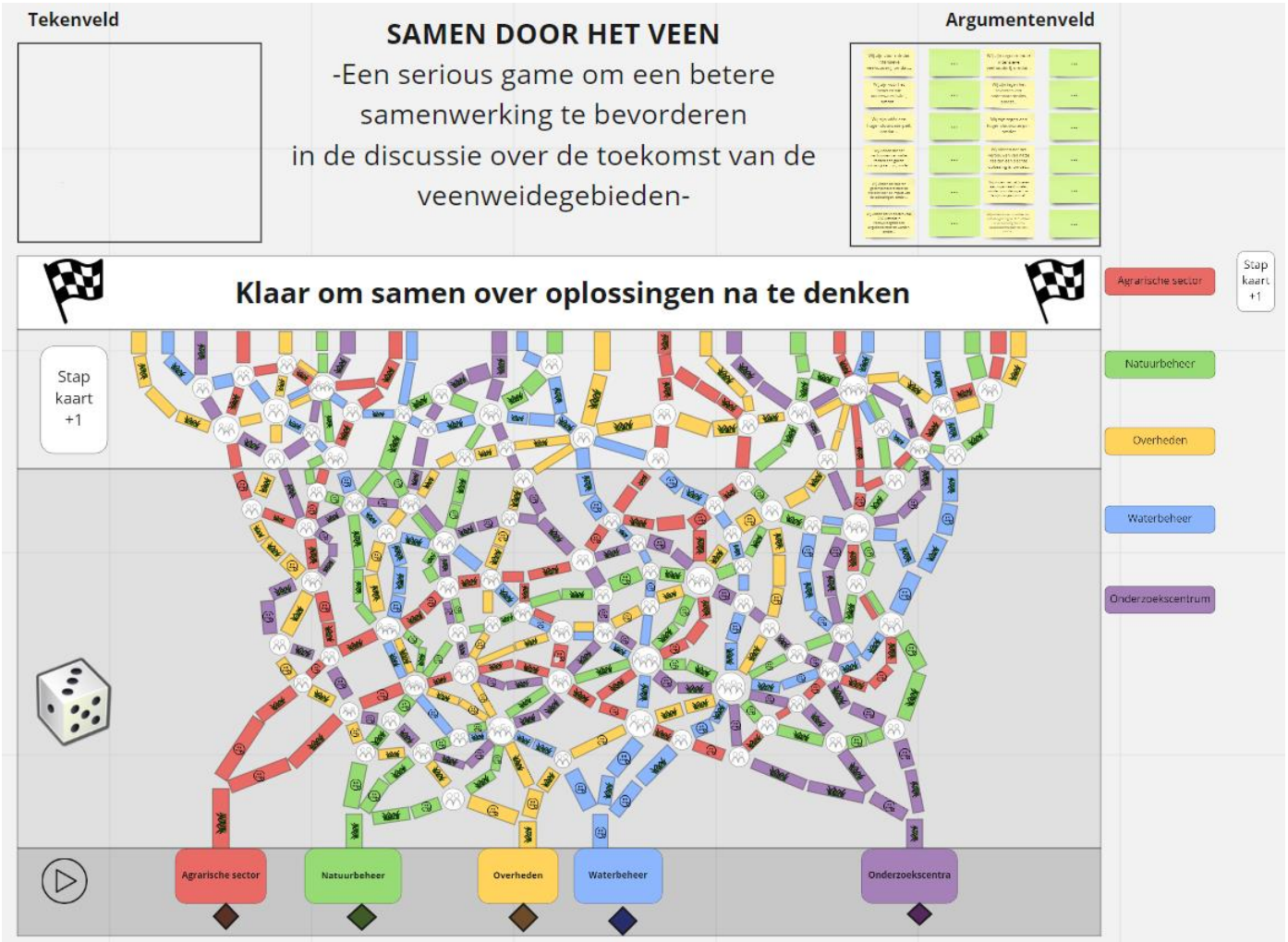

Aantal minigames 2 personen

- rood- groen: 5
- rood- geel: 5
- rood- blauw: 5
- rood- paars: 5
- groen- geel: 5
- groen- blauw: 6
- groen- paars: 7
- geel- blauw: 6
- geel- paars: 7
- blauw- paars: 5

Totaal aantal minigames met 2 personen: 56
Totaal aantal minigames met 3 of meer: 33
3: 23
4: 8
5: 2
= 33

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Appendix L – Notes of changes per test session

Test 1

Met Science Communication studenten op 18-02-21

Ik wil er met deze test achter komen of

- het spel een beetje loopt → ja
- er genoeg elementen in zitten→ niet van alles
- het niet te makkelijk/moeilijk is→ was prima→ wel lastig te testen, want wel hoogopgeleid maar niet kennis over onderwerp→ **wordt überhaupt heel lastig om echt goed te testen**
- je genoeg stappenkaarten kan verzamelen → ja
- de opdrachten haalbaar zijn → weer lastig te testen, maar wel wat dingen uitgehaald

Aanpassingen na test 1, vóór Test 2:

Bord**:**

- Bord gedraaid, liggend is het groter in beeld
- Iets minder stappen voor iedereen in het begin
- Iets meer geheime taken en weidekaarten
- 2 extra ontmoetingen rood-groen
- Kleur blauw aangepast
- Pionnen aangepast duidelijker
- Shortcut groene route buitenom
- Route van groen ook optie naar links gegeven
- Daardoor ook links minigame voor 4 en voor 5 personen extra
- Routes nog iets betere vormgegeven en extra streepje voor rood, want die klopte niet

Weidekaarten:

- Extra ga volgende splitsing linksaf toegevoegd
- 3 kaarten toegevoegd waarin iedereen kort iets moet vertellen
- Verder geen kaarten veranderd
- Wel test 2 versie gemaakt die makkelijker handelbaar is voor ppt. Dus niet voor alles een voorkantje en alles door elkaar gehusseld

Geheime taken:

- De opdrachten gericht op specifieke speler en ook alternatief als jij dat zelf bent
- Alles evenveel erin gestopt voor de balans
- Ook twee opdrachten toegevoegd:
    - Wat vindt <speler> het belangrijkst aan veenweide
    - Wat is voor <speler> de grootste uitdaging

Test 2

25-02 met Bouwkunde studenten

Ging goed, duurde 1u 45 min

Aanpassingen na test 2, vóór Test 3:
Bord**:**

- Groen donkerder gemaakt
- Testjes met vloeiende lijnen
- Meer statistieken geteld
- Weer vrij veel stappen eruit gehaald

Weidekaarten:

- Grijs met groen accent gemaakt → lijkt het niet meer op kleuren van spelers

Geheime taken:

- Grijs met blauw accent gemaakt → lijkt het niet meer op kleuren van spelers

Minigames 2 personen

- Grijze achtergrond en blauwe poppetje donkerder

Minigames 3 of meer

- Kleur niet meer associëren met kleuren op bord
- Poppetjes grijstinten, geen verwarring met wie er meedoen
- Noem op… van 30 naar 40 seconden voor 5 opnoemen
- **Minigame toegevoegd ipv sommige voordelen en problemen: associëren**
    - **Met deze minigame komen de eerste gedachten van iemand naar voren als we het over een bepaald onderwerp hebben en krijg je dus op een andere manier een kijkje in hun perspectief**

Test 3

28-02 (Mirja, Roos, Sophie J, Sophie L, Karlijn)
Het duurde 1,5u op een rustig tempo

➔ Ging ook goed, voor het eerst met rolverhaaltje werkte goed en voor het eerst met mensen die elkaar minder goed kennen, dat hielp ook wel heel erg

Aanpassingen na test 3 vóór test 4
Bord**:**

- Buitenste wegen van groen en geel weggehaald
    - Het spel gaat juist om de minigames en niemand koos überhaupt dat pad
- Nog minder lege vlakken → kwam uit de evaluatie
- En minder stappen, want duurt nog steeds net lang

Weidekaarten:

-

Geheime taken:

-

Minigames 2 personen

- Vragenronde veranderd in Standpunt ronde
    - Nu werden de vragen oppervlakkig en veel van hetzelfde door het ja nee format.
    - Dat heb ik nu verder ingekaderd: het moet beginnen met "vind jij" en je moet dus achter elkaars standpunt komen in 5 vragen
    - 5 in 50 veranderd in 5 in 40 sec, want veel tijd over in Test 3
- Tekenen 25 sec ipv 20 sec

Minigames 3 of meer

- Associëren niet 2 pp maar 1 pp, dat is intuitiever omdat de andere spellen ook 1 pp zijn

Test 4

09-03-21 (Sabine, Rosa, Sven, Ricardo, Pien)
Het duurde 1,5u

➔ Ging prima, weinig aanpassingen nodig (misschien nog ietsje korter en meer weidekaarten/geheime taken)

Aanpassingen na test 4 vóór test 5 (skills day)
Bord**:**

- Flink ingekort (ook omdat ik maar 1 uur heb straks)
- Nog niet alle vakjes bedekt met kaartjes, want dat kost weer extra tijd
- Door aanpassen zijn verhoudingen aantal minigames ook iets beter in balans

Weidekaarten:

Geheime taken:

Minigames 2 personen

Minigames 3 of meer

Test 5

Aanpassingen na (skills day) vóór test 6 (laatste)
Bord**:**

- Meer vakjes gevuld met kaarten pakken → begin heel veel gevuld naar einde steeds minder
- Paars nog een detour extra gegeven

Weidekaarten:

- Socialise kaarten veranderd van 1 persoon vragen naar 2 personen vragen

Geheime taken:

- Extra opdrachten met veenweide gerelateerde dingen gemaakt

Minigames 2 personen

- TOEVOEGEN:
    - Kies 1 van de statements en schrijf er een argument achter waar jullie het allebei over eens kunnen worden

Minigames 3 of meer

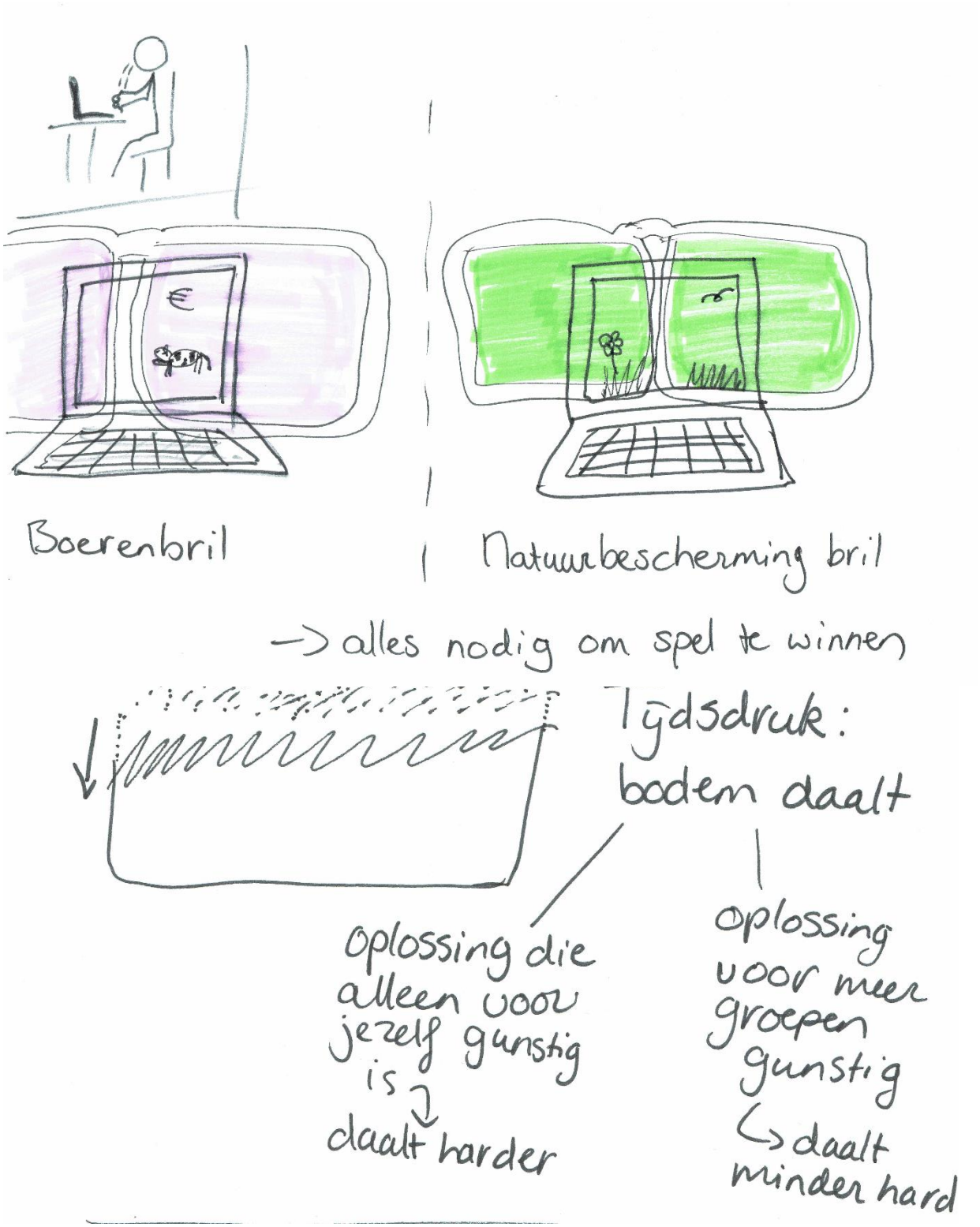
- Associëren 25 ipv 30 sec
- TOEVOEGEN:
    - Kies 1 van de statements en schrijf er een argument achter waar jullie het allebei over eens kunnen worden

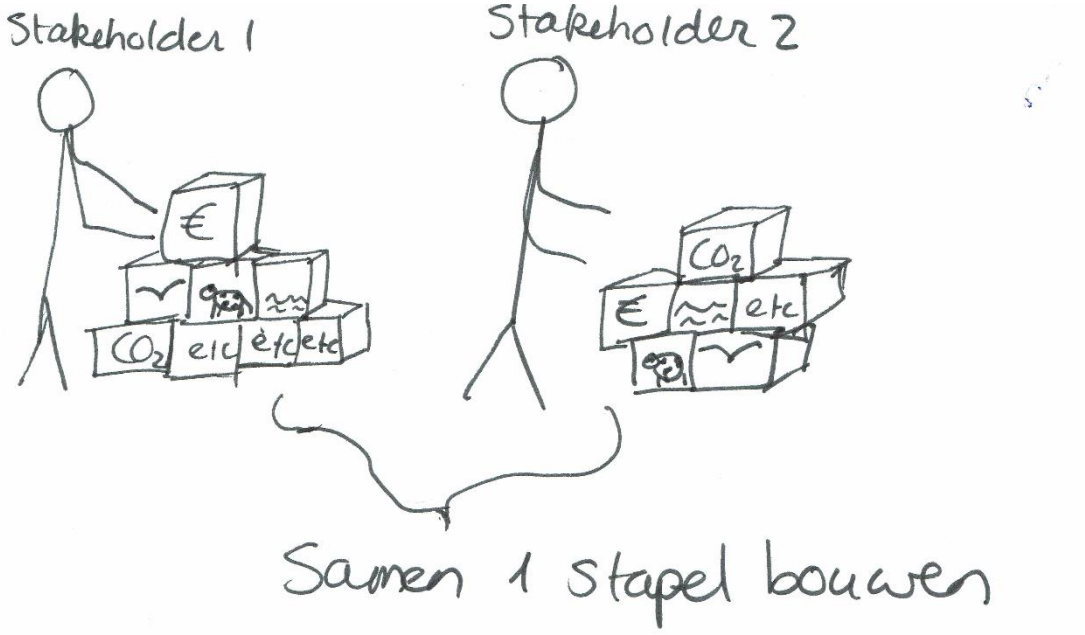
Voor de final test:
Voorbereidend formulier:

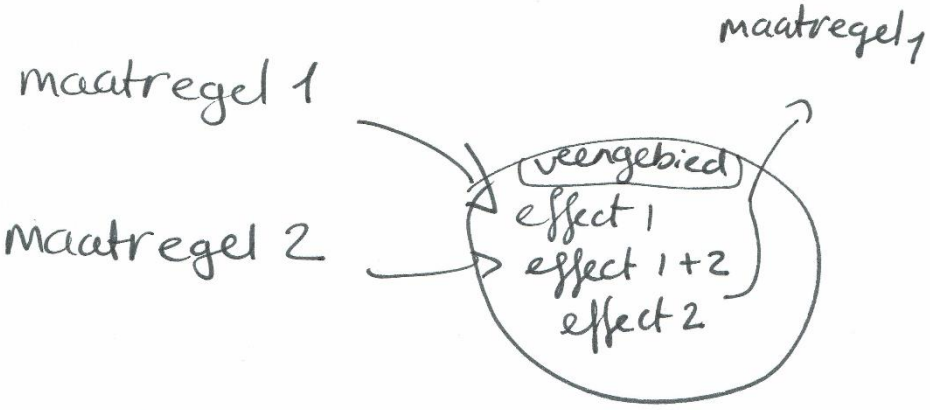
- nog iets meer nuance antwoorden gegeven
- Vraag over discussies weggehaald → zijn ze allemaal niet bij geweest
- Vraag waarde stakeholders anders gesteld

Appendix M – Sketches of potential games

M-1 First bunch of sketches







Je ziet het gevolg van je keuze meteen terug in het geheel

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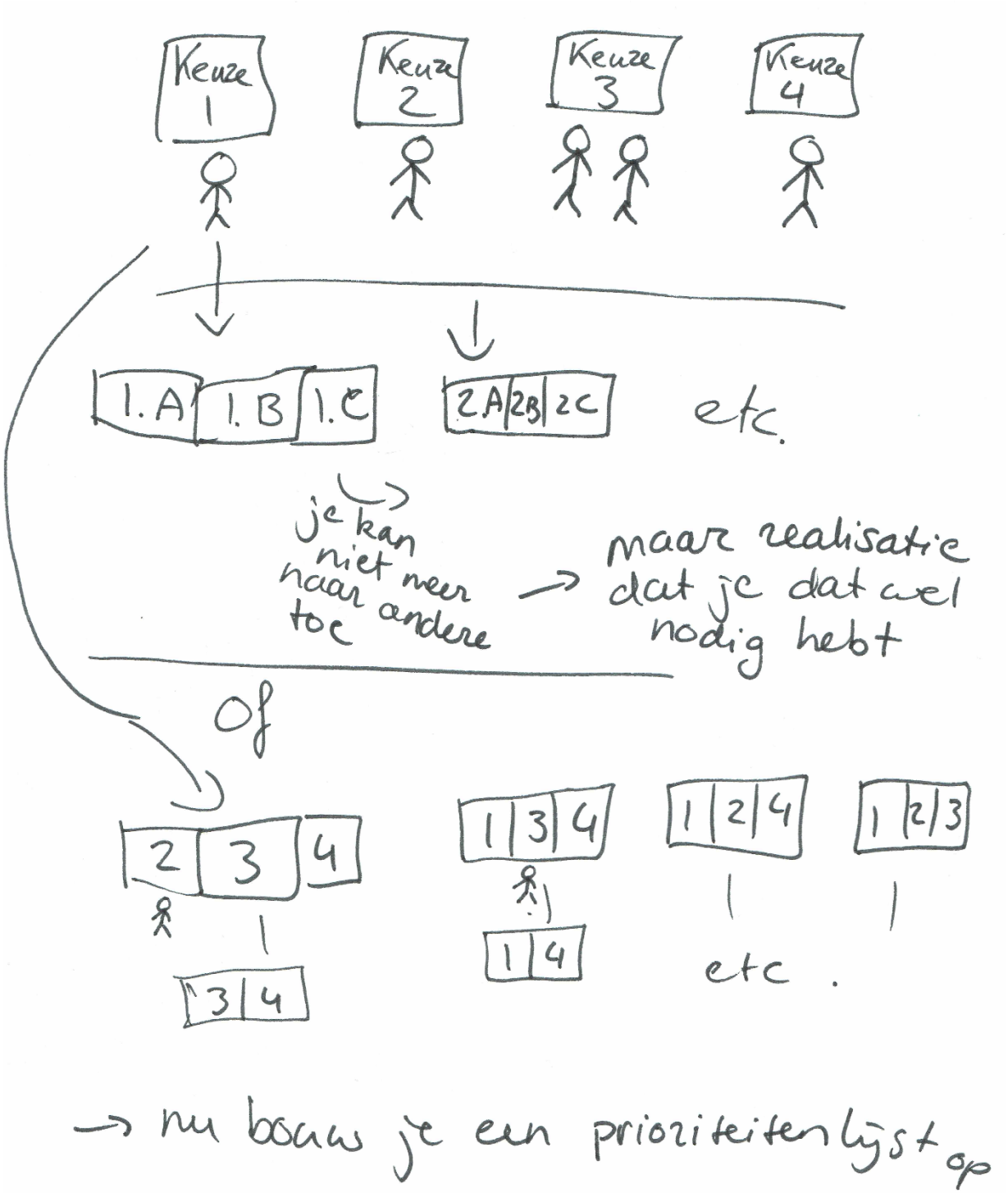

→ nu bouw je een prioriteitenlijst op

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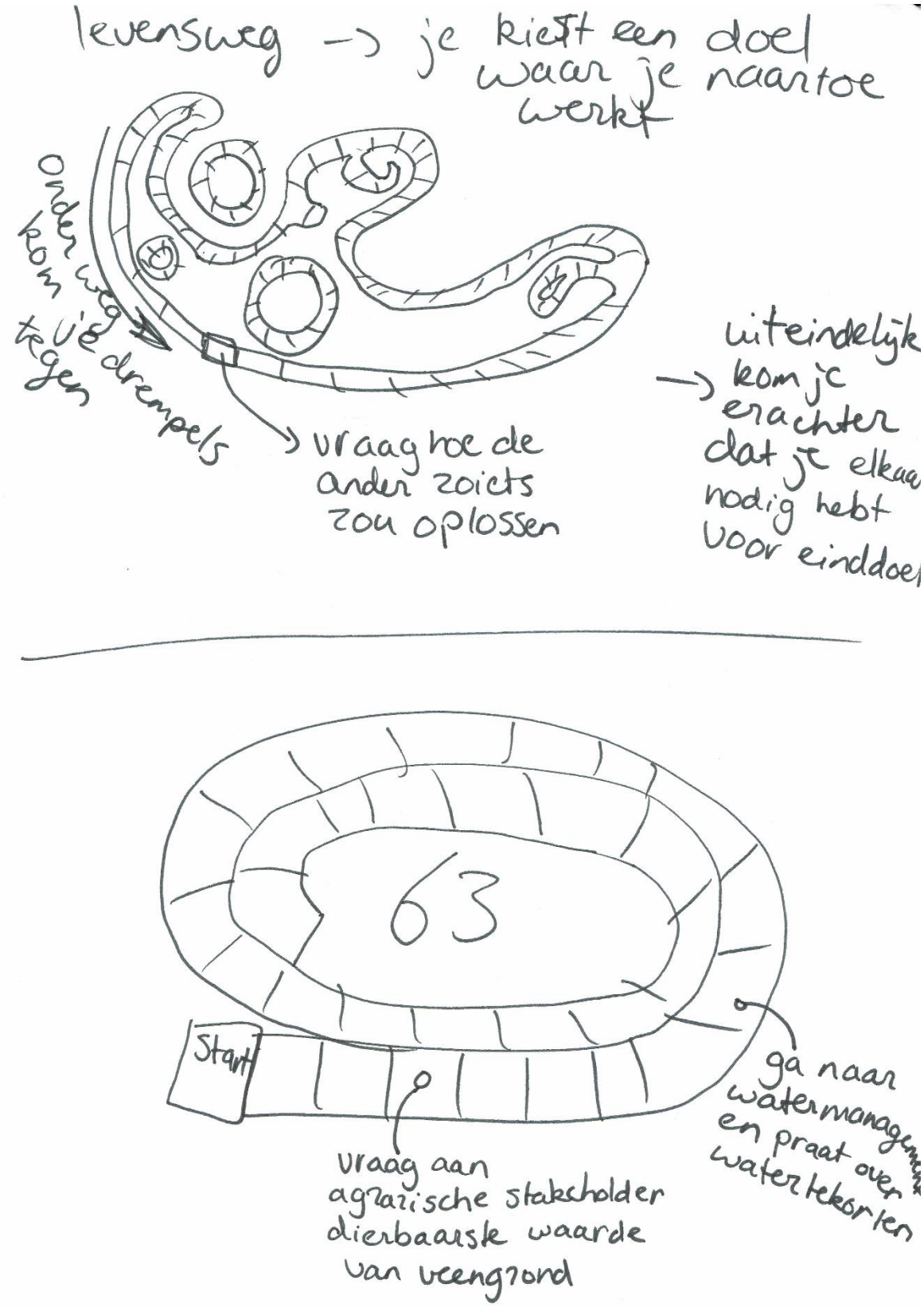

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Problemen uitdelen

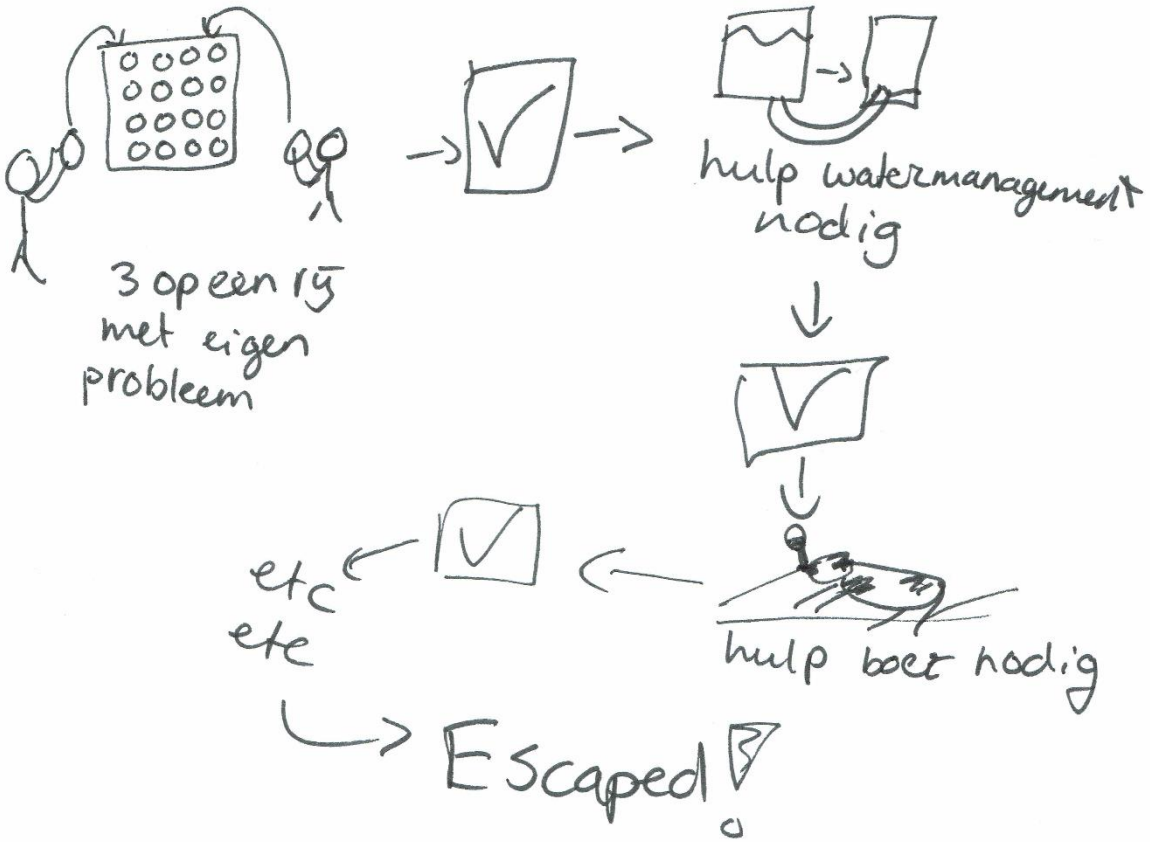
"ik denk dat dit bij jou hoort"

of

elkaars problemen inschatten en punten krijgen voor hoeveel goed

---

Escaperoom



M-2 Sketches of last 3 options

Option 1

idee 2

- meerdere rondes
- iedereen krijgt ander plaatje te zien
- om en om beschrijven wat je ziet
- samen puzzelen wat het is
- gerelateerd aan veenweide / gerelateerd aan samenwerken
- daarna discussie erover / reflectie / uitleg van 1 of meer stakeholders
- op meer manieren punten verdienen
- aan het eind 1 overlappend thema raden

2.1

Option 2

Veenscaperoom

- maken met bijv googleforms

player1 player2 player3

- iets wat iemand van natuurbeheer beter weet

weidevogel ☑

wat is er met de koe aan de hand?

- iets wat veehouderij beter zal weten

zwanger ☑

etc.

- samen ontsnappen
- onderweg elkaars waarde inzien
- onderweg elkaar beter leren kennen
- miro bord en overleg

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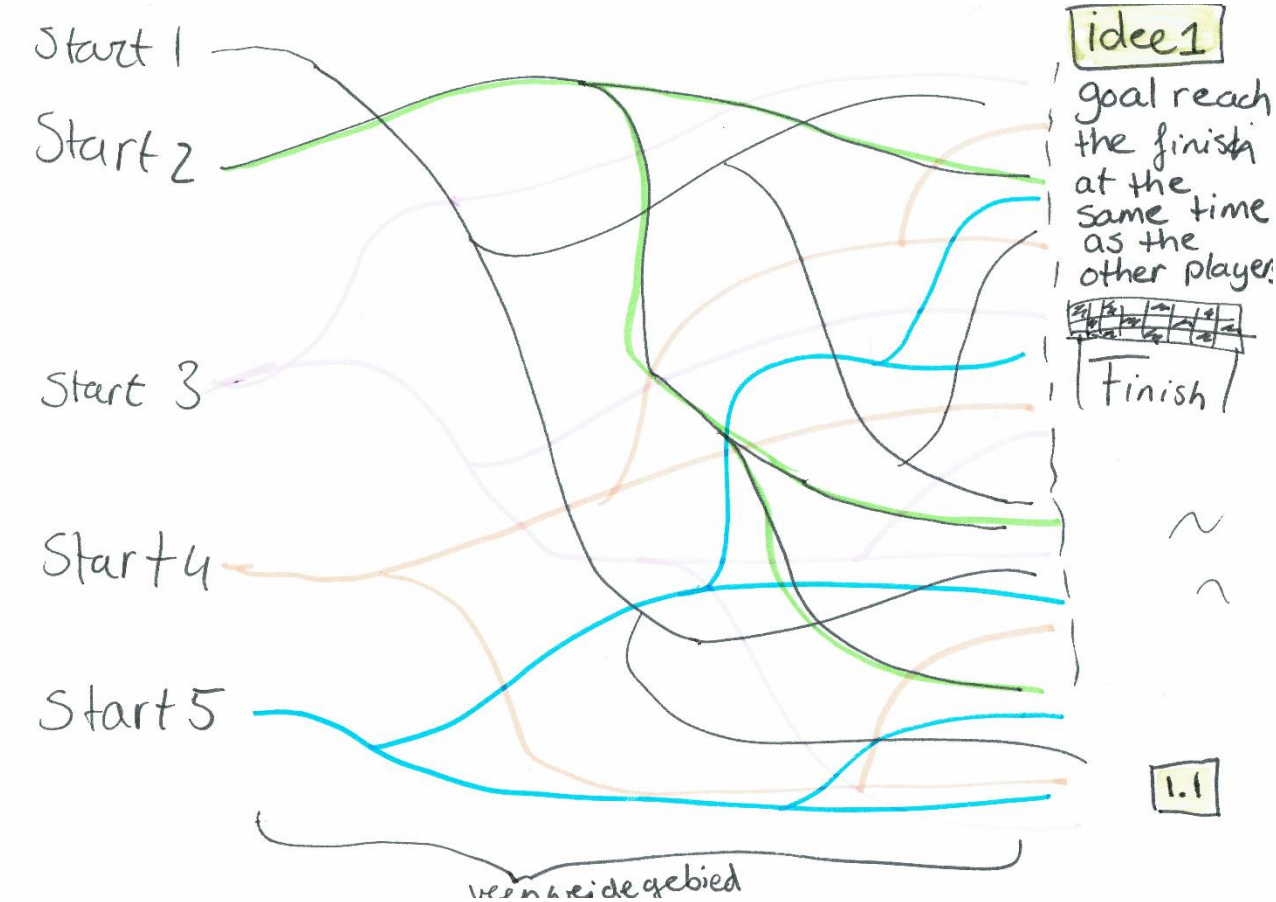
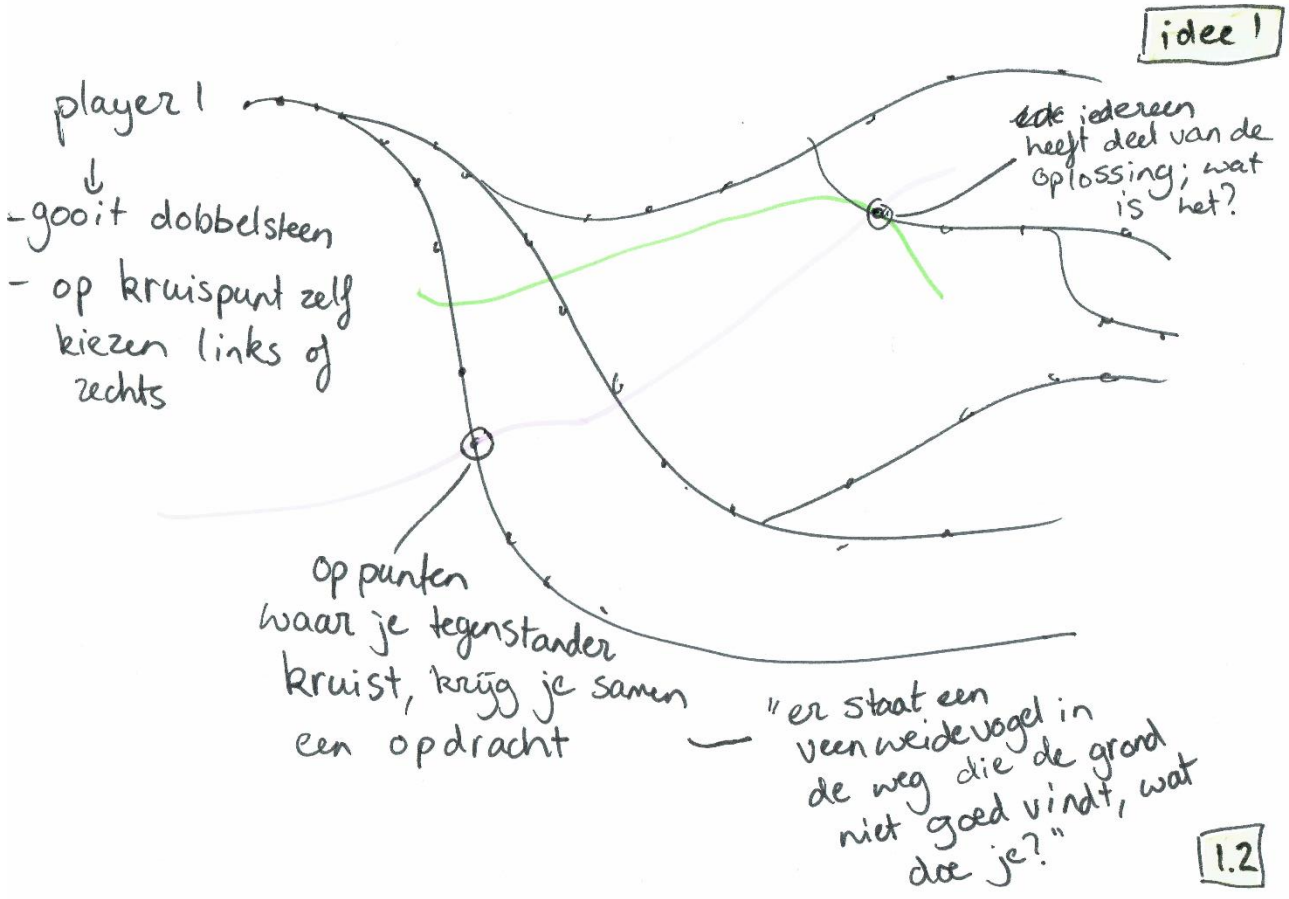
Option 3


Start 1
Start 2
Start 3
Start 4
Start 5
idee 1
goal reach the finish at the same time as the other player
Finish
1.1


idee 1
player 1
- gooit dobbelsteen
- op kruispunt zelf kiezen links of rechts
ook iedereen heeft deel van de oplossing; wat is het?
op punten waar je tegenstander kruist, krijg je samen een opdracht
"er staat een veenweidevogel in de weg die de grond niet goed vindt, wat doe je?"
1.2

idee1

- Als iedereen tegelijk bij finish
  - spel klaar iedereen wint
  - +200 punten voor iedereen
- Als te vroeg bij finish
  - terug naar ander pad
  - -punten
  - andere spelers Spellen spelen waar jij nodig bent
- Spel samen is iedereen naar dat punt
- Je trotseert een veen weide gebied met minigames (mgs)
  - mgs voor elementen morph chart
  - sommige kennis nodig
  - andere meer building hust

1.3

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Appendix N – The preparatory and afterwards form

N-1 Voorbereidend vragenformulier

Voorbereidend vragenformulier

- Antwoord de vraag eerst voor je eigen perspectief.
- Antwoord de vraag daarna ook voor de andere perspectieven hoe jij verwacht dat zij deze vraag zullen antwoorden.
- Je mag meerdere antwoorden aanvinken om meer nuance aan te brengen in je antwoord.

1. Wat is jouw rol?

2. Op welke dag doe je mee met het spel?

Vink alle toepasselijke opties aan.

- ☐ 7 april
- ☐ 8 april

3. (Voor het invullen, zie de tips onder de titel bovenaan) Vraag: Welke stakeholdergroepen zouden (volgens jou) waardevolle toevoegingen kunnen hebben aan gesprekken over oplossingen tegen bodemdaling in veenweidegebieden? - alles kan: je kan iedereen kiezen, niemand kiezen, een paar kiezen, jezelf wel of niet kiezen etc.-

Vink alle toepasselijke opties aan.

	Agrarische sector	Natuurbeheer	Overheid	Waterbeheer	Onderzoekscentra	Ik mis nog een groep
Agrarische sector	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐
Onderzoekscentra	☐	☐	☐	☐	☐	☐

4. Als je in de vorige vraag koos voor: 'ik mis nog een groep', welke groep was dat dan?

5. Denk jij dat alle veehouderijen kunnen blijven bestaan in dezelfde vorm?

Vink alle toepasselijke opties aan.

	Ja, er hoeft niets te veranderen	Ja, met eventueel kleine aanpassingen	Misschien moeten er een paar weg	Nee, de grond kan dit niet aan	Nee, er moeten grote maatregelen komen	Nee, er moeten minder koeien komen
Agrarische sector	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐

6. Zou er meer variatie moeten zijn in het grondgebruik op veengebieden?

Vink alle toepasselijke opties aan.

	Ja, variatie maakt de grond gezonder	Ja, variatie verhoogt de biodiversiteit	Ja, dat maakt het landschap afwisselender	Misschien, maar waar moeten de boerderijen dan heen?	Nee, dit landschap is typisch Nederlands	Nee, de boeren kunnen zo goed samenwerken
Agrarische sector	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐

7. Wat denk jij van subsidies voor CO2 besparing of boetes voor CO2 in veenweidegebieden?

Vink alle toepasselijke opties aan.

	Goed, beide zullen helpen voor minder CO2 uitstoot	Vooral subsidies motiveren mensen	Laat de uitstoters maar boetes betalen	Wie moet deze boetes dan gaan betalen?	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Uitstoot is onvermijdelijk, geldsystemen lossen niets op
Agrarische sector	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐

8. Denk jij dat onderwaterdrains een goede oplossing zijn om de bodemdaling tegen te gaan?

Vink alle toepasselijke opties aan.

	Ja, dit is de toekomst	Ja, maar er moet ook meer gebeuren	Misschien, maar kan het niet goedkoper?	Misschien, maar drukdrains zijn beter	Misschien, maar ik ga er niet voor betalen	Nee, afremmen van bodemdaling is niet genoeg	Nee, de waterstructuur kan dat niet aan
Agrarische sector	☐	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐	☐

9. Zie jij nog andere goede oplossingen om bodemdaling tegen te gaan?

Vink alle toepasselijke opties aan.

	Klei op veen aanbrengen	Minder intensieve veehouderij	Boeren moeten helemaal weg uit veengebieden	Toeristen trekken voor alternatieve inkomsten	Natte teelten kweken	Visteelt in de sloten als alternatieve inkomsten	Met plaatselijke wateropslag reguleren	Brak water gebruiken voor vernatting
Agrarische sector	☐	☐	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐	☐	☐

10. Wie of wat zal er het meeste lijden onder de huidige (!) omstandigheden in veenweidegebieden?

Vink alle toepasselijke opties aan.

	Koeien	Agrarische sector	Biodiversiteit	Klimaat	Weidevogels	Machines op het land	Waterkwaliteit	Overheid	Gewassen
Agrarische sector	☐	☐	☐	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐	☐	☐	☐

11. Wie of wat zal er het meeste lijden onder nieuwe (!) maatregelen (tegen bodemdaling) in veenweidegebieden?

Vink alle toepasselijke opties aan.

	Koeien	Agrarische sector	Biodiversiteit	Klimaat	Weidevogels	Machines op het land	Waterkwaliteit	Overheid	Gewassen
Agrarische sector	☐	☐	☐	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐	☐	☐	☐

N-2 Vragenformulier achteraf

Vragenformulier achteraf

- Zijn jouw eigen ideeën veranderd? Ben je bereid om meer nuance in je antwoord te leggen of ben je alleen maar sterker achter jouw standpunt gaan staan?
- Is jouw kennis over andermans standpunten veranderd?

- Antwoord opnieuw de vragen voor je eigen perspectief.
- Antwoord de vraag daarna ook voor de andere perspectieven hoe jij verwacht dat zij deze vraag zullen antwoorden. (misschien weet je daar nu wel net iets meer van)
- Je mag meerdere antwoorden aanvinken om meer nuance aan te brengen in je antwoord.

1. Wat is jouw rol?

_____

2. Op welke dag deed je mee met het spel?

Vink alle toepasselijke opties aan.

☐ 7 april
☐ 8 april

3. (Voor het invullen, zie de tips onder de titel bovenaan) Vraag: Welke stakeholdergroepen zouden (volgens jou) waardevolle toevoegingen kunnen hebben aan gesprekken over oplossingen tegen bodemdaling in veenweidegebieden? - alles kan: je kan iedereen kiezen, niemand kiezen, een paar kiezen, jezelf wel of niet kiezen etc.-

Vink alle toepasselijke opties aan.

	Agrarische sector	Natuurbeheer	Overheid	Waterbeheer	Onderzoekscentra	Ik mis nog een groep
Agrarische sector	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐
Onderzoekscentra	☐	☐	☐	☐	☐	☐

4. Als je in de vorige vraag koos voor: 'ik mis nog een groep', welke groep was dat dan?

5. Denk jij dat alle veehouderijen kunnen blijven bestaan in dezelfde vorm?

Vink alle toepasselijke opties aan.

	Ja, er hoeft niets te veranderen	Ja, met eventueel kleine aanpassingen	Misschien moeten er een paar weg	Nee, de grond kan dit niet aan	Nee, er moeten grote maatregelen komen	Nee, er moeten minder koeien komen
Agrarische sector	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐

6. Zou er meer variatie moeten zijn in het grondgebruik op veengebieden?

Vink alle toepasselijke opties aan.

	Ja, variatie maakt de grond gezonder	Ja, variatie verhoogt de biodiversiteit	Ja, dat maakt het landschap afwisselender	Misschien, maar waar moeten de boerderijen dan heen?	Nee, dit landschap is typisch Nederlands	Nee, de boeren kunnen zo goed samenwerken
Agrarische sector	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐

7. Wat denk jij van subsidies voor CO2 besparing of boetes voor CO2 in veenweidegebieden?

Vink alle toepasselijke opties aan.

	Goed, beide zullen helpen voor minder CO2 uitstoot	Vooral subsidies motiveren mensen	Laat de uitstoters maar boetes betalen	Wie moet deze boetes dan gaan betalen?	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Uitstoot is onvermijdelijk, geldsystemen lossen niets op
Agrarische sector	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐

8. Denk jij dat onderwaterdrains een goede oplossing zijn om de bodemdaling tegen te gaan?

Vink alle toepasselijke opties aan.

	Ja, dit is de toekomst	Ja, maar er moet ook meer gebeuren	Misschien, maar kan het niet goedkoper?	Misschien, maar drukdrains zijn beter	Misschien, maar ik ga er niet voor betalen	Nee, afremmen van bodemdaling is niet genoeg	Nee, de waterstructuur kan dat niet aan
Agrarische sector	☐	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐	☐

9. Zie jij nog andere goede oplossingen om bodemdaling tegen te gaan?

Vink alle toepasselijke opties aan.

	Klei op veen aanbrengen	Minder intensieve veehouderij	Boeren moeten helemaal weg uit veengebieden	Toeristen trekken voor alternatieve inkomsten	Natte teelten kweken	Visteelt in de sloten als alternatieve inkomsten	Met plaatselijke wateropslag reguleren	Brak water gebruiken voor vernatting
Agrarische sector	☐	☐	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐	☐	☐

10. Wie of wat zal er het meeste lijden onder de huidige (!) omstandigheden in veenweidegebieden?

Vink alle toepasselijke opties aan.

	Koeien	Agrarische sector	Biodiversiteit	Klimaat	Weidevogels	Machines op het land	Waterkwaliteit	Overheid	Gewassen
Agrarische sector	☐	☐	☐	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐	☐	☐	☐

11. Wie of wat zal er het meeste lijden onder nieuwe (!) maatregelen (tegen bodemdaling) in veenweidegebieden?

Vink alle toepasselijke opties aan.

	Koeien	Agrarische sector	Biodiversiteit	Klimaat	Weidevogels	Machines op het land	Waterkwaliteit	Overheid	Gewassen
Agrarische sector	☐	☐	☐	☐	☐	☐	☐	☐	☐
Natuurbeheer	☐	☐	☐	☐	☐	☐	☐	☐	☐
Overheid	☐	☐	☐	☐	☐	☐	☐	☐	☐
Waterbeheer	☐	☐	☐	☐	☐	☐	☐	☐	☐
Onderzoekscentrum	☐	☐	☐	☐	☐	☐	☐	☐	☐

Appendix O – The evaluation form

Evaluatie Samen door het veen

Neem de tijd om de vragen te beantwoorden, ik ben heel benieuwd naar jullie inzichten.

Er komen 5 secties langs:
- algemene indruk
- persoonlijk leren kennen
- perspectieven leren kennen
- eigen inzicht en ervaring
- afsluiting

Dankjewel voor het meedoen en het invullen!

Algemene indruk

1. Welke rol had je tijdens het spel?

_____

2. Op welke dag deed je mee aan het spel?

Markeer slechts één ovaal.

- ◯ 7 april
- ◯ 8 april

3. Ik vond dit spel (saai links en leuk rechts)

Markeer slechts één ovaal.

	1	2	3	4	5	
Saai om te spelen	◯	◯	◯	◯	◯	Leuk om te spelen

4. Ik vond dit spel (te makkelijk links en te moeilijk rechts, als het precies goed was, kies je 3)

Markeer slechts één ovaal.

	1	2	3	4	5	
Te makkelijk	◯	◯	◯	◯	◯	Te moeilijk

5. Mijn eerste indruk is in 1 zin:

_____

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6. Ik had het gevoel dat iedereen iets kon toevoegen zowel aan het spel als aan de gesprekken. (oneens links, eens rechts)

Markeer slechts één ovaal.

	1	2	3	4	
Oneens	◯	◯	◯	◯	Eens

7. Kan je uitleggen waarom je wel/niet denkt dat iedereen iets kon toevoegen aan het spel en de gesprekken?

8. Welk spelelement was het leukst, welke was het nuttigst en welke was het minst leuk en welke het minst nuttig? (schrijf op als: 'Leukst: ..., Nuttigst:... Minst leuk:... Minst nuttig:... ')

Persoonlijk leren kennen (2/5)

9. Ik heb het gevoel dat ik iedereen op persoonlijk vlak beter heb leren kennen (oneens links, eens rechts)

Markeer slechts één ovaal.

	1	2	3	4	
Oneens	◯	◯	◯	◯	Eens

10. Waardoor komt het dat je de andere spelers wel of niet beter hebt leren kennen op persoonlijk vlak?

11. Welk(e) spelelement(en) hielp(en) jou specifiek om de anderen op persoonlijk vlak te leren kennen?

12. Zou je de volgende keer als je met deze groep bij elkaar komt ...

Markeer slechts één ovaal per rij.

	Ja	Nee
...meer vertrouwen in elkaar hebben, omdat je elkaar nu beter hebt leren kennen?	◯	◯
... beter weten wat je van elkaar kunt verwachten, doordat je elkaar nu beter hebt leren kennen?	◯	◯
... het leuk vinden om elkaar opnieuw te spreken?	◯	◯

Perspectieven leren kennen

13. Ik heb de perspectieven van andere spelers beter leren inzien tijdens het spel (oneens links, eens rechts)

Markeer slechts één ovaal.

	1	2	3	4	
Oneens	◯	◯	◯	◯	Eens

14. Wat zijn de meest opvallende inzichten over de andere stakeholders die je hebt opgedaan tijdens het spel?

15. Welk(e) spelelement(en) hielp(en) jou specifiek om de perspectieven van anderen te leren kennen?

16. Ondanks dat je het niet met iedereen eens zal zijn, kan je nu wel beter begrijpen waarom iemand een bepaald perspectief heeft?

Markeer slechts één ovaal.

- ◯ Ja
- ◯ Nee

17. Geef eens een voorbeeld van een moment dat voor jou meer begrip bracht over hoe een ander tegen iets aan kijkt.

Eigen inzicht en ervaring

18. Sta je na dit spel meer open voor de ideeën van de andere stakeholders? (minder open links, meer open rechts; als er niets is veranderd, kies je 3)

Markeer slechts één ovaal.

	1	2	3	4	5	
Minder open	◯	◯	◯	◯	◯	Meer open

19. Waardoor komt het dat je meer of minder open staat voor anderen, of dat er niets is veranderd?

20. Heb je tijdens het spel (bewust of onbewust) rekening moeten houden met andermans denkwijze?

Markeer slechts één ovaal.

- ◯ Ja, regelmatig
- ◯ Ja, soms
- ◯ Nee, niet bewust
- ◯ Nee, helemaal niet

21. Tijdens welke onderdelen van het spel heb (bewust of onbewust) je rekening gehouden met andermans denkwijze?

22. Op welke manier heb je tijdens het spel rekening moeten houden met andermans denkwijze? (Omschreef je bijvoorbeeld iets op een manier die de ander beter zou begrijpen? Of stelde je bepaalde vragen die met de ander te maken hadden?) Geef een voorbeeld.

23. Welke inzichten over jezelf heb je opgedaan tijdens het spel?

(5/5)

Afsluiting

24. Wat heb je verder nog geleerd tijdens dit spel?

25. Ik heb nog meer ideeën/tips om het nóg beter te maken

26. Ik vond deze dingen juist al heel goed

Appendix P – The different analysis tables

When this is not clear, this link can be used as well:
https://docs.google.com/spreadsheets/d/19RtNwo2_llm1DF35zHjsGWi0BdTtkNhgydGMh5h35Ak/edit?usp=sharing

Table P-1

			Onderzoekscentrum		Waterbeheer	
			Voor	Na	Voor	Na
Welke stakeholdergroepen zouden (volgens jou) waardevolle toevoegingen kunnen hebben aan gesprekken over oplossingen tegen bodemdaling in veenweidegebieden?	Agrarische sector	07-04	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra
		08-04	Agrarische sector, Overheid, Waterbeheer	Agrarische sector, Overheid, Waterbeheer	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra	
	Natuurbeheer	07-04	Agrarische sector, Natuurbeheer, Waterbeheer	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra
		08-04	Agrarische sector, Natuurbeheer, Onderzoekscentra	Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	
	Overheden	07-04	Overheid	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra
		08-04	Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	
	Waterbeheer	07-04	Natuurbeheer, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra, **Lokale ondernemers**	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra **Lokale ondernemers**
		08-04	Agrarische sector, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	
	Onderzoekscentrum	07-04	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra
		08-04	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	

Overheid		Natuurbeheer		Agrarische sector	
Voor	Na	Voor	Na	Voor	Na
Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer, Overheid	Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra
Agrarische sector, Overheid	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Overheid, Waterbeheer, Onderzoekscentra	Onderzoekscentra	Agrarische sector, Natuurbeheer, Onderzoekscentra
Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Overheid, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Waterbeheer, Onderzoekscentra
Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra	Waterbeheer	Agrarische sector, Onderzoekscentra
Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra
Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Onderzoekscentra
Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer, Onderzoekscentra	Agrarische sector, Overheid, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Overheid, Onderzoekscentra
Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer	Agrarische sector, Waterbeheer, Onderzoekscentra
Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Natuurbeheer, Overheid, Waterbeheer	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer
Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Overheid, Waterbeheer, Onderzoekscentra	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra	Overheid	Agrarische sector, Natuurbeheer, Waterbeheer, Onderzoekscentra

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Table P-2

			Onderzoekscentrum		Waterbeheer		
			Voor	Na	Voor	Na	
Denk jij dat alle veehouderijen kunnen blijven bestaan in dezelfde vorm?	Agrarische sector	07-04	Ja, er hoeft niets te veranderen, Ja, met eventueel kleine aanpassingen	Ja, er hoeft niets te veranderen, Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	Ja, er hoeft niets te veranderen, Ja, met eventueel kleine aanpassingen	Ja, met eventueel kleine aanpassingen	J kl M e N m
		08-04	Ja, met eventueel kleine aanpassingen	Ja, met eventueel kleine aanpassingen	Ja, met eventueel kleine aanpassingen		J ve
	Natuurbeheer	07-04	Nee, er moeten minder koeien komen	Misschien moeten er een paar weg, Nee, de grond kan dit niet aan, Nee, er moeten minder koeien komen	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	N ni N m N k
		08-04	Nee, er moeten grote maatregelen komen	Nee, er moeten minder koeien komen	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen		N k
	Overheden	07-04	Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	N ni N m N k
		08-04	Nee, de grond kan dit niet aan	Misschien moeten er een paar weg	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen		M e
	Waterbeheer	07-04	Ja, met eventueel kleine aanpassingen	Misschien moeten er een paar weg, Nee, er moeten grote maatregelen komen	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	N ni N m
		08-04	Nee, de grond kan dit niet aan	Ja, met eventueel kleine aanpassingen	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen		N m
	Onderzoekscentrum	07-04	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	Ja, er hoeft niets te veranderen, Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen	N ni N m
		08-04	Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen	Misschien moeten er een paar weg, Nee, de grond kan dit niet aan		N ni

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Overheid		Natuurbeheer		Agrarische sector	
Voor	Na	Voor	Na	Voor	Na
Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg, Nee, er moeten grote maatregelen komen	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg, Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen	Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen	Ja, met eventueel kleine aanpassingen	Ja, met eventueel kleine aanpassingen
Ja, er hoeft niets te veranderen	Ja, er hoeft niets te veranderen, Ja, met eventueel kleine aanpassingen	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen, Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen	Ja, er hoeft niets te veranderen, Ja, met eventueel kleine aanpassingen
Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Nee, er moeten minder koeien komen	Nee, er moeten minder koeien komen	Nee, de grond kan dit niet aan	Misschien moeten er een paar weg
Nee, er moeten minder koeien komen	Nee, er moeten grote maatregelen komen	Misschien moeten er een paar weg, Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Nee, er moeten minder koeien komen	Misschien moeten er een paar weg
Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Misschien moeten er een paar weg	Misschien moeten er een paar weg, Nee, er moeten grote maatregelen komen	Nee, er moeten grote maatregelen komen	Nee, er moeten minder koeien komen
Misschien moeten er een paar weg	Nee, de grond kan dit niet aan	Misschien moeten er een paar weg	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen	Misschien moeten er een paar weg, Nee, er moeten minder koeien komen	Misschien moeten er een paar weg, Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen
Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen	Misschien moeten er een paar weg, Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Nee, de grond kan dit niet aan	Nee, de grond kan dit niet aan	Nee, de grond kan dit niet aan	Misschien moeten er een paar weg
Nee, er moeten grote maatregelen komen	Nee, er moeten minder koeien komen	Nee, er moeten grote maatregelen komen	Ja, met eventueel kleine aanpassingen, Nee, de grond kan dit niet aan	Nee, er moeten grote maatregelen komen	Misschien moeten er een paar weg
Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Nee, de grond kan dit niet aan	Nee, de grond kan dit niet aan	Misschien moeten er een paar weg	Ja, met eventueel kleine aanpassingen
Nee, de grond kan dit niet aan	Misschien moeten er een paar weg	Nee, de grond kan dit niet aan, Nee, er moeten grote maatregelen komen, Nee, er moeten minder koeien komen	Ja, met eventueel kleine aanpassingen	Misschien moeten er een paar weg	Misschien moeten er een paar weg

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Table P-3

			Onderzoekscentrum	
			Voor	Na
Zou er meer variatie moeten zijn in het grondgebruik op veengebieden?	Agrarische sector	07-04	Misschien, maar waar moeten de boerderijen dan heen?, Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken	Ja, variatie verhoogt de biodiversiteit, Misschien, maar waar moeten de boerderijen dan heen?, Nee, dit landschap is typisch Nederlands
		08-04	Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken	Misschien, maar waar moeten de boerderijen dan heen?
	Natuurbeheer	07-04	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender, Misschien, maar waar moeten de boerderijen dan heen?
		08-04	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender
	Overheden	07-04	Ja, variatie verhoogt de biodiversiteit	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit
		08-04	Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender
	Waterbeheer	07-04	Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie verhoogt de biodiversiteit, Misschien, maar waar moeten de boerderijen dan heen?
		08-04	Ja, dat maakt het landschap afwisselender, Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender
	Onderzoekscentrum	07-04	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender, Misschien, maar waar moeten de boerderijen dan heen?, Nee, dit landschap is typisch Nederlands	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Misschien, maar waar moeten de boerderijen dan heen?, Nee, dit landschap is typisch Nederlands
		08-04	Ja, variatie verhoogt de biodiversiteit	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender, Misschien, maar waar moeten de boerderijen dan heen?

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	Waterbeheer		Overheid		
	Voor	Na	Voor	Na	
	Misschien, maar waar moeten de boerderijen dan heen?, Nee, dit landschap is typisch Nederlands	Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie maakt de grond gezonder, Misschien, maar waar moeten de boerderijen dan heen?, Nee, dit landschap is typisch Nederlands	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender, Misschien, maar waar moeten de boerderijen dan heen?	
	Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken		Nee, de boeren kunnen zo goed samenwerken	Nee, de boeren kunnen zo goed samenwerken	
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit	Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit	Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit		Ja, variatie verhoogt de biodiversiteit		
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, dat maakt het landschap afwisselender	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit	
	Misschien, maar waar moeten de boerderijen dan heen?		Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie verhoogt de biodiversiteit	
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender			
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Nee, dit landschap is typisch Nederlands		Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit	
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie verhoogt de biodiversiteit		Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	
	Misschien, maar waar moeten de boerderijen dan heen?		Ja, variatie maakt de grond gezonder	Misschien, maar waar moeten de boerderijen dan heen?	

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	Natuurbeheer		Agrarische sector	
	Voor	Na	Voor	Na
en	Misschien, maar waar moeten de boerderijen dan heen?	Misschien, maar waar moeten de boerderijen dan heen?, Nee, de boeren kunnen zo goed samenwerken	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Misschien, maar waar moeten de boerderijen dan heen?, Nee, de boeren kunnen zo goed samenwerken	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Misschien, maar waar moeten de boerderijen dan heen?, Nee, de boeren kunnen zo goed samenwerken
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Misschien, maar waar moeten de boerderijen dan heen?, Nee, dit landschap is typisch Nederlands	Misschien, maar waar moeten de boerderijen dan heen?	Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken	Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken
	Ja, variatie verhoogt de biodiversiteit	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Nee, dit landschap is typisch Nederlands
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie verhoogt de biodiversiteit
	Ja, dat maakt het landschap afwisselender, Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken	Nee, dit landschap is typisch Nederlands	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender	Ja, variatie verhoogt de biodiversiteit
	Ja, variatie verhoogt de biodiversiteit, Nee, dit landschap is typisch Nederlands	Ja, variatie verhoogt de biodiversiteit	Ja, variatie maakt de grond gezonder, Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie maakt de grond gezonder, Ja, dat maakt het landschap afwisselender
	Ja, variatie maakt de grond gezonder	Ja, variatie maakt de grond gezonder	Ja, variatie verhoogt de biodiversiteit, Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit
		Ja, variatie maakt de grond gezonder	Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie verhoogt de biodiversiteit
	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender, Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie maakt de grond gezonder	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Ja, dat maakt het landschap afwisselender, Misschien, maar waar moeten de boerderijen dan heen?, Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit
en	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit	Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken	Ja, variatie maakt de grond gezonder, Ja, variatie verhoogt de biodiversiteit, Misschien, maar waar moeten de boerderijen dan heen?	Ja, variatie verhoogt de biodiversiteit, Nee, dit landschap is typisch Nederlands, Nee, de boeren kunnen zo goed samenwerken

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Table P-4

			Onderzoekscentrum		
			Voor	Na	
Wat denk jij van subsidies voor CO2 besparing of boetes voor CO2 in veenweidegebieden?	Agrarische sector	07-04	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?	CC en ha Uit ge
		08-04	Vooral subsidies motiveren mensen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Wi be
	Natuurbeheer	07-04	Laat de uitstoters maar boetes betalen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?	Go mi
		08-04	Laat de uitstoters maar boetes betalen	Goed, beide zullen helpen voor minder CO2 uitstoot	Vo me
	Overheden	07-04	Goed, beide zullen helpen voor minder CO2 uitstoot, Vooral subsidies motiveren mensen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?	Vo me
		08-04	Goed, beide zullen helpen voor minder CO2 uitstoot	Laat de uitstoters maar boetes betalen	La be
	Waterbeheer	07-04	Laat de uitstoters maar boetes betalen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?	Vo me La be
		08-04	Vooral subsidies motiveren mensen	Goed, beide zullen helpen voor minder CO2 uitstoot	Vo me
	Onderzoekscentrum	07-04	Goed, beide zullen helpen voor minder CO2 uitstoot, Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?	CC en
		08-04	Vooral subsidies motiveren mensen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Vooral subsidies motiveren mensen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Wi be

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	Waterbeheer		Overheid		
	Voor	Na	Voor	Na	
	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	Vooral subsidies motiveren mensen	Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	W be
en	Wie moet deze boetes dan gaan betalen?		Vooral subsidies motiveren mensen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	Wie moet deze boetes dan gaan betalen?	Vo W be Ui ge
	Goed, beide zullen helpen voor minder CO2 uitstoot	Vooral subsidies motiveren mensen	Goed, beide zullen helpen voor minder CO2 uitstoot, Laat de uitstoters maar boetes betalen	Goed, beide zullen helpen voor minder CO2 uitstoot, Vooral subsidies motiveren mensen, Laat de uitstoters maar boetes betalen	G m Vo C la
	Vooral subsidies motiveren mensen		Laat de uitstoters maar boetes betalen	Uitstoot is onvermijdelijk, geldsystemen lossen niets op	G m
	Vooral subsidies motiveren mensen	Vooral subsidies motiveren mensen	Goed, beide zullen helpen voor minder CO2 uitstoot, Vooral subsidies motiveren mensen	Goed, beide zullen helpen voor minder CO2 uitstoot, Laat de uitstoters maar boetes betalen, Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	G m Vo La be C la Ui ge
	Laat de uitstoters maar boetes betalen		Vooral subsidies motiveren mensen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Laat de uitstoters maar boetes betalen	G m
	Vooral subsidies motiveren mensen, Laat de uitstoters maar boetes betalen	Vooral subsidies motiveren mensen		Vooral subsidies motiveren mensen	C la Ui ge
	Vooral subsidies motiveren mensen		Laat de uitstoters maar boetes betalen	Uitstoot is onvermijdelijk, geldsystemen lossen niets op	G m
	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Vooral subsidies motiveren mensen		Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	C la
en	Wie moet deze boetes dan gaan betalen?		Goed, beide zullen helpen voor minder CO2 uitstoot	Vooral subsidies motiveren mensen	G m

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	Natuurbeheer		Agrarische sector	
	Voor	Na	Voor	Na
en p	Wie moet deze boetes dan gaan betalen?	Wie moet deze boetes dan gaan betalen?	Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen
	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	Wie moet deze boetes dan gaan betalen?, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op
es	Goed, beide zullen helpen voor minder CO2 uitstoot, Vooral subsidies motiveren mensen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Vooral subsidies motiveren mensen	Vooral subsidies motiveren mensen	Uitstoot is onvermijdelijk, geldsystemen lossen niets op
p	Goed, beide zullen helpen voor minder CO2 uitstoot	Goed, beide zullen helpen voor minder CO2 uitstoot, Vooral subsidies motiveren mensen	Vooral subsidies motiveren mensen, Laat de uitstoters maar boetes betalen	Uitstoot is onvermijdelijk, geldsystemen lossen niets op
es en	Goed, beide zullen helpen voor minder CO2 uitstoot, Vooral subsidies motiveren mensen, Laat de uitstoters maar boetes betalen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	Vooral subsidies motiveren mensen	Goed, beide zullen helpen voor minder CO2 uitstoot, Laat de uitstoters maar boetes betalen	Vooral subsidies motiveren mensen, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen
es	Goed, beide zullen helpen voor minder CO2 uitstoot	Goed, beide zullen helpen voor minder CO2 uitstoot, Laat de uitstoters maar boetes betalen	Goed, beide zullen helpen voor minder CO2 uitstoot, CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Goed, beide zullen helpen voor minder CO2 uitstoot, Laat de uitstoters maar boetes betalen
	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	Vooral subsidies motiveren mensen	Uitstoot is onvermijdelijk, geldsystemen lossen niets op
p	Goed, beide zullen helpen voor minder CO2 uitstoot	Goed, beide zullen helpen voor minder CO2 uitstoot	Wie moet deze boetes dan gaan betalen?	Uitstoot is onvermijdelijk, geldsystemen lossen niets op
en p	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen
	Goed, beide zullen helpen voor minder CO2 uitstoot	Vooral subsidies motiveren mensen, Wie moet deze boetes dan gaan betalen?, Uitstoot is onvermijdelijk, geldsystemen lossen niets op	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen	CO2 uitstoot is lastig te meten en dus lastig geld aan te hangen, Uitstoot is onvermijdelijk, geldsystemen lossen niets op

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Table P-5

			Onderzoekscentrum		
			Voor	Na	
Denk jij dat onderwaterdrains een goede oplossing zijn om de bodemdaling tegen te gaan?	Agrarische sector	07-04	Misschien, maar ik ga er niet voor betalen, Nee, de waterstructuur kan dat niet aan	Ja, dit is de toekomst, Misschien, maar kan het niet goedkoper?, Misschien, maar drukdrains zijn beter, Misschien, maar ik ga er niet voor betalen	Mi be Mi vo
		08-04	Misschien, maar ik ga er niet voor betalen	Misschien, maar ik ga er niet voor betalen	Mi be Mi vo
	Natuurbeheer	07-04	Ja, maar er moet ook meer gebeuren, Nee, afremmen van bodemdaling is niet genoeg	Ja, maar er moet ook meer gebeuren, Nee, afremmen van bodemdaling is niet genoeg	Ja ge Ne bo
		08-04	Nee, afremmen van bodemdaling is niet genoeg	Nee, afremmen van bodemdaling is niet genoeg	Mi vo
	Overheden	07-04	Misschien, maar kan het niet goedkoper?, Misschien, maar ik ga er niet voor betalen	Ja, maar er moet ook meer gebeuren, Misschien, maar kan het niet goedkoper?, Nee, afremmen van bodemdaling is niet genoeg	Ja ge Ne bo
		08-04	Ja, maar er moet ook meer gebeuren	Nee, afremmen van bodemdaling is niet genoeg	Mi go
	Waterbeheer	07-04	Misschien, maar kan het niet goedkoper?, Misschien, maar ik ga er niet voor betalen, Nee, afremmen van bodemdaling is niet genoeg, Nee, de waterstructuur kan dat niet aan	Misschien, maar kan het niet goedkoper?, Nee, afremmen van bodemdaling is niet genoeg, Nee, de waterstructuur kan dat niet aan	Ja ge Ne bo
		08-04	Ja, maar er moet ook meer gebeuren	Ja, maar er moet ook meer gebeuren	Ja ge Mi go Mi be
	Onderzoekscentrum	07-04	Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren, Nee, afremmen van bodemdaling is niet genoeg	Misschien, maar kan het niet goedkoper?, Misschien, maar drukdrains zijn beter, Nee, afremmen van bodemdaling is niet genoeg	Ja ge
		08-04	Misschien, maar drukdrains zijn beter	Misschien, maar drukdrains zijn beter	Mi vo

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Waterbeheer		Overheid	
Voor	Na	Voor	Na
Misschien, maar drukdrains zijn beter, Misschien, maar ik ga er niet voor betalen	Ja, maar er moet ook meer gebeuren, Misschien, maar kan het niet goedkoper?	Ja, dit is de toekomst, Misschien, maar kan het niet goedkoper?, Misschien, maar drukdrains zijn beter, Misschien, maar ik ga er niet voor betalen	Misschien, maar ik ga er niet voor betalen
Misschien, maar drukdrains zijn beter, Misschien, maar ik ga er niet voor betalen		Misschien, maar kan het niet goedkoper?, Misschien, maar ik ga er niet voor betalen	Misschien, maar ik ga er niet voor betalen
Ja, maar er moet ook meer gebeuren, Nee, afremmen van bodemdaling is niet genoeg	Ja, maar er moet ook meer gebeuren	Ja, maar er moet ook meer gebeuren, Nee, afremmen van bodemdaling is niet genoeg	Nee, afremmen van bodemdaling is niet genoeg
Misschien, maar ik ga er niet voor betalen		Nee, afremmen van bodemdaling is niet genoeg, Nee, de waterstructuur kan dat niet aan	Ja, dit is de toekomst, Nee, afremmen van bodemdaling is niet genoeg
Ja, maar er moet ook meer gebeuren, Nee, afremmen van bodemdaling is niet genoeg	Ja, maar er moet ook meer gebeuren	Ja, maar er moet ook meer gebeuren, Misschien, maar kan het niet goedkoper?, Misschien, maar ik ga er niet voor betalen, Nee, afremmen van bodemdaling is niet genoeg	Misschien, maar kan het niet goedkoper?, Misschien, maar ik ga er niet voor betalen, Nee, afremmen van bodemdaling is niet genoeg
Misschien, maar kan het niet goedkoper?		Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren, Misschien, maar kan het niet goedkoper?	Ja, dit is de toekomst
Ja, maar er moet ook meer gebeuren, Nee, afremmen van bodemdaling is niet genoeg	Ja, maar er moet ook meer gebeuren	Ja, maar er moet ook meer gebeuren, Nee, afremmen van bodemdaling is niet genoeg	Nee, afremmen van bodemdaling is niet genoeg
Ja, maar er moet ook meer gebeuren, Misschien, maar kan het niet goedkoper? Misschien, maar drukdrains zijn beter		Nee, de waterstructuur kan dat niet aan	Ja, dit is de toekomst, Misschien, maar drukdrains zijn beter
Ja, maar er moet ook meer gebeuren	Nee, de waterstructuur kan dat niet aan	Misschien, maar drukdrains zijn beter	
Misschien, maar ik ga er niet voor betalen		Misschien, maar drukdrains zijn beter, Nee, afremmen van bodemdaling is niet genoeg, Nee, de waterstructuur kan dat niet aan	Misschien, maar ik ga er niet voor betalen

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Natuurbeheer		Agrarische sector	
Voor	Na	Voor	Na
Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren, Misschien, maar kan het niet goedkoper?, Misschien, maar ik ga er niet voor betalen	Misschien, maar kan het niet goedkoper?, Nee, afremmen van bodemdaling is niet genoeg	Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren, Misschien, maar kan het niet goedkoper?, Misschien, maar drukdrains zijn beter	Ja, maar er moet ook meer gebeuren
Ja, dit is de toekomst, Misschien, maar kan het niet goedkoper?, Misschien, maar drukdrains zijn beter, Misschien, maar ik ga er niet voor betalen	Misschien, maar ik ga er niet voor betalen	Misschien, maar kan het niet goedkoper?, Misschien, maar ik ga er niet voor betalen, Nee, afremmen van bodemdaling is niet genoeg	Misschien, maar ik ga er niet voor betalen
Nee, afremmen van bodemdaling is niet genoeg, Nee, de waterstructuur kan dat niet aan	Nee, afremmen van bodemdaling is niet genoeg, Nee, de waterstructuur kan dat niet aan	Ja, maar er moet ook meer gebeuren, Misschien, maar ik ga er niet voor betalen, Nee, afremmen van bodemdaling is niet genoeg	Nee, afremmen van bodemdaling is niet genoeg
Ja, maar er moet ook meer gebeuren, Misschien, maar drukdrains zijn beter, Nee, afremmen van bodemdaling is niet genoeg	Nee, afremmen van bodemdaling is niet genoeg	Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren	Ja, dit is de toekomst
Misschien, maar kan het niet goedkoper?, Misschien, maar drukdrains zijn beter, Nee, de waterstructuur kan dat niet aan	Nee, afremmen van bodemdaling is niet genoeg	Ja, dit is de toekomst, Misschien, maar ik ga er niet voor betalen, Nee, afremmen van bodemdaling is niet genoeg	Misschien, maar ik ga er niet voor betalen
Misschien, maar kan het niet goedkoper?	Ja, dit is de toekomst, Misschien, maar ik ga er niet voor betalen	Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren, Misschien, maar kan het niet goedkoper?	Ja, dit is de toekomst
Misschien, maar drukdrains zijn beter, Nee, afremmen van bodemdaling is niet genoeg, Nee, de waterstructuur kan dat niet aan	Nee, de waterstructuur kan dat niet aan	Ja, maar er moet ook meer gebeuren, Misschien, maar ik ga er niet voor betalen, Nee, afremmen van bodemdaling is niet genoeg	Nee, afremmen van bodemdaling is niet genoeg
Ja, maar er moet ook meer gebeuren, Nee, de waterstructuur kan dat niet aan	Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren, Misschien, maar drukdrains zijn beter, Nee, de waterstructuur kan dat niet aan	Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren	Ja, dit is de toekomst
Ja, dit is de toekomst, Misschien, maar ik ga er niet voor betalen, Nee, afremmen van bodemdaling is niet genoeg, Nee, de waterstructuur kan dat niet aan	Nee, de waterstructuur kan dat niet aan		Nee, de waterstructuur kan dat niet aan
Ja, dit is de toekomst, Ja, maar er moet ook meer gebeuren, Misschien, maar drukdrains zijn beter, Nee, afremmen van bodemdaling is niet genoeg	Ja, dit is de toekomst	Ja, maar er moet ook meer gebeuren	Ja, dit is de toekomst

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Table P-6

			Onderzoekscentrum		
			Voor	Na	
Zie jij nog andere goede oplossingen om bodemdaling tegen te gaan?	Agrarische sector	07-04	Klei op veen aanbrengen, Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten	Klei op veen aanbrengen, Met plaatselijke wateropslag reguleren	To alt
		08-04	Klei op veen aanbrengen, Met plaatselijke wateropslag reguleren	Klei op veen aanbrengen, Met plaatselijke wateropslag reguleren	To alt
	Natuurbeheer	07-04	Boeren moeten helemaal weg uit veengebieden, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Natte teelten kweken, Met plaatselijke wateropslag reguleren	Mi Na Vis alt
		08-04	Boeren moeten helemaal weg uit veengebieden, Toeristen trekken voor alternatieve inkomsten	Minder intensieve veehouderij, Natte teelten kweken	Kl Mi Na Me re
	Overheden	07-04	Klei op veen aanbrengen, Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken	Mi Na
		08-04	Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten	Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken	
	Waterbeheer	07-04	Klei op veen aanbrengen, Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken	Natte teelten kweken, Met plaatselijke wateropslag reguleren	Mi Na Me re
		08-04	Klei op veen aanbrengen, Toeristen trekken voor alternatieve inkomsten	Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Mi To alt Na Me re
	Onderzoekscentrum	07-04	Klei op veen aanbrengen, Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Met plaatselijke wateropslag reguleren	Mi Na
		08-04	Klei op veen aanbrengen, Minder intensieve veehouderij, Met plaatselijke wateropslag reguleren	Klei op veen aanbrengen, Toeristen trekken voor alternatieve inkomsten	To alt Vis alt Me re

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Waterbeheer		Overheid	
Voor	Na	Voor	Na
Toeristen trekken voor alternatieve inkomsten	Toeristen trekken voor alternatieve inkomsten, Visteelt in de sloten als alternatieve inkomsten	Met plaatselijke wateropslag reguleren	Toeristen trekken voor alternatieve inkomsten, Met plaatselijke wateropslag reguleren
Toeristen trekken voor alternatieve inkomsten		Klei op veen aanbrengen, Toeristen trekken voor alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Toeristen trekken voor alternatieve inkomsten
Minder intensieve veehouderij, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten	Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken	Minder intensieve veehouderij, Met plaatselijke wateropslag reguleren	Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren
Klei op veen aanbrengen, Minder intensieve veehouderij, Natte teelten kweken, Met plaatselijke wateropslag reguleren		Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren
Minder intensieve veehouderij, Natte teelten kweken	Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten	Minder intensieve veehouderij, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren
		Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Brak water gebruiken voor vernatting	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Natte teelten kweken
Minder intensieve veehouderij, Natte teelten kweken, Met plaatselijke wateropslag reguleren	Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Met plaatselijke wateropslag reguleren	Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting
Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Met plaatselijke wateropslag reguleren		Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden	Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Met plaatselijke wateropslag reguleren
Minder intensieve veehouderij, Natte teelten kweken	Toeristen trekken voor alternatieve inkomsten, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Minder intensieve veehouderij, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Brak water gebruiken voor vernatting	Minder intensieve veehouderij, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren
Toeristen trekken voor alternatieve inkomsten, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren		Klei op veen aanbrengen, Minder intensieve veehouderij, Natte teelten kweken, Brak water gebruiken voor vernatting	Natte teelten kweken, Met plaatselijke wateropslag reguleren

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Natuurbeheer		Agrarische sector	
Voor	Na	Voor	Na
Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten	Klei op veen aanbrengen, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken	Met plaatselijke wateropslag reguleren	Met plaatselijke wateropslag reguleren
Klei op veen aanbrengen, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Met plaatselijke wateropslag reguleren	Klei op veen aanbrengen	Klei op veen aanbrengen
Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Natte teelten kweken	Minder intensieve veehouderij, Met plaatselijke wateropslag reguleren	Met plaatselijke wateropslag reguleren
Klei op veen aanbrengen, Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Met plaatselijke wateropslag reguleren	Klei op veen aanbrengen, Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Met plaatselijke wateropslag reguleren	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Met plaatselijke wateropslag reguleren	Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken
Natte teelten kweken, Brak water gebruiken voor vernatting	Minder intensieve veehouderij, Natte teelten kweken, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Minder intensieve veehouderij	Minder intensieve veehouderij, Natte teelten kweken
Klei op veen aanbrengen, Toeristen trekken voor alternatieve inkomsten, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Klei op veen aanbrengen, Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Met plaatselijke wateropslag reguleren	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Toeristen trekken voor alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden
Natte teelten kweken, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Natte teelten kweken, Met plaatselijke wateropslag reguleren	Minder intensieve veehouderij, Met plaatselijke wateropslag reguleren	Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren
Klei op veen aanbrengen, Toeristen trekken voor alternatieve inkomsten, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Klei op veen aanbrengen, Minder intensieve veehouderij, Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken
Natte teelten kweken	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Natte teelten kweken	Minder intensieve veehouderij, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Klei op veen aanbrengen, Met plaatselijke wateropslag reguleren
Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren	Klei op veen aanbrengen, Natte teelten kweken, Visteelt in de sloten als alternatieve inkomsten, Met plaatselijke wateropslag reguleren, Brak water gebruiken voor vernatting	Minder intensieve veehouderij, Boeren moeten helemaal weg uit veengebieden, Met plaatselijke wateropslag reguleren	Toeristen trekken voor alternatieve inkomsten, Natte teelten kweken

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Table P-7

			Onderzoekscentrum		Waterbeheer	
			Voor	Na	Voor	Na
Wie of wat zal er het meeste lijden onder de huidige (!) omstandigheden in veenweidegebieden?	Agrarische sector	07-04	Klimaat, Waterkwaliteit, Overheid	Biodiversiteit, Klimaat	Agrarische sector, Gewassen	Koeien, Agrarische sector, Machines op het land
		08-04	Klimaat, Waterkwaliteit	Waterkwaliteit, Overheid	Gewassen	
	Natuurbeheer	07-04	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Biodiversiteit, Klimaat	Biodiversiteit, Klimaat, Weidevogels	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels
		08-04	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Biodiversiteit, Klimaat, Weidevogels	Biodiversiteit	
	Overheden	07-04	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Overheid	Biodiversiteit, Klimaat	Biodiversiteit, Klimaat, Waterkwaliteit	Biodiversiteit, Klimaat
		08-04	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Biodiversiteit, Klimaat, Weidevogels, Overheid	Overheid	
	Waterbeheer	07-04	Waterkwaliteit	Biodiversiteit, Klimaat	Biodiversiteit, Klimaat, Waterkwaliteit	Biodiversiteit, Klimaat, Waterkwaliteit
		08-04	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Biodiversiteit, Klimaat, Weidevogels	Biodiversiteit	
	Onderzoekscentrum	07-04	Klimaat	Biodiversiteit, Klimaat	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit
		08-04	Biodiversiteit, Klimaat, Waterkwaliteit	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Biodiversiteit	

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Overheid		Natuurbeheer		Agrarische sector	
Voor	Na	Voor	Na	Voor	Na
Biodiversiteit, Klimaat, Waterkwaliteit	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Weidevogels, Machines op het land, Overheid, Gewassen	Koeien, Agrarische sector, Biodiversiteit, Machines op het land
Machines op het land, Gewassen	Klimaat	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Machines op het land, Gewassen	Agrarische sector, Biodiversiteit, Machines op het land	Agrarische sector, Machines op het land, Gewassen	Agrarische sector, Biodiversiteit, Machines op het land
Biodiversiteit, Klimaat, Weidevogels	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Koeien, Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Overheid	Koeien, Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Machines op het land, Gewassen	Agrarische sector, Biodiversiteit, Weidevogels, Waterkwaliteit	Agrarische sector, Biodiversiteit, Weidevogels, Waterkwaliteit
Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Machines op het land	Klimaat, Weidevogels	Biodiversiteit, Weidevogels
Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Overheid	Biodiversiteit, Klimaat, Waterkwaliteit, Overheid	Koeien, Agrarische sector, Biodiversiteit, Klimaat, Overheid, Gewassen	Koeien, Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Machines op het land, Gewassen	Biodiversiteit, Waterkwaliteit	Koeien
Biodiversiteit, Waterkwaliteit, Overheid	Biodiversiteit, Klimaat, Weidevogels	Agrarische sector, Biodiversiteit, Klimaat, Overheid	Biodiversiteit, Klimaat, Weidevogels, Overheid	Klimaat, Overheid	Klimaat
Waterkwaliteit	Waterkwaliteit, Overheid	Agrarische sector, Klimaat, Weidevogels, Waterkwaliteit	Waterkwaliteit	Agrarische sector, Biodiversiteit, Waterkwaliteit	Waterkwaliteit
Klimaat, Weidevogels, Waterkwaliteit	Biodiversiteit, Klimaat, Waterkwaliteit, Gewassen	Weidevogels	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Klimaat, Waterkwaliteit	Biodiversiteit, Weidevogels
	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Overheid	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Gewassen	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Gewassen	Agrarische sector
Koeien, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Overheid	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Gewassen	Biodiversiteit, Klimaat, Weidevogels	Agrarische sector, Biodiversiteit, Klimaat, Machines op het land, Waterkwaliteit, Gewassen	Biodiversiteit, Klimaat, Waterkwaliteit	Agrarische sector, Biodiversiteit

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Table P-8

			Onderzoekscentrum		Waterbeheer		
			Voor	Na	Voor	Na	
Wie of wat zal er het meeste lijden onder nieuwe (!) maatregelen (tegen bodemdaling) in veenweidegebieden?	Agrarische sector	07-04	Koeien, Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Machines op het land, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Weidevogels, Machines op het land, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Biodiversiteit, Machines op het land, Gewassen	Ko Ag Ma Ge
		08-04	Agrarische sector, Weidevogels, Machines op het land, Gewassen	Koeien, Agrarische sector, Machines op het land, Gewassen	Agrarische sector		Ko Ag Ma
	Natuurbeheer	07-04	Koeien, Agrarische sector, Machines op het land, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Biodiversiteit, Weidevogels, Machines op het land, Gewassen	Agrarische sector	Agrarische sector, Machines op het land, Gewassen	Ko Ag Ma Ge
		08-04	Agrarische sector, Machines op het land	Koeien, Agrarische sector, Machines op het land	Machines op het land		Bi Kl W W
	Overheden	07-04	Koeien, Agrarische sector, Machines op het land, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Machines op het land, Gewassen	Agrarische sector	Agrarische sector, Machines op het land, Gewassen	Ko Ag Ma Ge
		08-04	Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Machines op het land	Machines op het land		Ag Ov
	Waterbeheer	07-04	Koeien, Agrarische sector, Machines op het land, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Machines op het land, Waterkwaliteit	Agrarische sector	Agrarische sector, Machines op het land, Gewassen	
		08-04	Agrarische sector, Machines op het land, Gewassen	Machines op het land, Gewassen	Machines op het land		Bi Kl W
	Onderzoekscentrum	07-04	Koeien, Agrarische sector, Machines op het land, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Weidevogels, Machines op het land, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Machines op het land, Gewassen	Agrarische sector, Machines op het land, Gewassen	
		08-04	Agrarische sector, Machines op het land, Gewassen	Koeien, Machines op het land, Gewassen	Agrarische sector		Ag Bi Kl W W

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Overheid		Natuurbeheer		Agrarische sector	
Voor	Na	Voor	Na	Voor	Na
Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Gewassen	Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Gewassen	Biodiversiteit, Weidevogels, Machines op het land
Koeien, Agrarische sector, Machines op het land	Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Machines op het land, Overheid, Gewassen	Koeien, Agrarische sector, Machines op het land	Agrarische sector, Machines op het land, Waterkwaliteit, Gewassen	Koeien, Agrarische sector, Machines op het land
Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Machines op het land	Koeien, Agrarische sector, Gewassen	Koeien, Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Gewassen	Agrarische sector, Gewassen	Biodiversiteit, Weidevogels
Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Agrarische sector	Agrarische sector, Machines op het land, Overheid	Machines op het land, Overheid	Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Agrarische sector
Koeien, Agrarische sector, Machines op het land, Gewassen	Koeien, Agrarische sector, Machines op het land	Agrarische sector, Gewassen	Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit, Overheid	Agrarische sector	Biodiversiteit, Gewassen
Agrarische sector, Overheid	Agrarische sector	Overheid	Agrarische sector, Overheid	Klimaat	Overheid
	Machines op het land	Agrarische sector, Waterkwaliteit	Agrarische sector, Weidevogels, Waterkwaliteit	Agrarische sector, Gewassen	Biodiversiteit, Waterkwaliteit
Biodiversiteit, Klimaat, Waterkwaliteit	Agrarische sector, Machines op het land	Waterkwaliteit	Koeien, Agrarische sector, Overheid	Klimaat, Weidevogels, Waterkwaliteit	Agrarische sector
	Koeien, Machines op het land	Koeien, Agrarische sector, Gewassen	Agrarische sector, Weidevogels, Waterkwaliteit, Gewassen	Agrarische sector	Biodiversiteit, Gewassen
Agrarische sector, Biodiversiteit, Klimaat, Weidevogels, Waterkwaliteit	Agrarische sector	Waterkwaliteit	Koeien, Agrarische sector, Machines op het land, Overheid, Gewassen	Biodiversiteit, Klimaat, Waterkwaliteit	Agrarische sector

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Appendix Q – Answers to the evaluation form

5. Mijn eerste indruk is in 1 zin:

- een gezellig duidelijk spel waarbij alle onderwerpen over veenweidegebieden aan bod komen.
- confronterend op een subtiele positieve manier
- Het bord zag er ingewikkeld uit, maar het spel was makkelijk te leren.
- Het spel zit leuk in elkaar met verschillende soorten spellen.
- Zag er ingewikkeld uit. Veel paden en weinig structuur (leek het)
- Heel erg leerzaam en leuk om met elkaar in gesprek te gaan.
- Het spel is knap gemaakt.
- Gezellig
- Leuke inzichten, maar in real life is het natuurlijk leuker, en meer ruimte voor discussie

7. Kan je uitleggen waarom je wel/niet denkt dat iedereen iets kon toevoegen aan het spel en de gesprekken?

- iedereen bekeek de sitauatie vanuit een andere kant en iedereen zocht een oplossing die in zijn ogen goed was
- Niet iedereen had evenveel kennis over het onderwerp. Er was wel een basiskennis, maar de onderzoekerscentrumpersoon wist eigenlijk zoveel, dat niemand daar echt meer zn eigen belangen tegenover durfde te zetten.
- Iedereen had een andere kijk op hoe de situatie in elkaar steekt en welke oplossingen effectief zouden zijn. De antwoorden bij de spelletjes brachten goed aan het licht dat ieder het vanuit een andere invalshoek bekeek. Soms werd ook duidelijk hoe de gedachten van de een aankwamen bij de ander en wat diens praktische bezwaren/kanttekeningen daarbij waren. Al ging het om kleine dingen, het zijn wel dingen waar je zelf niet aan hebt gedacht of die blijkbaar voor de ander belangrijker zijn dan voor jou.
- Door de multiplayer spellen kon je een eigen mening in inzicht vertellen. Alleen omdat niet iedereen aan een spel mee kon doen, wist je niet wat iedereen er over denkt.
- De minigames maakte dat wel mogelijk. Je werd gepusht om iets te zeggen.
- Elke actor heeft veel kennis en iedereen kon duidelijk haar mening geven.
- Voor mijn gevoel heeft de overheid niet heel veel toegevoegd. Hij hield zich een beetje afzijdig en had voor mijn gevoel niet een hele sterke mening en ook geen inhoudelijke toevoegingen.
- Hun rol in het veenweidegebied is anders dan verwacht die onderdeel moet zijn voor de oplossing.
- Iedereen kwam sowieso aan de beurt en werd daardoor "gedwongen" iets te zeggen.

8. Welk spelelement was het leukst, welke was het nuttigst en welke was het minst leuk en welke het minst nuttig? (schrijf op als: 'Leukst: ..., Nuttigst:... Minst leuk:... Minst nuttig:... ')
leukst: minigames
Nuttigst: minigames
minst leuk: Geheime opdracht
minst nuttig: geheime opdracht

leukst: die 5 dingen noemen,
nutigst: die 5 dingen opnoemen,
minst leuk: die gesnoerde mondkaartjes vielen bij mijn niet zo goed.
Minst nuttig: geen idee.

Leukst: groepsopdrachten.
Minst leuk: ik had nog wel even door kunnen praten a.d.h.v. het spel. Al zou dat in een werkelijke situatie waarschijnlijk uitgebreid plaatsvinden.
Nuttigst: dat spelletje met vijf vragen voor de ander. Dat gaf veel inzicht in welk thema iemand belangrijk vond en wat diegene dacht van de ander.
Minst nuttig: op zichzelf waren de persoonlijke vragen niet nuttig, maar het maakte het geheel wel vriendschappelijker en gezelliger. Ik kan niet iets aanwijzen dat mij echt onnodig leek.

Leukst: de wiedespellen
nuttigst: de argumentenveld
Minst leuk:tekenen
minst nuttig: tekenen

Leukst: geheime opdracht
Nuttigst: minigames (met één of meerdere)
Minst leuk: stellingen
Minst nuttig: geheime opdracht

Leuks: gesprekken tussendoor,
Nuttigst: gesprekken en discussie over het onderwerp,
minst leuk: weet nu niks,
minst nuttigst: de spelelementen.

Leukst: geheime taak;
nuttigst: samen een post-it vinden waar we het allemaal mee eens waren;
minst leuk: minigames waar ik niet aan mee mocht doen;
minst nuttig: ga drie stappen terug

Leukst: socializen,
Nuttigst: Het eens zijn met hetzelfde argument,
Minst leuk: Geheime taak,

Minst nuttig: Geen

Leukst: tekenen
Nuttigst: Argumenten game
Minst leuk: Mini game waarbij iedereen binnen bepaalde tijd dingen moest opnoemen (onder tijdsdruk werden soms foute antwoorden genoemd, en het leidde niet echt tot discussie/ andere inzichten)

10. Waardoor komt het dat je de andere spelers wel of niet beter hebt leren kennen op persoonlijk vlak?

- door de geheime vragen en de minigames
- door de opdrachten waarbij je letterlijk mensen vragen moet stellen over hun situatie en hun leven.
- Wel, omdat met de opdrachten ook vaak persoonlijke dingen werden gevraagd en je samenwerkte in teamverband. Niet, omdat het daar te kort voor was en er ook veel inhoudelijke elementen in het spel zaten. Maar voor de gegeven tijd denk ik dat het zeker bevorderend is voor de relaties tussen de deelnemers
- Er werd wel wat gevraagd maar je bent natuurlijk ook vooral bezig met het spel.
- Wel omdat ik heel veel geheime opdrachten heb moeten doen. Hierbij is het vaak op persoonlijk vlak en dat moet je subtiel doen waardoor je direct een gesprek hebt.
- Door de geheime opdrachten en de vragen die werden gesteld.
- Er kwamen niet echt persoonlijke gesprekken op gang.
- door de mini-games
- Omdat er ook geheime kaarten inzaten waarbij je persoonlijke dingen moest vragen, leuke toevoeging!

11. Welk(e) spelelement(en) hielp(en) jou specifiek om de anderen op persoonlijk vlak te leren kennen?

- minigames
- die vragen als je op zo'n grasvakje ging staan. en die groepsopdrachten waren ook heel goed.
- De individuele opdrachten.
- De geheime taken.
- Geheime opdracht
- geheime kaart en discussie achteraf
- De geheime taken waren lastig om nonchalant in te zetten omdat er geen persoonlijke gesprekken spontaan ontstonden, maar ze dwongen je er wel toe deze te starten.
- "Vind jij" spel, en zoek een gezamenlijk argument met een reden.
- De geheime kaarten en de pauze

14. Wat zijn de meest opvallende inzichten over de andere stakeholders die je hebt opgedaan tijdens het spel?

- Mij viel vooral op dat de overheid het niks uit maakt als de boeren weggekocht zouden worden of hoge kosten moeten maken die eigenlijk helemaal niet uit kunnen. Kortom de overheid heeft niks met de boer!
- Dat eigenlijk niemand echt weet waar een boer allemaal mee bezig is naast het praktische deel (koeien melken enzo)
- Agrariers zijn meer bezig met de problematiek dan ik voorheen dacht en hebben een constructievere opstelling.
  Onderzoekers hebben uiteenlopende meningen over oplossingen voor de problematiek.
  Overheden meten milieueffecten en uitstoot met elk andere maatstaven.
  Natuurorganisaties zijn niet pertinent tegen agrariers in veenweidegebieden.
- Van de onderzoekscentrum: hij vertelde dingen waarvan ik geen weten afwist. Ook de agrarische sector.Hoe die tegen dit probleem aankeken.
- Natuurbeheer is behoorlijk meedenkend in het agrarische perspectief, wat goed is voor het verdere verloop.
- Dat de agrarische sector toch nog wel erg conservatief is en niet echt te wachten staat op verandering.
- De overheid vindt problemen voor boeren door eventuele maatregelen een ondernemingsrisico, zelfs als bedrijven failliet gaan door maatregelen van de overheid.
  Het onderzoekscentrum vond het niet nodig om af te schalen en dacht dat enkel technische oplossingen zouden volstaan. (Eigenlijk viel dat wel enigszins te verwachten, maar ik was er toch door verrast)
  De agrarische sector leek erg onverschillig. Als ze er zelf maar niet te veel voor hoefde te betalen, leek ze alles wel best te vinden. Misschien wist ze ook gewoon niet zo goed wat ze ervan moest vinden.
- van de onderzoekscentra en waterbeheer.
- De overheid geeft niet veel om de boeren, en ziet een gedwongen verhoging van het waterpeil als ondernemersrisico.
  Boeren staan wel degelijk open voor verandering, mits er voldoende geld tegenover staat.
  Natuurbeheer ziet niet veel in drukdrainage, ook al kan dit helpen het waterpeil te verhogen, wat mogelijk gunstig is voor natuurbeheer zoals weidevogels.

15. Welk(e) spelelement(en) hielp(en) jou specifiek om de perspectieven van anderen te leren kennen?

- De minigames. Met dit spel kwam je erachter hoe een ander over de oplossing denkt en hoe zij er naar kijken.
- dat er naderhand gesproken werd met de hele groep, hoewel dat niet echt een spelelement was. Maar wat betreft spelelement, waarschijnlijk die weidekaarten van die grasvakjes
- De memobriefjes waren behulpzaam, net zoals andere elementen. Het was meer dat bij sommige opdrachten net iets aan bod kwam en ook een

gelegenheid zich aanbood om een vraag te stellen over iets dat in voorgaande spellen opviel bij een ander. Ik kan niet echt een specifiek ding aanwijzen.
- het argumenten veld en het vragen naar een mening.
- Minigames en de nabespreking.
- Discussie achteraf en de stellingen
- Gezamenlijke post-its vinden, dat maakte het concreet.
- "vind jij" en zoek een gezamenlijk argument
- Argumenten game

17. Geef eens een voorbeeld van een moment dat voor jou meer begrip bracht over hoe een ander tegen iets aan kijkt.

- onderzoekscentra dacht ook aan belangen van de boer. dit bleek uit zijn vragen en opmerken over de kosten van de drains.
- toen ik hoorde dat de boeren best vaak te maken hebben met internationale wetten en buurlanden
- Poeh dit had je me eigenlijk direct na afloop van het spel moeten vragen. Bij de onderzoeker was het dat hij iets antwoordde op een vraag en daar hoorde ik wat opvallends in. Dus vroeg ik daar in het wisselen van de beurten naar. Bij de agrarier speelde ik bijv een spelletje met die memobriefjes met statements, waarbij we er een moesten zoeken waar we het beide mee eens waren. Ik hoorde haar praktische bezwaren tegen natte teelt en ook dat zij de noodzaak inzag van het verhogen van het waterpeil. En dat zij ook inzag dat veenweide niet het meest geschikt was voor vee.
- de agrarische sector. Ik dacht dat de agrarische sector wat minder mee zouden denken ovr aanpassingen doen, maar ze waren wel bereid om dat te doen.
- Het is nog niet helemaal duidelijk, maar ben het veelal met men eens. Het is niet dat het spel daar veel extra aan heeft toegevoegd. Wellicht komt dit doordat ikzelf er heel diep in zit.
- De agrarische sector gaf aan dat dit echt haar droom is en dan snap ik heel goed dat je ergens voor gaat.
- Wat ik net al noemde, de overheid ziet boeren als ondernemers met ondernemingsrisico en vindt dat de overheid niet heel veel verantwoordelijkheid heeft; onderzoekscentrum is veel bezig met technische oplossingen en denkt dat die kunnen volstaan
- Dat iemand zei van op papier klinkt het zo makkelijk en leren we het zo, maar in de praktijk is het toch anders als ik het zo hoor.
- De overheid ziet een gedwongen verhoging van het waterpeil dus als ondernemersrisico. Hij kon wel goed uitleggen dat het een complex vraagstuk is omdat er veel belangen zijn, en hierin heeft hij natuurlijk gelijk, en dit kweekte begrip. Maar ik heb ook het idee dat er bij de overheid weinig kennis is over de agrarische sector. Een gedwongen waterpeil verhoging werd bijvoorbeeld vergeleken met een verhoging van de alcoholleeftijd, wat misplaatst is.

19. Waardoor komt het dat je meer of minder open staat voor anderen, of dat er niets is veranderd?

- ik stond open voor een oplossing maar als ik hoor hoe de overheid over de kosten hiervan denkt sta ik er minder open voor.
- Ik was al heel erg open
- Ik sta meer open, omdat iedere actor echt andere dingen inbrengt. Voorheen dacht ik dat we allemaal over hetzelfde praatten maar andere belangen hadden. Nu zie ik dat we de situatie ook vanuit verschillende invalshoeken bekijken.
- omdat ik dingen geleerd heb door de ogen van een waterbeheerder, dacht ik dat het een makkelijke oplossing zou zijn. Door kennis van de andere stakeholders weet ik dat het anders is.
- Ik ben al heel intensief met verschillende stakeholder perspectieven bezig, daardoor kon het spel hier waarschijnlijk al minder aan toevoegen.
- Omdat iedereen heel erg open was.
- Ik stond denk ik al erg open voor ideeën van anderen en ik heb niet het gevoel dat het spel daar veel aan veranderd heeft eerlijk gezegd.
- meer kennis over de andere sectoren is aanwezig.
- Ik heb het idee dat ik al redelijk goed de standpunten wist van een aantal stakeholders, omdat ik met mijn onderzoek nauw betrokken ben met alle stakeholders in het veenweidegebied. En ik vraag me ook lichtelijk af of een groep studenten (met niet allemaal evenveel kennis over veenweide) wel een goed beeld geeft van de daadwerkelijke perspectieven van stakeholders (neemt niet weg dat het heel interessant was!). Om nog wat specifieker erop in te gaan, heb ik nu minder begrip gekregen voor de overheid omdat ik het idee heb dat ze te weinig kennis hebben over de agrarische sector, en misschien iets meer begrip voor natuurbeheer, omdat ze lijken mee te willen werken aan oplossingen.

21. Tijdens welke onderdelen van het spel heb (bewust of onbewust) je rekening gehouden met andermans denkwijze?

- ik weet zo niet welk onderwerp. Maar je wilt de toekomst van de melkveehouderij niet negatief laten klinken maar toch ziet de toekomst er wel zo uit...
- Tijdens het noemen van 5 dingen, en met die overeenkomende mening vinden.
- Met die memobriefjes bijvoorbeeld, toen we in korte tijd moesten bedenken waar alle partijen mee in zouden stemmen.
- -
- De stellingen
- post-its zoeken waar we het allemaal mee eens waren
- zoek een gezamenlijk argument en vind jij
- Tijdens de argumenten game, maar ook tijdens het overleg achteraf

22. Op welke manier heb je tijdens het spel rekening moeten houden met andermans denkwijze? (Omschreef je bijvoorbeeld iets op een manier die de ander beter zou begrijpen? Of stelde je bepaalde vragen die met de ander te maken hadden?) Geef een voorbeeld.

- _
- Ik legde inderdaad iets op een andere manier uit zodat het beter begrepen zou worden.
- Bij dat spel kwamen vooral mijn vooroordelen aan bod, omdat ik probeerde te kijken waar ik dacht dat we het beide over eens zouden zijn. Ik bleek het echter behoorlijk fout te hebben.
- Het enige wat ik merkte was dat ik een beetje uitkeek om hele extreme standpunten neer te zetten. De ambiance was meer om genuanceerde posities in te nemen.
- Omdat je bij het post-its zoeken beperkt de tijd had, moest je een voorstel doen voor een stelling waar je dacht dat anderen het ook mee eens konden zijn.
- De denkwijze van mij kan totaal anders zijn, om mijn denkwijze niet meteen te uiten, gaf ik eerst de beurt aan iemand anders om zijn/haar denkwijze te horen.
- Ik kom zelf natuurlijk ook van een boerderij, waardoor mijn mening soms hard overkomt tegenover bijvoorbeeld natuurbeheer of overheid hoe ik over de agrarische sector denk, waardoor ik in mijn uitleg soms wat meer nuance aanbracht om meer begrip te tonen voor andere stakeholders.

23. Welke inzichten over jezelf heb je opgedaan tijdens het spel?

- ik wist nog helemaal niet zoveel over drainage
- Dat ik een nog kleiner onderdeel ben van een geheeld dan ik al dacht
- Dat ik meer waarde zou moeten hechten aan participatie van stakeholders
- Dat ik op sommige vlakken verkeerd was over hoe anderen ergens over dachten.
- Dat ik vrij diep in het veengebied zit en ook vrij veel er vanaf weet.
- Dat ik wel vind dat de boeren veel moeten oplossen en dat de rol van de overheid eigenlijk niet zo groot zou moeten zijn met hulp aan de boer, maar wel streng op regelgeving
- Ik heb weer even ingezien dat ik toch een beetje in een groene bubbel zit en dat ik de natuur waarschijnlijk hoger heb staan dan anderen. Ik vind van mezelf dat ik erg meedenkend ben en mee wil denken over de beste oplossingen voor iedereen, maar niet iedereen ziet dezelfde problemen als ik of vindt die net zo belangrijk.
- Ik draag meer kennis over veenweide dan ik eerst dacht. Verder is mijn denkwijze best wel logisch en staat gelukkig ook in lijn met andere stakeholders.
- Dat ik meer dan ik dacht voorstander ben van de veehouderij zoals hij nu is, wel met kleine duurzame aanpassingen voor de toekomst.
  Ook dat je goed rekening moet houden met de vele belangen in het veenweidegebied. De agrarische sector is niet de enige "eigenaar" en de enige die bepaald wat er gebeurd.

24. Wat heb je verder nog geleerd tijdens dit spel?

- oplossing voor de veendaling
- Dat als je je eigen standpunt uitlegt, soms mensen dat niet oppikken, je moet dat voorzichtig brengen.
- Interessante weetjes. Zoals wat onderwaterdrainage mogelijk doet met het bodemleven.
- Dat het probleem niet opgelost kan worden en dat we ook buiten nederland eigenlijk afspraken moeten maken.
- In gesprek blijven is het belangrijkst.
- Dat veel actoren wel iets zien in compensatie van de boer
- Ik merkte dat het nog lastiger was dan ik dacht om bij de opdracht over post-its het eens te kunnen worden in een korte tijd. Dus, ik heb geleerd dat het soms wel kan lijken alsof er consensus is en dat men elkaar begrijpt en met elkaar meeleeft, maar dat als puntje bij paaltje komt, het toch niet lukt om een besluit te nemen over een juiste maatregel.
- Ik heb geleerd dat waterbeheerders zelf zeggen dat ze slecht zijn in communicatie en dat communicatie heel belangrijk is voor een goede samenwerking en bereidwilligheid van verschillende actoren.
- dat de tijd snel voorbij kan gaan
- De verschillende studies die er zijn. Mensen leren kennen. Dingen over waterbeheer in Nederland.

25. Ik heb nog meer ideeën/tips om het nóg beter te maken

- het spel niet via teams. ik denk dat de contact dan nog soepeler verloopt. (maar ik snap dat het in dit geval wel moest.)
- Een soort van eindspel met iedereen na de finish en als je die dan haalt dan win je écht.
- Meer discussie na afloop van het spel en deze enquete direct na het spel geven. Het is nu al een beetje weggezakt bij me.
- misschien om iets meer de tijd te geven bij de tijdspellen
- Wellicht is de user interface beter te maken, gebruiksvriendelijker (terugkijkend op het feit dat niet iedereen de stappenkaarten kon aanklikken).
- Misschien een biologische boer toevoegen aan het gezelschap.
- Ik denk dat meer persoonlijke interactie het nog beter zou laten werken. Je had dat al met die geheime taken, maar zulk soort spelelementen met een andere focus kunnen er meer in denk ik. De sfeer bleef nu nog een beetje stijf en formeel. Het kan ook goed zijn dat dat heel anders is als het niet online gespeeld wordt.
- Bij sommige elementen mag er van mij iets meer ruimte zijn om dieper op het onderwerp in te gaan. Nu werd er vaak een mening of een standpunt genoemd zonder dat iemand de gelegenheid had om dit goed uit te leggen. Dat zorgde er juist niet voor dat je nader tot elkaar komt. Ik vind dit een lastig punt, omdat je zei dat het ook juist niet de bedoeling was om in het spel heel diep op de inhoud in te gaan en echt naar een oplossing te gaan zoeken.

Maar als het spel bedoeld is om meer onderlinge verbinding te creëren zou je de nadruk meer op overeenkomsten kunnen leggen dan op de verschillen.
- Onlangs hebben we met de studie ook een serieus game gedaan en die was zo gemaakt dat verschillende belanghebbenden een gezamenlijk doel kregen. Inhoudelijk, en niet alleen samen over de finish komen.
- langere discussiemomenten of andere discussiemomenten
- In Real life werkt zo'n spel natuurlijk intuïtiever, maar door corona is dat helaas niet mogelijk. Zoals hiervoor al genoemd vond ik de meerdere personen mini games te weinig discussie opleveren, terwijl dat (in mijn ogen) juist het belangrijkst is van zo'n spel. Er ging dus naar mijn idee relatief veel tijd zitten in het spelen van het spel in plaats van in discussie.

26. Ik vond deze dingen juist al heel goed
- ik vind het bordspel knap gemaakt
- de rest van het spel was eigenlijk echt al super duper goed over nagedacht. Niks op aan te merken. :)
- Het ging allemaal vlot en het spel was niet te gecompliceerd. Dat maakte het genoeg om aanleiding te geven tot interessante gespreken na afloop en niet genoeg om al gelijk in heftige discussies verzeild te raken.
- Ik vind het heel knap dat je zo iets leuks neer heb kunnen zetten in een online versie. Dat lijkt mij heel lastig. De spellen die je bedacht hebt zijn heel goed. de begeleiding van het spel was super!
- Het gehele concept is zeker goed! Bord ziet er overweldigend uit, maar blijkt simpeler dan verwacht.
- De discussie, gesprekken en heb echt een leuke middag gehad.
- De post-its werkte heel goed, zoals ik al meerdere keren heb gezegd inmiddels ;)
- De geheime taken waren ook goed om elkaar beter te leren kennen.
- Het tekenen vond ik erg leuk.
- Het was goed om een gemeenschappelijk doel te hebben.
- Knap spelbord en leuk met al die minigames.
- de minigames
- Complimenten hoe je dit spel in elkaar hebt gezet! je kunt zien dat je er veel tijd in hebt gestopt, en het is een heel geregel om alles online voor elkaar te krijgen, maar het is je gelukt! Leuk dat je veel verschillende onderdelen had, en dat er ook persoonlijke vragen in zaten om elkaar beter te leren kennen.