

# ‘One Health’ Design Thinking: The effects on zoonotic awareness of stakeholders within nature-inclusive farming

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## ABSTRACT

Disease and prevention control is a complex (wicked) problem that involves stakeholders across human, animal, and environmental interests. Increasing zoonotic risk awareness is needed for creating sustainable solutions through regulations, policy, and execution of measures. To orchestrate this complex challenge a design thinking session with a One Health view was designed. The effects on the awareness of stakeholders using this session were examined. The study was conducted as a qualitative case study focused on zoonotic risks within nature-inclusive agriculture. The current context of nature-inclusive farming was examined and the design thinking session was tested using a multi-stakeholder set-up. Increased awareness is discussed through the interplay between design thinking & systems thinking through One Health. Providing knowledge sharing through discussions and holistic perspective taking. The paper discusses the positioning of the session within risk identification and management processes as a warming-up exercise. For aligning perspectives and understanding a One Health stakeholder ecosystem in a pragmatic way.

## CCS CONCEPTS

• Human-centered computing • Collaborative and social computing • Collaborative and social computing design and evaluation methods

## KEYWORDS

Design thinking, Systems thinking; Multi-stakeholder, zoonotic risk management; One Health; case study

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## INTRODUCTION

Zoonoses are diseases transmitted by animals to humans. Human-to-animal contact increases the chance of transmission of unknown diseases to humans. Contact includes proximity (air), physical contact, or eating food from animals. Transmission can lead to the emergence of new, possibly deadly, diseases [11]. In a worst-case scenario, a disease that can spread from human to human can lead to an epidemic or even pandemic [29]. Relevant examples are the Q-fever outbreak and the Covid-19 pandemic [15][29]. The risk for zoonotic transmission and possibly an outbreak is, however, present with every animal-to-animal and human-to-animal contact. This includes livestock farming, the keeping of companion animals, globalization and transport, wild animals, vectors, changes in climate/biodiversity, and rewilding [4].

Disease and prevention control of zoonoses is a complex (wicked) problem that involves many stakeholders [72]. Zoonotic risk management is complex as emerging zoonotic diseases are difficult to predict. The challenge involves a large number of stakeholders with, in some cases, opposing needs and perspectives [25][72]. In addition, there are no clearly defined solutions to the problem as the risk of zoonotic transmission depends on “various anthropogenic, genetic, ecologic, socioeconomic, and climatic factors” [25]. As a result, there is a need for analysis of zoonotic risks and the introduction of preventive measures [4][69]. Within, for example, livestock farming regulations such as the confinement duty of animals have been introduced to prevent outbreaks such as the bird flu from spreading uncontrollably [6]. However, as mentioned by the report of Bekedam et al. [2021] many risks of zoonoses within society remain insecure and unknown.

As advised by Bekedam et al. [2021] the risk of zoonotic transmission may be decreased through increased zoonotic literacy. Bekedam et al. [2021] describes zoonotic literacy as ‘(...) the importance that knowledge and awareness in the field of zoonoses are much more widely disseminated.’ The identification of risks, creation of policy, and the implementation of measures around zoonoses asks for both a varied expert and non-expert (e.g. farmers), on the surface, perspective. Next to the human

perspective, animal and environmental perspectives need to be considered [4][25]. These perspectives are represented by expert veterinarians and varying biologists. As a result, stakeholders have varying levels of zoonotic literacy, varied interests, and different expertise. This increases the complexity of communication and discussion around policy and measures [72]. It is, therefore, more difficult to comply with all perspectives and create effective and desirable solutions. Increased zoonotic literacy may increase knowledge, awareness, and resulting communication about zoonoses between stakeholders [4][72].

Within this case study, the transition to nature-inclusive farming is examined. An area where zoonotic literacy should increase [4]. Nature-inclusive farming, within this research, is described as farming where animals are brought back into nature and a varied ecosystem becomes part of agriculture [57]. Currently, however, risks are unknown and there is little policy or measures for zoonotic risk management imposed for nature-inclusive agriculture. In addition, it is unsure if zoonoses are taken into account as a risk by involved parties within the transition to nature-inclusive farming by farmers [4].

This problem is present in the Brabant region in the Netherlands as well. Where BrabantAdvies organises the 'Brabants Kennisnetwerk Zoönosen' (BKZ). This initiative brings together professionals from the human, veterinary and environmental sectors [40]. This project was done in collaboration with BrabantAdvies and therefore includes a multi-stakeholder set-up where experts within and related to the BKZ are consulted.

An opportunity to use design methodology was recognized in order to support the problem of zoonotic risk management. To increase zoonotic literacy for stakeholders within nature-inclusive farming a multi-stakeholder session was designed for this research. The session was designed using the design thinking approach and includes 4 exercises based on design methodology [12]. Design thinking is a relevant approach to be applied in this context due to its strength in creating human-centred solutions. It can be applied to complex societal problems based on varied needs from different perspectives [39]. In addition, the session made use of a One Health (OH) perspective, using the One Health approach [11][25]. Focusing on humans, animals, and the environment when defining risks in order to create an increased awareness of zoonotic risks from all three perspectives, rather than through a human lens only.

The goal of this case study was to investigate effects on awareness of zoonotic risk through use of a Design thinking session. This research specifically focused on awareness, as zoonotic literacy consists of several stages [4]. The study does not extend enough to measure the effects on zoonotic literacy in general. Awareness is, however, part of becoming more literate about zoonoses [4][52]. In addition, the session focused purely on risk identification. As mentioned by Bekedam [2021] analysis needs to be done on risks before creating new policies and measures by, for instance, LNV [18]. Lastly, the study itself focused on explaining the current

context and effects of the designed session, not elaborating on existing/known risks within prevention and disease control. As a result, the design research question of the study was stated as follows:

Main research question:

- “How does a risk identification session based on a design thinking approach with a One Health perspective, contribute to the awareness of zoonotic risk within nature-inclusive agriculture?”

Sub research question:

- “What does Design thinking with a One Health view add to the experience of stakeholders using the session?”

The session was designed based on contextual interviews with nine different stakeholders. The session itself was attended by seven attendees from six different expert stakeholders including a farmer, GGD (gathering data & monitoring), veterinarians & the (local) government. The effects of the session were first tested solely with experts present as the session required previous knowledge about zoonoses. After the session, an analysis was done about the experience with the session using a questionnaire. Interviews were held to understand the effect on awareness. Lastly, a questionnaire was sent to farmers including a video. In order to understand the possible effects of the session for non-expert stakeholders and a desire to follow such a session.

## RELATED WORK

As the research combines a variety of approaches and processes the related work describes the most important fields in literature related to this study. At the end of the section, the conclusion explains the combination of fields within this study and the resulting gap.

### Risk management

Risk is described as “the measure of probability (likelihood) and consequences of not achieving the defined goal” and is built up as a correlation between likelihood and impact according to Smith et al. [2006] [63]. In addition, risk management (RM) is “a systematic way of looking at areas of risk and consciously determining how each should be treated.” [75]. It is used within entrepreneurial as well as social and ecological challenges and is described as ‘highly contextual and case-specific’ [8][26][49].

RM consists of several steps in order to create a strategy for risk reduction [65]. The three main steps within the process are risk identification, risk analysis, and risk evaluation [71]. As identification is the first step in the process of RM, the designed session focuses solely on risk identification. Stoneburner et al. [2002] mentions that within risk identification is essential to identify with the system, and scope it to identify threats.

Biosecurity is part of RM and is described as a way to “(...) cover strategies to assess and manage the risks of infectious diseases,

quarantined pests, invasive alien species, living modified organisms, and biological weapons.” [42] The measures are created through means of stakeholder investigations. As mentioned by Reed & Curzon [2015] [54] stakeholder mapping is essential for the governance of biosecurity and is applied through means of various techniques around the world: “Stakeholder mapping for biosecurity may therefore usefully combine top-down and participatory approaches, working with stakeholders to identify categories.”

RM is supported through frameworks, and workshops. Frameworks within RM are created within a certain area of interest or for a case study [26]. For example, the study by Pittinger et. al. [1998] uses a participatory workshop, including stakeholder discussions to create an ecological risk assessment framework. The study by Goh et al. [2013] [28] describes a RM workshop within a construction project as a comprehensive way to define risks. These workshops are generally described in cases involving human actors and previously identified risks. This study includes non-human actors and a variety of unknown risks [4].

Next to frameworks, tools exist to assess risk. An example of a case-specific tool is the Failure Mode and Effect Analysis tool (FMAE) [60]. The FMAE tool provides a way to step-wise identify and score risks, using a column-like structure. However, the tool is critiqued for being prone to participant judgments and assessments can be ambiguous [37][60].

RM and risk identification remain a difficult and often case-specific challenge. Although efforts to structure and systemize the RM process [71]. The frameworks found, generally only provide a structure for connecting stakeholders. Not a pragmatic way to actually connect them [26][75]. As prevention of disease and control is described as a multi-stakeholder challenge including many actors and needs, there is an opportunity to go beyond using frameworks and tools and use more creative ways to tackle the wicked challenge [72].

### **Wicked problems & design thinking**

#### *Wicked problems*

A wicked problem is described as a problem that “for each attempt to create a solution changes the understanding of the problem” [38]. A careful approach to involving stakeholders is necessary in order to guide the wicked problem of zoonotic risk management [72].

Projects tackling wicked problems aim to create solutions through creating shared understanding through means of stakeholder involvement [48]. The project of eZoon, focusing on prevention and disease control of zoonoses, identifies stakeholders through a contextual inquiry and value specification [72]. An extensive list of stakeholders is identified and analyzed in order to involve the right parties to come to conclusions.

#### *Design thinking*

Design thinking is an established way of working within the innovation process of corporations and institutions [39][55][67]. It supports stakeholders with identifying solutions by going through an iterative approach with the use of numerous tools [39]. Additionally, design thinking may provide a way for moving into new perspectives to create a “newly shared and coherent set of beliefs”. According to Liedtka [2013] [36] this is hypothesized to be achieved through the “emphasis on visualization and prototyping”. Within case studies, sessions with stakeholders are organized in order to frame challenges [14]. As described by the IDEO design thinking way of working this can be done with a fixed structure. Empathize, define, ideate and prototype [33].

Design thinking has in successful ways been applied for risk identification. An example found is the study by Lewis et al. [2020] [35]. For risk identification, this study concludes design thinking helped in being more efficient in decision making. Within the define stage, the approach helped for “narrowing, selecting, and refining the risk.” Design thinking has been applied within policy making as well, a context where this study eventually aims to. As mentioned by Mintrom [2016] [44] design thinking within policymaking can help through participant observation, open-to-learning conversations, mapping, and sensemaking.

Design thinking with a multi-stakeholder can provide a new perspective on the challenge of prevention and disease control. Studies found illustrate that design thinking methodology and tools are able to create a new shared perspective. Within the studies found, however, the perspective and shared understanding stay confined to the human actors, despite representing animal and environmental actors [14][72].

#### *One Health approach*

The One Health (OH) approach is a widely used paradigm that is used to “to provide more effective, evidence and systems-based health interventions” [64][25]. The approach focuses on the health of animals, humans, and the environment. Prevention and disease control is at the heart of OH, where the goal is to include the interest of animals and the environment subsequent to that of the human. The approach is mentioned within policies and frameworks [10][26][72]. However, concretely implementing OH is “unfortunately rare” [64]. The effect of the approach is therefore questioned and critiqued [23][56]. Especially as executing multidisciplinary collaboration with a goal of shared understanding requires intensive coordination. As mentioned by dos S. Ribeiro et al. [2019] [58] veterinary, environmental and medical experts should work together within interdisciplinary teams through “integration of real world expertise for knowledge co-creation”.

However, as argued by Friese & Nuyts [2017] [23] OH still creates hierarchy by seeing human health as first priority next to animal and environmental health. The anthropological concept of post-humanism goes further, imposing no hierarchy between actors [20]. Post-humanism is used in combination with design technology to

bring stakeholders into the perspective of the non-human by following the non-human actor [23]. A post-human perspective can create a better understanding of the relationships that cause zoonotic transmission instead of focusing on a chain of causes, currently done within public health [56].

A more pragmatic approach is required for OH in order to support stakeholders in considering decisions across multiple perspectives [47][64]. Additionally, within this study, the One Health paradigm is approached with a post-humanistic lens, seeing animals and the environment as equal to humans. In order to achieve a greater sense of perspective taking for stakeholders [23]. In order to retain familiarity, the term 'One Health' is used within this study for describing the non-hierarchical relationship between animals, humans, and the environment.

#### *Awareness*

Awareness is described as: "knowledge that something exists, or understanding of a situation or subject at the present time based on information or experience" [16][73]. This research also describes awareness in the broadest sense, not focusing on one type of knowledge. Within other research, awareness is widely described as one of the first stages for changing behaviour within certain practices or environments [68]. Within the transtheoretical model of Prochaska et al. [2019] [52] this phase is described as precontemplation (no awareness) and contemplation (awareness). The transtheoretical model for behaviour change is applied within practices ranging from healthcare, on an individual level to education and public awareness programs [30]. Other models of behaviour change include the behaviour model of Balm [3] and the I-change model from [70]. Both models mention openness and understanding as part of becoming aware as first steps in changing behaviour.

Within risk management, behaviour change models are often used to create risk awareness and therefore reduce risk for the targeted audience [22][62]. Depending on the study setting, different strategies may have an effect on increasing risk awareness. In the paper by Freivogel et al. [2020] an education video helps to increase risk awareness and therefore reduce risk. Within multi-stakeholder projects using behaviour change models can cause a major change in implementation, risk awareness is the first step in this process [45]. In addition, reaching awareness amongst different stakeholder groups is seen as a challenge. Doing this is important for engagement and alignment further into the risk management process [41].

#### **Conclusion**

Risk management with a focus on prevention and disease control has provided measures and regulations to prevent outbreaks from occurring within (intensive) livestock farming [15][29]. Biosecurity measures in some cases are applicable to nature-inclusive farming [18]. However, defining zoonotic risks remains a complex, wicked problem with a need for multi-stakeholder alignment [72].

Design thinking methodology can support stakeholders by connecting involved parties and by letting stakeholders empathise with different perspectives [36][39]. In addition, design thinking has shown to be an effective way to provide opportunities within RM cases [14]. The addressed importance of the One Health approach provides an opportunity within the project to implement the approach into the Design thinking methodology in a pragmatic way. The study therefore combines a design thinking session with focus on risk identification with a pragmatic One Health perspective. The One Health perspective in this research is viewed through a post-humanistic lens [20][23]. The effects on awareness of stakeholders within the session is measured. Awareness encompassing knowledge and understanding about all aspects of the zoonotic risk challenge.

By doing this a new variation of a design thinking session is proposed which is hypothesised to create increased awareness by alleviating blind spots for stakeholders. Providing perspectives across all parts of OH, aiming to simplify the wicked problem of prevention and disease control. This is the first step in increasing the shared understanding of zoonotic risk and therefore zoonotic literacy within nature-inclusive farming [4].

## **METHODOLOGY**

This case study followed a multi-stakeholder research through design approach [7]. The research focuses on gathering qualitative data through means of a contextual inquiry which includes 9 expert stakeholder interviews (Table 1). The stakeholders were conducted through a stakeholder identification conducted through stakeholder mapping [54][72]. Second, a multi-stakeholder design thinking session was conducted. For this session a design thinking session with One Health view was designed consisting of 4 exercises. Following the session, two evaluation methods were conducted. A UEQ was sent out to participants in order to investigate experience in a quick manner. In addition, individual evaluations were held through means of short interviews set up using the Most Significant Change technique (MSC) [13]. Lastly, a questionnaire was sent out to non-expert stakeholders, in this case farmers. A video was included about the project to illustrate the earlier conducted session. The research process can be overviewed in Figure 1. A set of findings and insights are presented within this study to show the effects on awareness and experience of stakeholders within this session and possible positioning of the session.

Throughout the project a group of experts was consulted. The expert group is related to BrabantAdvies and consists of three members. The expert group provided guidance, feedback and input throughout the study. As all three expert members were part of the

**Table 1: Participants of the contextual inquiry interviews**

Interview number	Participant number	Stakeholder/expert	Function
P1	1, 2	ZLTO, LTO	Portfolio manager healthy animals, policy worker
P2	3	GD Animal Health	Manager Swine Health Department Royal GD
P3	4	Utrecht University	Vet-microbiologist and parasitologist
P4	5	GGD	Physician Society and Health; Infectious Disease Control
P5	6	Senior Global Health consultant	Vice-chairman
P6	7	Wageningen University & Research	Professor, Emerging and Zoonotic Viruses
P7	8	Het <u>krulstaartje</u>	Owner, student
P8	9	BrabantAdvies	Policy advisor
P9	10	BAJK	Director

multi-stakeholder session (Table 2, participant A2, A4, A7) , the findings have been taken up in the findings of the contextual inquiry, session and the discussion.

### Contextual inquiry

First, a stakeholder identification and mapping was conducted through means of consults with the expert group and literature research. A stakeholder list was created and relevant stakeholders were contact. Following this, semi-structured interviews were conducted across a variety of stakeholders to understand the current context and knowledge about the topic [46] (Appendix C). The interviews were held separately per stakeholder and lasted half an hour to an hour each. A topic guide was used to guide all interviews in a similar direction. During the interviews general notes were written down. All interviews were recorded under consent from a consent form and later transcribed using Microsoft Word Transcribe [43] and edited afterwards using intelligent verbatim transcription [34]. The transcripts were used to call back to quotes within future steps of the research. The interviewed stakeholders including corresponding functions are listed in table 1.

### Multi-stakeholder Design thinking session

Using the Design thinking approach from IDEO [33] and the FMEA tool as structural inspiration a session with 4 assignments

was created [60]. The tool was iterated upon multiple times and discussed with the expert group accordingly. Based on the contextual interviews and prior made stakeholder list, stakeholders were invited for the session. All members of the expert group participated. In total, 7 participants joined the session. An overview can be found in table 2. No farmers without any previous knowledge on zoonoses were present during this session as the study aimed to find out changes in awareness for experts first. Organising the session with a threshold of expert level would lessen the chance for confusion and need for prior education about zoonoses. The session was recorded and notes were written down during the session by an Industrial Design student joining the session to assist.

### Session evaluation

#### Interviews

Following the multi-stakeholder Design thinking session, evaluating interviews were conducted with 5 out of 7 attendees. Each interview was semi-structured and lasted between 10 and 20 minutes (Appendix D). The questions within the interviews were set-up taking inspiration from the 'Most Significant Change' (MSC) technique [13] to deduct the biggest change for participants using the session. The interviews were transcribed using Microsoft Word Transcribe [43] and edited afterwards using intelligent

**Table 2: Attendees of the multi-stakeholder design thinking session**

Attendee number	Stakeholder	Participated in contextual interview	Participated in User Experience questionnaire	Participated in evaluation interview	Comment
A1	Q-support	No	No	No	Was only present half of the session
A2	BrabantAdvies	No	Yes	Yes	
A3	BrabantAdvies	No	Yes	Yes	
A4	Topigs Norvin	No	Yes	Yes	
A5	GGD	No	Yes	No	
A6	Het <u>krulstaartje</u>	Yes	Yes	Yes	
A7	Doctor MG, environmental medical science.	No	No	Yes	

verbatim transcription [34]. All interviews were recorded under consent. The transcripts were used to call back to quotes within future steps of the research.

*User Experience Questionnaire*

Next to the evaluating interviews a User Experience Questionnaire (UEQ) [31] was sent to the session attendees. The questionnaire was directly downloaded from the UEQ website in Dutch and taken over in Google Forms. Eventually 5 out of 7 participants filled out the UEQ (Table 2). Participants A1 and A5 had too little time for the evaluation interviews to be conducted. Afterwards, the UEQ was analysed using the analytical tool provided on the UEQ website (Appendix F).

**Farmer questionnaire & video**

Lastly, a video was created explaining the goal of this research and the iterated session assignments. This video became part of a questionnaire which was sent to farmers from BAJK and ZLTO. Both questionnaires were sent within a newsletter of the concerned organisation and filled in anonymously under consent. The questionnaire was structured as follows (Appendix G):

1. Questions about current zoonotic risk knowledge within nature-inclusive farming
  2. Showing the video
  3. Asking about opinion and imagined experience with the tools.
- In the end, X farmers participated in the questionnaire.

The questionnaire was eventually filled in by 2 participants. One farmer partly executing a nature-inclusive initiative (Farmer 1) and one regular farmer (Farmer 2). Both farmers have cattle and let visitors on their farm.

The amount of participants was too small to deduct quantitative findings from. The questionnaire was unfortunately sent to farmers around the time new nitrogen regulations were announced in the Netherlands [1]. So focus for farmers was likely on this subject matter.

**DESIGN**

For the design of the session, the Design Thinking methodology [33][36] and the structure of the Failure Mode and Effect analysis (FMAE) tool [61] were used as an inspiration for creating the exercises within the design thinking session. The FMEA is originally used to identify risks within products but provides concrete steps to identify risks and has been used in a variety of sectors [9][32]. The template of this tool was examined and the columns provided within the tool were used as a starting point for creating the assignments within the session.

As the session mainly focused on risk identification, only the first two phases of the Design Thinking process were run through [36]. The first two exercises cover the ‘Empathize’ phase, the third and fourth the ‘Define’ phase. Before the session a small introduction about the topic, introduction round and question round was provided (Appendix E). The 4 assignments were designed as follows:

*Nature-inclusive change cards & map*

As a first assignment nature-inclusive change cards were created. The aim of the cards is to empathise with the context of nature inclusive farming [36]. Participants were asked to share knowledge and brainstorm about possible ideas [36]. A way to familiarise with each other, understand the scope and expand understanding of nature-inclusive farming. The cards included photos to illustrate the context. The assignment itself did not focus on creating an holistic

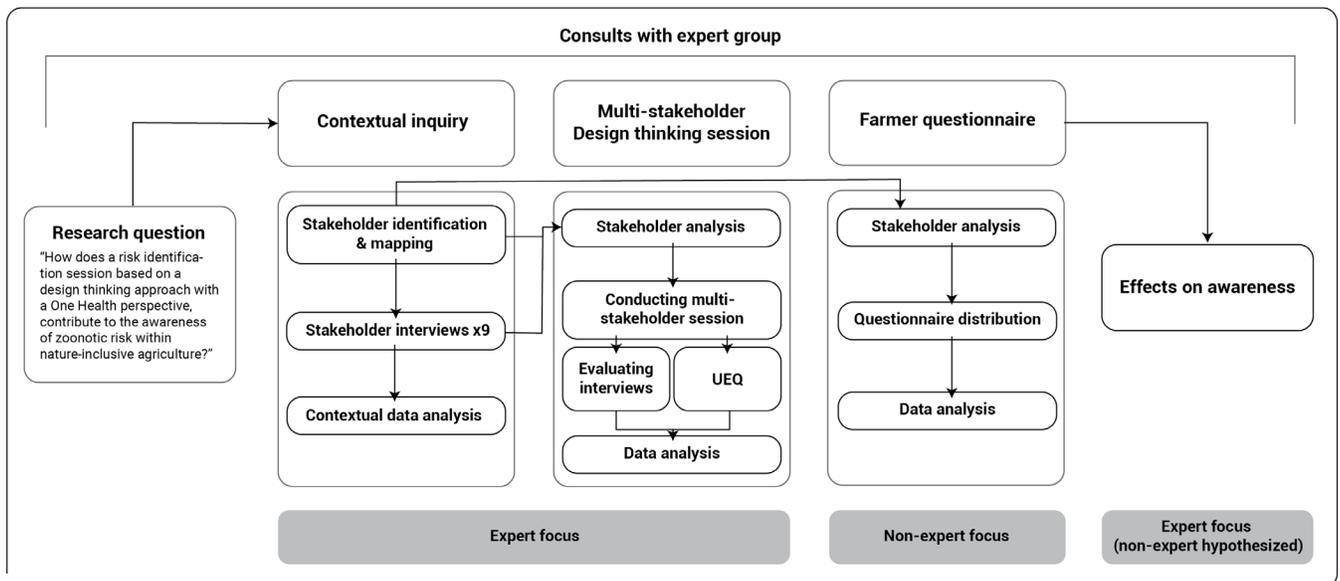


Figure 1: Design research process overview

view of the situation, rather a focus on specific changes and vectors to narrow down to identification.

Additionally, a map of a farm was provided to serve as inspiration and a discussion tool. A map was chosen to illustrate the nature-inclusive farming context and get stakeholders acquainted with a real life situation. The research by Ashley et al. [2] uses the FMAE tool and introduces a map of a healthcare environment to better identify risks. The map in this study had a significant effect on finding unknown risks.

During the session participants were asked to list changes within nature-inclusive farming on change cards. Three examples were provided within the session which were derived from the contextual interviews. The examples listed were: contact point between animals and visitors, open grassland, pathway next to farm. Each participant was asked to list zoonotic risks under a specific nature-inclusive change.

*One Health personas*

As a second assignment persona cards were handed out to participants. Personas are a widely used technique within interaction design to illustrate scenarios and engage participants effectively. In addition, personas can be used to display both quantitative and qualitative data [53].

Personas seemed a fitting way for stakeholders to change perspectives towards different actors as the cards verbalise a personality. This is done showing needs, gains and pains, a technique used within design thinking methodology [17]. In addition, personas have the ability to personalise the non-human. So both animals and the environment can be verbalised into a first-person perspective [21][66]. A persona can thus create empathy by

moving outside of a human actor and into a non-human one by presenting it as human-like. With feelings, motives and frustrations. Helping to physicalize OH as well [64].

For the session, four personas were created to empathise with different actors of the One Health approach: A farmer, a visitor of a farm, a pig and the environment. Participants were asked to examine, edit and complement the personas before giving feedback within a discussion.

*One Health empathy maps*

The One Health empathy map is an iteration on a customer empathy map used within service design methodology [74]. The customer empathy map is used to design persona's and therefore create empathy for a particular actor. According to [19] it describes the 'environment, behaviour, aspirations and concerns' of a customer.

As the persona exercise focuses on three different actors surrounding OH. An empathy map is provided for each OH actor. In order to specify the behaviour, aspirations and concerns for a specific context a possible risk for zoonotic transmission from exercise one is chosen as a shared perspective. As a result, the exercise aimed to overview different perspectives in a structured way. Creating a stepping stone for designing desired solutions that take into regard all perspectives. Visualising concerns and behaviours to understand other actors to greater extent and balance interests against each other [19].

Participants were asked to choose a zoonotic risk from exercise one themselves and fill out the empathy maps within duo's. Each group was then asked to compare the way actors behaved, experienced and felt within a situation and communicate the findings to the other group.

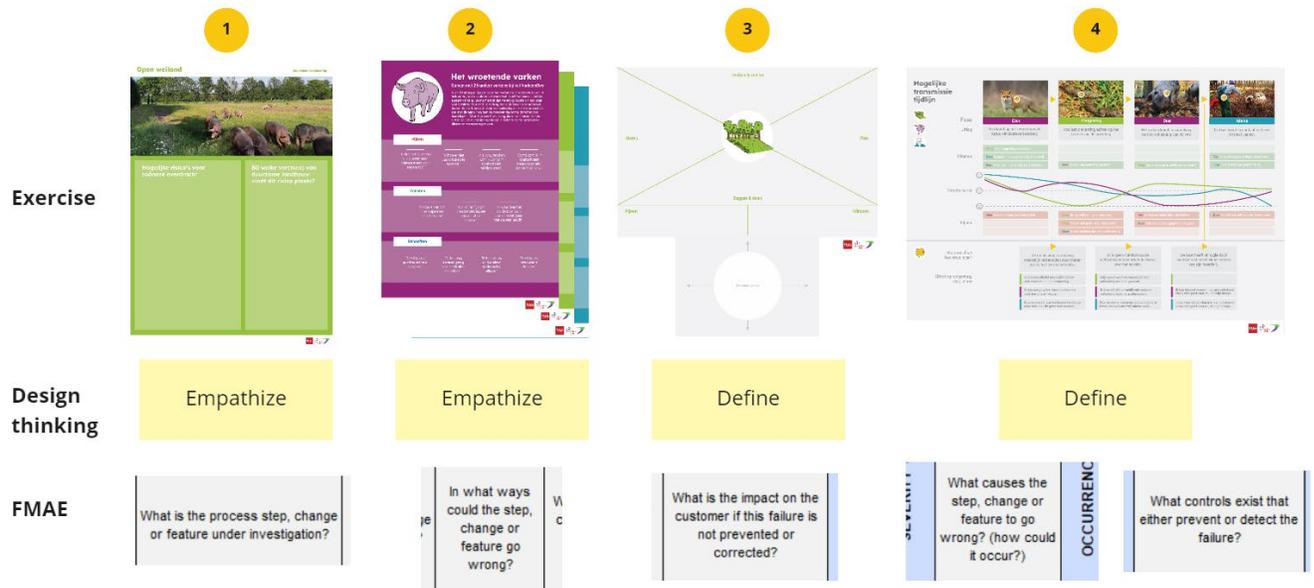


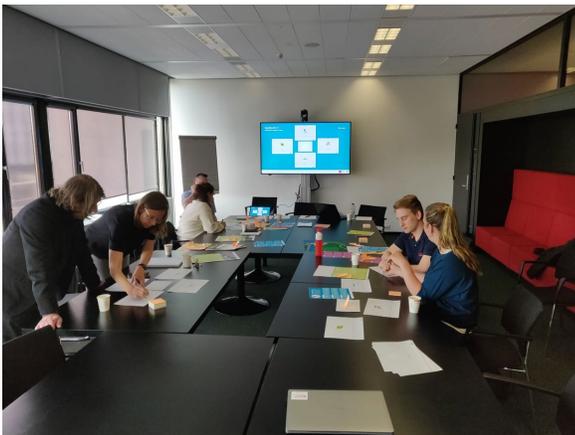
Figure 2: Session assignments with Design Thinking and FMAE structure

### *Possible transmission timeline*

For the last assignment it was decided to create a tailored version of a customer journey, often used within Service Design methodology [74]. A customer journey shows a process through time from the perspective of an actor. It is used to identify 'moments of truth' where the experience of an actor can improve [74]. Translating this to prevention and disease control would mean identifying solutions for biggest risks.

By taking the structure of a customer journey a transmission timeline is created. As the previous assignments focused on the perspective of animals, humans and the environment, this assignment addresses the perspective of a zoonoses itself. In order to better understand why a certain transmission takes place. Again visualising this through a designerly approach, being able to discuss complex risks in a more simple way [36].

As mentioned by [23] a more post-human view of OH would "follow the non-human". The customer journey structure allows to follow a disease through time. A virus persona was created to provide a clear perspective of a zoonotic disease spreading within a specific scenario. Stakeholders were asked to look at a filled out example made by the researcher and create a timeline themselves of the zoonotic risk within exercise three.



**Figure 3: The multi-stakeholder design thinking session being conducted at the Provinciehuis in Den Bosch**

### **Pilots**

Before the multi-stakeholder session two separate pilot feedback sessions were conducted to gather feedback about the exercises within the session. The first pilot was conducted with two students from Industrial Design at the University of Technology in Eindhoven. The second pilot feedback session was held with one expert from the expert group (A2). Each assignment was explained similar to the real session. Feedback was gathered and incorporated. Mostly small changes were made. However, exercise one and two were initially switched around. It appeared better to connect exercise two to exercise three. In order to have participants

first empathise with the environment and afterwards with the stakeholders.

### **Data analysis**

The qualitative data from the contextual inquiry, design thinking session and the evaluation interviews was processed following a thematic analysis structure [51] conducted via Miro. To identify clusters within the contextual inquiry and later the design thinking session and evaluation interviews, codes were created using a coding scheme. Each interview, the session and each evaluation was coded resulting in a set of quotes. Afterwards all quotes were grouped underneath themes. The themes naturally occurred while conducting the coding process. For the contextual inquiry 12 codes and 4 themes were created, For the design thinking session and evaluation of the interviews 16 codes and 9 themes were created.

## **FINDINGS**

The findings deducted from the data analysis are described below. First the findings from the contextual inquiry are described. The findings are described underneath 4 themes, connected to the themes found within the data analysis. Afterwards the results from the UEQ are described. Following are the findings from the session evaluation interviews. These findings are divided underneath 3 main findings and 8 sub findings, again related to the earlier data analysis. Lastly, the findings from the farmer questionnaire are presented.

### **Contextual inquiry**

#### *Current risk identification & regulation*

Following the contextual interviews it appears the topic is of interest and importance for stakeholders involved. Most participants described there is increased risk within nature-inclusive farming as animals come into contact with humans more compared to intensive livestock (P2, P3, P5, P6). However, within nature-inclusive farming the scale of animals held is significantly smaller. As a result, there is a shift in risks (P1, P3, P4, P9). Participant 5 even mentioned that past situations have shown farming in an open system caused more zoonotic transmission. Hence, the shift to farming in a closed system took place in the first place (P1).

Stakeholders mentioned that although this shift takes place, there are little to no specific regulations for nature-inclusive farming currently in place, some of the risks are researched (P3, P4, P5, P9). Most of the regulations are just advice (P7). In addition, the shift in risks is, as known to the participants involved within this study, not described into a document yet. As a result, it becomes difficult for the government to start and tackle the challenge (P6).

#### *Different perspective on risks*

Following the contextual interviews it was noticed that different stakeholders had different views on zoonotic risk within nature-inclusive farming. Stakeholders within a managing or policy function see the problem on an holistic level, tackling the system

from a larger level. For instance, many nature-inclusive initiatives situated in close proximity could cause a new network of transmission (P3, P5). Participant 7 however, a farmer tackling zoonotic risk within his nature-inclusive farm, executes many practical solutions to reduce risk already: “We place double fences to prevent people passing by from throwing something into the meadow” In addition, not all stakeholders seem to be aware of the shift in risk within nature-inclusive farming and see little difference with intensive livestock farming (P8, P9). A confirmed indication for the need for more alignment across stakeholders.

*Complexity of topic*

Complexity of the challenge became noticeable as stakeholders addressed the values and considerations of the government and farmers. It was mentioned farmers often shift or start with nature-inclusive farming because of idealism; a desire to do well for animals and the environment. Essentially, creating a separate group of farmers (P1, P4, P5, P8). This imposes two challenges. Introducing strict regulations may discourage farmers to start working with nature-inclusive farming. This might stagnate innovation, which is not desired (P4, P7). Secondly, nature-inclusive farms differ a lot from each other and farmers regulate farms differently as there is little to no specific policy. Most farmers are aware of zoonotic risk, mostly affiliated with organisations like LTO or BAJK (P2). Others will be less aware and therefore will not act upon risks (P2, P5, P7). Expert stakeholders have, as a result, little to no overview if farmers are aware.

Moreover, zoonotic risk is far from the only challenge for farmers to deal with (P5). Farmers have to deal with many regulations while trying to run a healthy business, considering economic values as well (P1, P5, P7, P9). Regulations about nitrogen emissions [1], climate change and the ongoing war in Ukraine play a significant concern for farmers (P2, P5, P9). As mentioned by participant 9, all farmers highly value hygiene and animal health as this is an important motive to keep their business running. However, because of the many challenges farmers face, zoonotic risk is placed ‘low on the agenda’ (P5). Farmers have little intrinsic motivation to understand how zoonoses transmit (P9).

*Current processes*

Currently, when a farmer starts a new initiative the municipality is advised by the GGD (P4). The GGD uses an assessment tool to assess if an initiative meets safety and environmental requirements [27]. The literacy on zoonotic risks within the GGD has increased over the past 20 years. As a result, zoonoses are part of the assessment within the tool, however, specific risks for nature-inclusive farming are not included (P6). In addition, monitoring of farms in the Netherlands is intensive and farmers who are part of a network (ZLTO, BAJK) receive information about zoonotic risk regularly (P1).

The municipality, on the other hand, uses the tool of the GGD as an advice and takes into account many other aspects when authorising a new farm (P4, P6, P8). The municipality too needs to weigh

interests of different human stakeholders, animals and the environment (P4). Each municipality has a focus on their own interests. Zoonotic risk management for the transition to nature-inclusive farming per case is therefore based on organisational structure and zoonotic awareness of individuals at a municipality. Although, because of the Q-fever outbreak, zoonotic awareness has increased within municipalities (P8). Further increasing literacy for policy makers, officials and experts is recognized to be just as important as the increase for farmers (P6, P8).

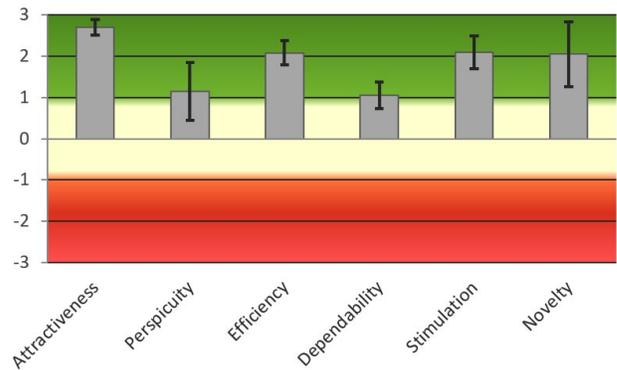
**Experience with multi-stakeholder design thinking session**

Following the contextual inquiry, the findings from the design thinking session are described. First the UEQ results are described. Having been analysed through means of a provided tool. Afterwards the findings from the evaluation interviews are described across 4 main and 9 sub themes.

*User Experience Questionnaire*

Looking at the results of the UEQ questionnaire. The usability score of the session is positive based on all items within the questionnaire. Especially attractiveness, efficiency, stimulation, and novelty showed above average performance. On a scale of -3 to 3 these items score higher than 2 (Figure 4)

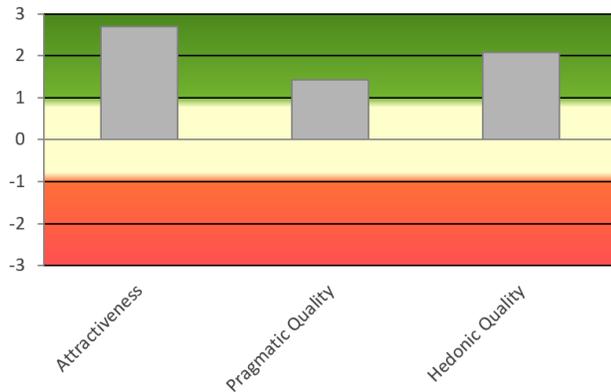
The parameters perspicuity and dependability, on the other hand, score below average but are skewed positive. Deriving from the UEQ items, the tool is perceived as slightly complex and unpredictable. Two items that show less adequate results are unpredictable/predictable (dependability) and complicated/easy (perspicuity).



**Figure 4: UEQ data analysis on 6 subthemes**

Within the UEQ analysis the 5 parameters are divided across attractiveness, pragmatic quality and hedonic quality (Figure 5). Attractiveness (2.7) and hedonic quality (2.08) score above average (more than 2). Pragmatic quality is scores positive but less significantly (1.48). Due to the lack of participants, however, the significance of all parameters except perspicuity are not significant, looking at the Guttman's Lambda2. The results from the UEQ

should therefore be seen as a support to the findings within this research.



**Figure 5: UEQ data analysis on 3 main themes**

#### *Design thinking approach in practice within case study*

The exercises within this session were received with enthusiasm by attendees and showed a different way of working than previously used to within this context: “Design thinking is new - otherwise you do the same thing over and over and conclude the same stuff.” (A2). In addition, working with predefined design thinking exercises provided a sense of guidance for participants (A4, A5)

The Design thinking structure was regarded as helpful as “The first assignment gives you the room to think, how does this exactly work?” (A7). Doing the exercises separately from each other brings “more creativity” (A3), although the session was already seen as a way to “support you to get creative.”

*Visualisation and playfulness.* Moreover, the visual and playful nature of the session (A2, A4, A7) provided both inspiration as well as overview within the complexity of the issue: “The map of exercise 1 helps in visualising where possible risks may occur.” (A2). However, visualisation within the session felt like showing an ideal and oversimplified picture (A2, A7) for several participants: “Map gives a romanticised & simplified picture, but it helps to illustrate what we are talking about.” (A2)

*Holistic as well as focused.* According to attendees the session provided a “birds-eye view” (A4) of the topic. Looking holistically at the complex issue by looking at a broad stakeholder ecosystem. However, the session still describes “a concrete situation” and “funnels the subjects where you want to talk about” (A3). As an effect of the both holistic and focused view, participant A1 mentioned the session illustrated the complexity of the problem as well.

#### *One Health perspective taking*

All stakeholders present indicated the exercises provided a way for the attendees to look at the issue from a different perspective than

previously used to, especially the OH exercises: “I was forced to watch the problem from another perspective.” (A2). The exercises seemed to remind the different stakeholders, who were mostly used to discuss topics without any guidance of a tool, about other actors in society: “Without session, you look over things because you look at the problem from one side. Overlooking what society thinks.” (A4). In addition “You get a much quicker idea of how the other experiences the situation. (A3).

The personas supported attendees into empathising with the different actors the most: “The cards about the other perspectives. In which you get into another person's perspective brought me the most.” (A3). Working with the OH was initially described as quite vague, however, the session illustrated that: “Empathising with animals says something about the animals being a living being.” (A2) Participants felt going into another was unique about this session as “Otherwise you stay in your own role” (A4).

*Complexity within OH perspective taking.* However, empathising with an animal or the environment remained difficult for most attendees: “Empathising for the environment or pig was difficult.” (A2) Filling out the exercises therefore became a hard task as stakeholders are “ (...) not that practically invested into the topic.” (A2)

The empathy maps expanded on the perspective taken by participants. Participants, however, found the exercise more difficult (A4, A7) as “you should know the risks beforehand to fill it out” (A7). All interviewed participants except A6, on the other hand, mentioned the transmission exercise was difficult through a lack of knowledge and guidance. Not being able to empathize with all perspectives through time.

#### *Knowledge sharing between stakeholders*

*Simplified discussion starter.* All participants mentioned the session provided an easy way to have a valuable and focused discussion without reading big reports (A2, A3, A4, A6, A7). This is done through asking simple questions (A7). In addition, participant A3 mentioned: “I am able to inform others working in another discipline”. Within normal stakeholder discussions, participant A2 mentioned the discussion stagnates because of opposing views. Participant A2 hypothesises: “The session may take fears away by providing solutions.” The discussion within the session was, as a result, very vivid and interesting: “It helps me to relieve me from the blind spot” (A2).

The exercises guided attendees towards a focused discussion around the topic of nature-inclusive farming. Even going as far to question the existence of nature-inclusive farming entirely: “Netherlands maybe is too small for a nature-inclusive approach.” (A1). In general, the discussions were held on a quite holistic level. As a result, the session only created more overview for participant A6, thus not extensively focusing on practical risk identification although being a partial focus of the exercises.

*Increased awareness through knowledge sharing* Participants A3 and A4 did not experience a change in direct awareness of zoonotic risk. Participant A4 mentioned, however, that: “You become more aware of the perspective of the other stakeholders. Awareness of other perspectives increases.” For participants A2, A3 and A6, gathering new knowledge means becoming more aware. Especially interesting was the notion of participant A6, a farmer who works with nature-inclusive farming: “I now look differently at certain aspects within my business. What can I do differently in the future?” and “What the veterinarian told about trees being a natural filter, it made me think.” Showing that knowledge shared may change the mindset of other stakeholders.

#### *Multi-stakeholder presence & connection*

Through knowledge sharing, working in groups and the group size participants felt a connection with each other (A3, A4, A6). Participant A6, for instance, mentioned: “The session showed me that I should talk to more stakeholders when innovating within my company”. Illustrating an increased awareness on the stakeholder ecosystem surrounding nature-inclusive farming.

The presence of different stakeholders was, however, discussed afterwards. Stakeholders mentioned that experts from all parts of the OH should be present to conduct a more valuable discussion. Currently, the experts were invited randomly which caused an imbalance in expertise available. Participant A2 mentioned: “Now the balance was off. No one was present from environmental expertise. Otherwise there would be more insights.” Attendee A4 recognized that specific experts should be present to identify specific risks. Illustrating extended multi-stakeholder collaboration is desired, but should be considered looking at levels of expertise. As participant A4 mentioned: “You need predefined knowledge to go into this session.”

#### **Farmer questionnaire**

Although having a very small sample size, the farmer questionnaire partly confirmed early notions of experts regarding current awareness. Both farmers saw the risk of zoonotic disease on their farm as low and saw themselves as aware of zoonotic risk. Zoonotic risk for cows is indeed lower compared to, for example, pigs and chicken [4]. Both farmers mentioned economic values to be of importance for not starting a nature-inclusive initiative.

Farmer 1 mentioned to notice no difference between zoonotic risk within regular livestock farming. In addition, this farmer mentioned to have no interest in learning more about zoonotic risk as this farmer indicated to know enough about the subject already. When showing the video provided within the project, the farmer mentioned becoming slightly more aware about the risks. The farmer noticed the contact between wild animals and farm animals as a new risk: “I never thought about wild and farm animal contact in this way.” Despite noticing more risk than prior to the questionnaire, the farmer did not seem to be interested in learning more about zoonotic risk. In addition, the session assignments did not come across as pragmatic within the video.

Farmer 2, on the other hand, mentioned to be aware of wild animals being at risk within nature-inclusive farming. This farmer was also open to learn more about zoonotic risk and noticed discussing about zoonotic risk is of importance. However, the farmer mentioned to the presented session would be of little value. Again, the tendency of joining such a session was low. This farmer mentioned the risks for nature-inclusive farming are bigger than the public thinks. Which is a reason for this farmer to not start a nature-inclusive initiative.

## **DISCUSSION**

The discussion describes a view on the current context followed by three insights based on the findings presented earlier. Each insight roughly corresponds with a finding from the session.

Prevention and disease control is a complex, multifaceted and multi-stakeholder challenge and asks for advanced alignment between stakeholders [72]. Like other ecological challenges, prevention and disease control involves human, animal and environmental actors [4][11][25][26][72]. Within prevention and disease control increased risk is caused through increased animal to animal and animal to human contact [4][11][18]. This is the case within nature-inclusive farming as well. Whilst being executed on a smaller scale, a shift in risks occurs as animals are brought into an open-system. Being exposed to vectors from outside such as wild animals or visitors [18].

The contextual interviews expanded on the complex view of the challenge. Stakeholders described prevention and disease control within farming as only a small part of the challenges farmers face. Economic and environmental challenges have higher priority for farmers and policy makers as a result [1]. Having little to no specific regulations causes a group of farmers to not be interested in and aware of specific zoonotic risk within nature-inclusive farming. Creating awareness for experts to more easily impose desired regulations therefore is as important as making farmers more aware to understand zoonoses and intrinsically act upon a more bio secure farm. As can be noticed within the results from the farmer questionnaire.

As this study researched the effects on awareness of the design thinking session for experts, the effects and following positioning is described for this stakeholder group. Afterwards, a broader view on the possible effects on other stakeholders is described.

#### **OH Design Thinking supporting a system thinking view**

Although many research has shown this [14][36]. Looking at the UEQ and session evaluation the strengths of the design thinking approach become apparent within this case study as well. Participants received the session as a pleasant, structured, understandable, creative and a surprising way of working. The session confirmed design thinking is an appropriate approach used within risk management and policy creation [44]. Supporting

discussions through means of a guided session using a bottom-up approach [5].

Despite being a simplified manner to discuss the topic the session was still experienced as complex. Because of the introduction of additional stakeholder perspectives through means of the OH approach [10][47]. Asking attendees to step outside of a personal stakeholder bubble and take on an unknown and non-human perspective, rather than asking to empathize with another human perspective [23]. As a result, participants felt like moving into the role of another actor and thus becoming empathic for a non-human actor, rather than for the human stakeholder (representative). This shows participants started to get feel more open about the subject matter. Described by Balm [2000] [3] as the first step in become aware and changing behavior. Although experienced as a difficult task, the (non-human) perspective taking achieved a sense of systemic overview as well, being aware of actors within the ecosystem. Illustrating to stakeholders the overlap between three different networks, through empathic exercises, a goal trying to be achieved while introducing the OH paradigm [25][58]. Showing this overlap simultaneously creates a top-down approach to the challenge [24].

Implementing OH into design thinking ensures increased systems thinking of stakeholders involved as well [59]. Understanding an holistic and, in the case of this study, a post-humanistic perspective of the challenge. Design thinking, on the other hand, has the ability to make sense of complexity of the system by introducing imagination and creativity [44]. The OH approach is therefore verbalized and physicalized in a pragmatic way. This redeems critique on the OH approach for not being difficult to implement within policy making in a pragmatic way [64]. In addition, it illustrates the interplay between Design and Systems thinking. Incorporating the strengths of both approaches in order to address: “the gaps and increasing chance of creating sustainable solutions to the wicked problems facing organizations and society today.” [50] This finding is best illustrated through the discussions stakeholders had within the session. While on the one hand stakeholders had holistic discussions about the mere existence of nature-inclusive farming in the Netherlands. Other discussions focused on practical solutions already imposed by the nature-inclusive farmer present. Showing a rich discussion can flourish from systems thinking and design thinking view.

#### **Effect on awareness for session positioning**

Identification of (new) zoonotic risks within nature-inclusive farming itself seemed too complex to be encompassed within a 2,5 hour multi-stakeholder session. As a result, awareness about zoonotic risks itself did not significantly increase for experts, neither did creating overview for risks itself. However, as a result of a focus on risk identification, knowledge sharing did occur and contributed to stakeholder awareness. A direct consequence of the simplified structure design thinking provides [36]. Especially the lesser experienced expert seemed to provide from knowledge

sharing. Illustrating a diverse group of stakeholders ensures increased awareness.

As mentioned, the perspective taking through the combination of systems thinking and design thinking provides stakeholders with the most significant change in awareness. Moreover, the collaborative exercises within the session aligned the perspectives between stakeholders, creating a shared and coherent understanding, a feature of design thinking described by Liedtka [2013]. Hence the discussions described before started easily as mentioned by stakeholders present. This was not a given during prior discussions.

This change illustrates how the session can be positioned best as an alignment exercise for a multi-stakeholder expert group. Aligning perspectives in order to try and support a fair, empathic and collaborative discussion amongst stakeholders with diverse needs [36]. The systems thinking and design thinking view provide a way to frame and reframe the zoonotic risk challenge [50]. In addition, this view supports the understanding of the stakeholder ecosystem. Providing awareness into which stakeholders should be invited throughout the risk management process to eventually identify risks and sustainable solutions [50][59].

As the effects of the session arise from the Design thinking and systems thinking methodology. The facilitator within the session should have experience with handling either one of the two approaches in order to “create an environment where these differing views are honored within the context of the larger system.”[50] In order to have discussions stay balanced between the pragmatic and the holistic.

#### **Importance of stakeholder assessment and knowledge management**

The session provides a way for stakeholders to identify stakeholders within the system and invite them accordingly. However, an initial stakeholder assessment is important for the session to illustrate an holistic system. In order for the OH approach and thus system thinking to provide optimal risk management later down the line [75]. This means actors from the human, animal and environmental sector should be present to provide their perspective. This would mean increased awareness of knowledge across the risk management process [41].

As a result, a sound stakeholder assessment is needed before conducting such a session. Several studies show ways to soundly map stakeholders using stakeholder mapping and inquiries [44][54]. These studies, however, do not make a direct consideration of inviting stakeholders to cover the OH paradigm, instead look at, for instance, power and legitimacy [72]. The session designed within this study may follow as an alignment exercise that, for instance, can co-exists next to the method proposed by van Woezik [2016]. In order to more pragmatically implement a OH perspective that exists outside of that of human

values alone. Adhering to a post-human perspective which sees all actors as equal [23][56].

Looking broader at other stakeholder groups. When involving lesser-experienced or non-expert stakeholders within this session an assessment is needed on the expert level and awareness of stakeholders. Participants mentioned the session requires a considerable amount of previous knowledge. Some experts within the session struggled with filling out the session itself. In order for the session to create fruitful discussions, alignment on perspectives and understanding between stakeholders, participants should contain a certain level of knowledge. To participate and contribute to the session.

Within this session, previous education is therefore necessary for non-expert stakeholders to connect with expert stakeholders. One could argue, non-expert stakeholders would benefit much from attending such a session in terms of increasing awareness. However, targeting unaware stakeholders, such as farmers, remains a challenge.

## LIMITATIONS

This research shows interesting insights related to the alignment of stakeholder perspective and the use of the session within the risk management process. However, there are several limitations to the study.

While the OH approach is used in order to have participants move into another perspective and as a result become more aware of other actors within the system. The session within this study is not tested without the OH approach. Other studies show design thinking sessions and empathic tools achieve perspective taking, creating a shared understanding and empathising with different actors as well [14]. Moreover, it was the first time many stakeholders within this research worked with design thinking. In hindsight, this study should have included a second stakeholder session where only human actors were introduced. In order to investigate the difference between a post-humanistic and humanistic approach to OH. Looking if the OH exercises make a difference in stakeholder decision making, valuing animals and the environment as more equal to humans. Moreover, it could be argued that designing the design thinking session with different assignments would have resulted in different results as well.

Secondly, the stakeholders within the session were invited randomly as many stakeholders were not available at the time of the session. In addition, the paper by van Woezik et al. [2016] was found after inviting the stakeholders. Using the methodology provided in the paper of van Woezik et al. [2016] would have influenced stakeholder identification and session composition. It must be noticed that inviting a different group of stakeholders would cause a different discussion, interplay and outcome of the session. This was mentioned by participants as well and is

especially important for assessing the effect of the OH approach within the session.

Moreover, all stakeholder invited currently are open to discuss this topic. As a result, no conflicts between participants occurred during the session. There is uncertainty if something like this would happen with, other, less involved stakeholders. While the session places stakeholders outside of their own perspective, the session could still lead to conflicts because of clashing interests or closed mindset. Where stakeholders are not willing to change their view about a certain subject.

Lastly, no farmers without knowledge of zoonoses were directly spoken to. The findings and conclusions therefore only give a view on expert experience and change in awareness. It can only be hypothesised farmers or other non-expert stakeholders benefit from being involved in the session. Especially questioning if farmers actually feel the need to join such a session. The study therefore biases towards an expert view, not describing the experience of a large group of stakeholders. One could argue farmers benefit more from stricter regulations and policy, which take into account farmer needs. Empathising with farmers through other design methodology or empathic tools. However, as seen by the farmer questionnaire. There certainly are farmers who can become more aware about zoonotic risk within nature-inclusive farming.

## FUTURE WORK

As this research did not extend to iterate on the tool, several iterations are proposed. Moreover, future steps come forward from the discussion and limitations described.

The tool should be iterated to provide a way for more guidance. This should be done through means of adding additional explanation and examples. This would focus the session less towards risk identification itself and more towards knowledge sharing and perspective taking across the OH approach. For example, the transmission timeline should be walked through with all stakeholders. A case should be provided to create the transmission timeline.

In the future, the session should be conducted with non-expert stakeholder groups in order to assess whether the session is desired and fitting for this kind of stakeholder. Additional research should find out if education on zoonoses will fit for this stakeholder group. Or whether other solutions work better to involve non-expert stakeholders. Increasing awareness of zoonotic risk. General practitioners were mentioned as a stakeholder group which might benefit from such a session, with the inclusion of additional prior education.

Moreover, the introduction of the OH approach should be researched with more specificity. Finding out the difference between regular design thinking and design thinking with a OH view. Additionally, different stakeholder groups and sessions must

show the consistency or difference in discussion results and experience.

Lastly, several participants within the study mentioned the session design is generalizable. Meaning the session can be applied to other wicked problems as well. The session may be stripped down to the risk identification, design thinking and OH components and build up again using appropriate mapping and content. Future research must find out if a design thinking session with OH view can be applied for different wicked problems.

## CONCLUSION

To conclude, within this case study on zoonotic risk identification within nature-inclusive farming, risks have not been overviewed prior, nor is there any regulation as risks are fairly unknown. In addition, nature-inclusive farming includes some contrasting beliefs. There is a need for awareness across both expert and non-expert stakeholders.

The effects of the design thinking session with OH view on awareness is twofold. The design thinking methodology provides stakeholders with a way to navigate through the complexity of the challenge. With its strengths in visualisation, structure and simplicity. On the other hand, the OH perspective provided a way to empathize with perspectives outside of that of oneself. This twofold creates an interplay between systems thinking and design thinking. Incorporating strengths of both approaches which created easy and valuable discussions on both an holistic as well as pragmatic level.

Risk identification and creating overview itself is too complex to encompass within such a session. This illustrated how such a session can be positioned as alignment exercise to warm up for a risk identification and risk management process. In addition providing a way identify the right stakeholders. Aiming for a pragmatic, non-human valued perspective. The session can therefore co-exist next to other stakeholder identification methods. To eventually create an open and aware mindset for involved stakeholders.

Future work must iterate on the tool to focus it more on aligning perspectives instead of risk identification. Future work must involve other expert stakeholders to research if any conflicts arise and if the session is effective and desired to be used by non-expert, adding prior education.

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# Appendices

## Appendix A - Consent forms Contextual inquiry interviews



### Toestemmingsformulier

Dit document biedt informatie over het interview over zoönose risico binnen natuur-inclusieve & circulaire landbouw, welke onderdeel is van een individuele opdracht wat wordt uitgevoerd onder de Inclusive Design & Thoughtful Technology projectgroep binnen de faculteit Industrial Design aan de Technische Universiteit Eindhoven. De studentgroep die dit onderzoeksproject uitvoert bestaat uit de volgende leden: Niek van den Berk.. Voordat we beginnen is het van belang dat u weet wat de procedure gedurende het interview en dat u uw toestemming geeft voor vrijwillige deelname. Gelieve dit document zorgvuldig door te lezen.

Het doel van dit interview is om een beter overzicht te krijgen van de huidige kennis over zoönose risico's binnen natuur-inclusieve & circulaire landbouw innovatie. Dit oriënterende interview zorgt ervoor dat de onderzoeker een beeld krijgt over de huidige context. De kennis opgedaan uit het interview wordt later in het onderzoek gebruikt om een co-creatie sessie op te zetten met verschillende betrokken partijen.

Gedurende dit interview zal de onderzoeker vragen stellen over uw perspectief op en kennis over zoönose risico's binnen natuur-inclusieve & circulaire landbouw.

Uw deelname aan dit onderzoek is geheel vrijwillig. U bent vrij om deelname te weigeren zonder enige reden hiertoe te geven, en u kan uw deelname gedurende elk moment tijdens het interview ontzeggen. Zulke beslissingen zullen geen negatieve consequenties met zich meebrengen.

Dit interview bevat geen risico's of nadelige bijwerken.

Dit onderzoek zal waarschijnlijk 30 minuten duren.

### Vertrouwelijkheid

Wij zullen geen persoonlijke informatie over u delen met iemand buiten dit onderzoeksteam. De informatie die we van u verspreiden op basis van het interview zal worden gebruikt voor het opzetten van een co-creatie sessie en het maken van voorbeeld casussen voor deze sessie. Ook zullen sommige bevinden misschien alvorens gepresenteerd worden aan verschillende betrokken partijen. Deze informatie zal geheel anoniem worden verwerkt en kan niet terug worden getraceerd naar u. Alleen de onderzoekers zullen uw identiteit kennen. Alleen audio opnames tijdens het interview zullen worden gemaakt die u kunnen identificeren. De opnames zullen worden opgeslagen op systemen goedgekeurd door de TU. De opnames zullen na het project is afgelopen (medio Juni) worden verwijderd. Als u ontevreden bent over de manier waarop er met de privacy van uw data wordt omgegaan, kunt u een klacht indienen bij de Chief Information & Security Officer, de Privacy & Security Officer en/of de Data Protection Officer van de Technische Universiteit Eindhoven via [privacy@tue.nl](mailto:privacy@tue.nl), of door contact op te nemen met de Dutch Data Protection Authority.

### Meer informatie

Als u meer informatie over het project wil opvragen waar dit onderzoek onderdeel van uitmaakt, kunt u contact opnemen met mijn begeleider [y.u@tue.nl](mailto:y.u@tue.nl)

### Certificaat van toestemming

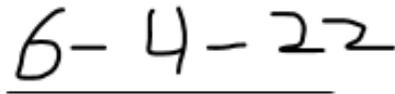
Ik geef toestemming om mijn gegevens te gebruiken voor educatie en onderzoek doeleinde. Ik begrijp gegevens deze data anoniem zullen worden verwerkt.

- Ik **geef toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.
- Ik **geef GEEN toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik, Cas den Boer heb dit toestemmingsformulier gelezen en begrepen en ik heb de kans gekregen om vragen te stellen. Ik stem in met vrijwillige deelname in dit onderzoek dat wordt uitgevoerd door het studententeam dat deelneemt aan de Inclusive Design & Thoughtful Technology projectgroep, wat wordt onderwezen aan de faculteit Industrial Design aan de Technische Universiteit Eindhoven.



Handtekening participant



Datum

- Ik **geef toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.
- Ik **geef GEEN toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik, (naam)Heleen Prinsen heb dit toestemmingsformulier gelezen en begrepen en ik heb de kans gekregen om vragen te stellen. Ik stem in met vrijwillige deelname in dit onderzoek dat wordt uitgevoerd door het studententeam dat deelneemt aan de ~~Inclusive Design & Thoughtful Technology~~ projectgroep, wat wordt onderwezen aan de faculteit Industrial Design aan de Technische Universiteit Eindhoven.

Heleen Prinsen

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Handtekening participant

22 maart 2022

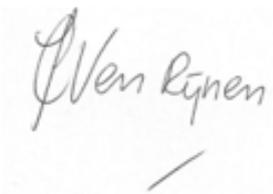
---

Datum

X Ik **geef toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik **geef GEEN toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik, J. van de Ven, heb dit toestemmingsformulier gelezen en begrepen en ik heb de kans gekregen om vragen te stellen. Ik stem in met vrijwillige deelname in dit onderzoek dat wordt uitgevoerd door het studententeam dat deelneemt aan de Inclusive Design & Thoughtful Technology projectgroep, wat wordt onderwezen aan de faculteit Industrial Design aan de Technische Universiteit Eindhoven.



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Handtekening participant

22-03-2022

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Datum

V Ik geef toestemming aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

o Ik geef GEEN toestemming aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik, Wim van der Poel heb dit toestemmingsformulier gelezen en begrepen en ik heb de kans gekregen om vragen te stemmen. Ik stem in met vrijwillige deelname in dit onderzoek dat wordt uitgevoerd door het studententeam dat deelneemt aan de Inclusive Design & Thoughtful Technology projectgroep, wat wordt onderwezen aan de faculteit Industrial Design aan de Technische Universiteit Eindhoven.



28 april 2022

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Handtekening participant

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Datum

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Ik **geef toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik **geef GEEN toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik, (naam)..... heb dit toestemmingsformulier gelezen en begrepen en ik heb de kans gekregen om vragen te stellen. Ik stem in met vrijwillige deelname in dit onderzoek dat wordt uitgevoerd door het studententeam dat deelneemt aan de ~~Inclusive~~ ~~Design & Thoughtful~~ Technology projectgroep, wat wordt onderwezen aan de faculteit Industrial Design aan de Technische Universiteit Eindhoven.

Noud Baetsen

04-04-2022

\_\_\_\_\_  
Handtekening participant

\_\_\_\_\_  
Datum

- Ik **geef toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.
- Ik **geef GEEN toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik, (naam)..... heb dit toestemmingsformulier gelezen en begrepen en ik heb de kans gekregen om vragen te stemmen. Ik stem in met vrijwillige deelname in dit onderzoek dat wordt uitgevoerd door het studententeam dat deelneemt aan de Inclusive Design & Thoughtful Technology projectgroep, wat wordt onderwezen aan de faculteit Industrial Design aan de Technische Universiteit Eindhoven.

Sjors Willems

Handtekening participant

12-04-2022

Datum

Ik **geef toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik **geef GEEN toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.

Ik, (naam)..... heb dit toestemmingsformulier gelezen en begrepen en ik heb de kans gekregen om vragen te stellen. Ik stem in met vrijwillige deelname in dit onderzoek dat wordt uitgevoerd door het studententeam dat deelneemt aan de Inclusive Design & Thoughtful Technology projectgroep, wat wordt onderwezen aan de faculteit Industrial Design aan de Technische Universiteit Eindhoven.

Henk Bekedam

\_\_\_\_\_  
Handtekening participant

13-04-2022

\_\_\_\_\_  
Datum

- o V Ik **geef toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.
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Arjan Stegeman

Handtekening participant

01-04-2022

Datum

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Manon Houben

Handtekening participant

23-03-2022

Datum

- Ik **geef toestemming** aan de onderzoeker om audio op te nemen ten behoeve van transcriberen en analyse. Ik begrijp dat deze gegevens geanonimiseerd zullen worden verwerkt.
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Daniëlle van Oudheusden

01-04-2022

Handtekening participant

Datum

## Appendix B – Consent forms multi-stakeholder session



### Toestemmingsformulier

Dit document biedt informatie over de multi-stakeholder sessie over zoönose risico binnen natuur-inclusieve & circulaire landbouw, welke onderdeel is van een individuele opdracht wat wordt uitgevoerd onder de Inclusive Design & Thoughtful Technology projectgroep binnen de faculteit Industrial Design aan de Technische Universiteit Eindhoven. De studentgroep die dit onderzoeksproject uitvoert bestaat uit de volgende leden: Niek van den Berk.. Voordat we beginnen is het van belang dat u weet wat de procedure gedurende het interview en dat u uw toestemming geeft voor vrijwillige deelname. Gelieve dit document zorgvuldig door te lezen. *1. 26.1*

Het doel van deze sessie is om de zoönosen risico's binnen de duurzame landbouw in kaart te brengen en te onderzoeken of mijn tool bijdraagt aan het bewustzijn van de risico's. Als experts zullen jullie ook feedback geven op de tools binnen deze sessie. De kennis opgedaan uit deze sessie wordt later in het onderzoek gebruikt om bevindingen op te doen en op de tool te itereren.

Gedurende deze sessie zal de onderzoeker ook vragen stellen over uw perspectief op de tools en de risico's binnen duurzame landbouw.

Uw deelname aan dit onderzoek is geheel vrijwillig. U bent vrij om deelname te weigeren zonder enige reden hiertoe te geven, en u kan uw deelname gedurende elk moment tijdens het interview ontzeggen. Zulke beslissingen zullen geen negatieve consequenties met zich meebrengen. *55-0-55*

Deze sessie bevat geen risico's of nadelige bijwerken. *55-0-55*  
Deze sessie zal waarschijnlijk 2,5 uur duren.

### Vertrouwelijkheid

Wij zullen geen persoonlijke informatie over u delen met iemand buiten dit onderzoeksteam. De informatie die we van u verspreiden op basis van het interview zal worden gebruikt voor het itereren op de tool en het maken van bevindingen. Ook zullen sommige bevindingen misschien alvorens gepresenteerd worden aan verschillende betrokken partijen. Deze informatie zal geheel anoniem worden verwerkt en kan niet terug worden getraceerd naar u. Alleen de onderzoekers zullen uw identiteit kennen. Een audio opname tijdens het interview zal worden gemaakt die u kunnen identificeren. De opnames zullen worden opgeslagen op systemen goedgekeurd door de TU. De opnames zullen na het project is afgelopen (medio Juni) worden verwijderd. Ook zullen er foto's worden gemaakt tijdens de sessie, deze zullen naderhand worden geanonimiseerd. De niet geanonimiseerde foto's zullen na het onderzoek (medio Juni) worden verwijderd. Als u ontevreden bent over de manier waarop er met de privacy van uw data wordt omgegaan, kunt u een klacht indienen bij de Chief Information & Security Officer, de Privacy & Security Officer en/of de Data Protection Officer van de Technische Universiteit Eindhoven via [privacy@tue.nl](mailto:privacy@tue.nl), of door contact op te nemen met de Dutch Data Protection Authority.

### Meer informatie

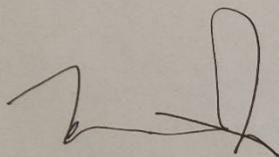
Als u meer informatie over het project wil opvragen waar dit onderzoek onderdeel van uitmaakt, kunt u contact opnemen met mijn begeleider [y.u@tue.nl](mailto:y.u@tue.nl)

## Certificaat van toestemming

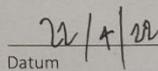
Ik geef toestemming om mijn gegevens te gebruiken voor educatie en onderzoek doeleinde. Ik begrijp gegevens deze data anoniem zullen worden verwerkt.

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Handtekening participant



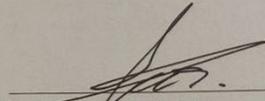
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Handtekening participant

22-04-22  
Datum

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Cas den Boer  
Handtekening participant

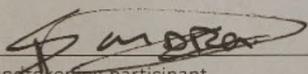
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Handtekening participant

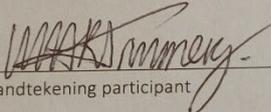
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Ik, (naam) Myrtille Verhagen heb dit toestemmingsformulier gelezen en begrepen en ik heb de kans gekregen om vragen te stemmen. Ik stem in met vrijwillige deelname in dit onderzoek dat wordt uitgevoerd door het studententeam dat deelneemt aan de Inclusive Design & Thoughtful Technology projectgroep, wat wordt onderwezen aan de faculteit Industrial Design aan de Technische Universiteit Eindhoven.

  
Handtekening participant

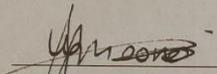
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Handtekening participant

22-4-2022  
Datum

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Handtekening participant

22-04-2022

Datum

## Appendix C – Contextual inquiry interview questions

Ik ben Niek van den Berk, master student Industrial Design aan de TU Eindhoven. Industrial Design focust zich op het verbeteren van maatschappelijke problemen door middel van het vinden van oplossingen. Denk hierbij aan producten, services en apps maar ook door middel van participatie, workshops and sessies.

Ik ben op dit moment bezig met een onderzoeksproject over het zoönose risico binnen natuur-inclusieve & circulaire landbouw. Hierbij ben ik nu bezig met oriënterende interviews om de huidige kennis en context in kaart te brengen. Later ben ik van plan om een sessie te organiseren met verschillende betrokkenen om een daarin samen een tool te ontwikkelen die meer bewustzijn creëert wat betreft zoönose risico binnen natuur-inclusieve en circulaire landbouw.

- Wat is er bij jullie/jou bekend over zoönose risico binnen natuur-inclusieve & circulaire landbouw?
  - Welke risico's zie jij op dit moment binnen deze opkomende sector?
    - Is er verhoogd/verlaagd risico?
  - Zijn er al voorbeelden van uitbraken op dit gebied?
  - Hoe gaan jullie hier op dit moment mee om?
    - Wordt er op dit gemonitord?
  - Worden er al (preventieve) maatregelen getroffen?
    - Zowel binnen huidige veehouderij als binnen de transitie
  - Wat gebeurt er op dit moment als er innovatie wordt aangedragen binnen deze sector?
  
- Zo nee: Wat zou je verwachten wat de risico's zijn binnen natuur-inclusieve & circulaire landbouw?
  - Hoe zou je er beter over geïnformeerd willen worden?
  - Waar denk je dat er kansen liggen wat betreft het in kaart brengen van de risico's?
  - Wat denk je dat er moet gebeuren om dit risico mee te nemen in het innovatie proces?
  
- In hoeverre zijn andere betrokken partijen op de hoogte van de risico's binnen deze sector?
- Wordt er op dit moment rekening mee gehouden in het innovatieproces?
- Hoe denk je dat boeren zouden reageren op het feit dat ze aan het zoönose risico moeten denken voor/tijdens/na het starten van de innovatie?
- Denk je
  
- Zijn er nog andere betrokken partijen die ik zou moeten bespreken om meer over dit onderwerp te weten te komen?
  - Welke partijen zouden een nieuw perspectief brengen?
  - Welke partijen zouden meer kennis kunnen brengen?

## Appendix D – Session evaluation interview (MSC)

- Wat was jouw ervaring bij deze sessie?
- Wat heeft de sessie jou gebracht?
  - Wat betreft het overzicht creëren voor risico's?
  - Wat betreft het meer bewust worden van het zoönose risico?
  - Wat betreft een ander perspectief creëren op het zoönose risico?
- Wat is de grootste verandering kijkend naar deze drie aspecten?
  
- Wat vond je goed aan de sessie?
  - Wat vond je minder goed aan de sessie?
  - Welke opdracht vond je het meest bruikbaar?
- Hoe zou de sessie anders ingericht moeten worden? Wat zou er moeten veranderen?
  - Welke aanwezigen zouden er moeten zijn?
- Hoe denk je dat deze tools jou in de toekomst kunnen helpen bij het beter begrijpen van zoönose risico binnen duurzame/natuur-inclusieve landbouw.
- Wat is je grootste takeaway van deze sessie?
  
- Wil je nog iets anders kwijt over de sessie?

## Appendix E – Session boards

<https://demoday.id.tue.nl/projects/Gk7yE2eLgx>

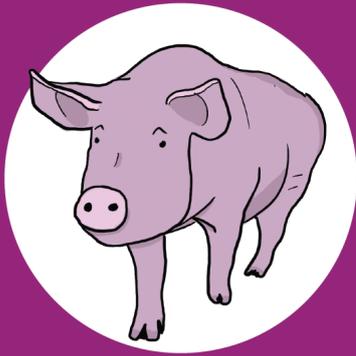
### Contactpunt tussen dieren en bezoekers

Duurzame verandering



Mogelijke risico's voor  
zoönose overdracht

Bij welke vor(men) van  
duurzame landbouw  
vindt dit risico plaats?



# Het wroetende varken

## Samen met 25 andere varkens bij het VarkensBos

Ik vind het super fijn om door het weiland en het bos te lopen. Ik heb zo erg veel ruimte om te doen wat ik zelf wil samen met de andere varkens. Soms merk ik dat we terug moeten in een stal wat ik minder fijn vind. Ik verlang dan ook terug naar het leven buiten. Ik merk ook dat door het buiten lopen ik meer in contact sta met de natuur en met de mensen die soms door het bos heen lopen. Af en toe ben ik wel bang dat er wat meer risico's zitten aan deze manier van leven. Omdat ik soms onbekende dieren en mensen tegenkom.

### Pijnen

"Ik vind het vervelend als ik **weer naar binnen moet** voor langere tijd."

"Ik hou er niet van om **ziek te worden**."

"Als ik buiten ben kom ik soms in **contact met wilde dieren**."

"Soms kom ik in **contact met mensen** zonder dat de boer er is."

### Winsten

"Ik hou ervan om in een **open wei** rond te lopen."

"Ik vind het fijn om in **een modderpoel** mezelf af te koelen."

"Ik waardeer het als de boer zich aan de **richtlijnen van de wet** houdt."

### Behoeften

"Ik wil graag **goed wroeten** in de grond."

"Ik ben **erg nieuwsgierig** dus ik wil alles ontdekken."

"Ik ben graag met **andere varkens bij elkaar**."

"Ik wil graag **vers water** drinken."



# De bedrijvige boer

## Eigenaresse van VarkensBos

Ik ben sinds 2019 bezig met de omschakeling naar een natuur-inclusief bedrijf. Ik heb via de provincie een stuk land kunnen verkrijgen van een groot aantal hectare. Hier laat ik mijn varkens vrij rondlopen. Dit is goed voor de natuur, de dieren en voor het voedsel van de mens. Ik ben in de toekomst van plan om de transitie naar natuur-inclusief nog interessanter te maken. Dit wil ik doen door ook mijn kippen vrij te laten in de natuur en meer bezoekers naar mijn bedrijf te trekken.

### Pijnen

"Het is lastig om aan alle **wet en regelgeving** te voldoen."

"Het beleid moet **werkbaar blijven** voor boeren."

"Regelgeving moet de **innovatie niet tegenhouden**."

"De **economie is nog niet klaar** voor natuur-inclusieve landbouw

### Winsten

"**Verduurzamen is belangrijk** voor natuur & omgeving."

"Ik hou me aan de **hygiëne maatregelen**."

"**Onbewerkt voedsel** is gezonder."

"**Lokaal produceren** zorgt voor meer wederzijds begrip."

### Behoeften

"Ik wil graag dat mijn **dieren gezond** zijn."

"Ik wil **geld verdienen** met mijn bedrijf."

"Ik wil dat mijn dieren buiten leven **in de natuur**."

"Ik wil graag **genoeg controle** over mijn eigen bedrijf."



## De omvangrijke omgeving

### 15 hectare bos met stuk open weiland

Mijn omgeving wordt gebruikt door de boerderij VarkensBos. Sinds al geruime tijd zijn er daardoor varkens te vinden in mijn omgeving. Omdat er aandacht wordt besteed aan de staat van mijn omgeving heb ik het idee dat er steeds meer soorten zich gaan huisvesten. Dit is positief voor zowel mijn grond als de balans tussen mens, dier en ik.

#### Pijnen

"Door mijn omvang kan ik **moeilijker worden gecontroleerd.**"

"Er kunnen **makkelijker ongewilde dieren** in mijn systeem komen."

"De **indeling van mijn land** zorgt soms voor extra risico."

#### Winsten

"Ik vind het fijn als mijn **grond goed bijgehouden** wordt."

"Meer natuur zorgt voor **meer biodiversiteit.**"

"Ik geniet van het feit dat mensen en dieren **geven om mijn welzijn.**"

"Ik zorg voor **meer balans** in het ecosysteem."

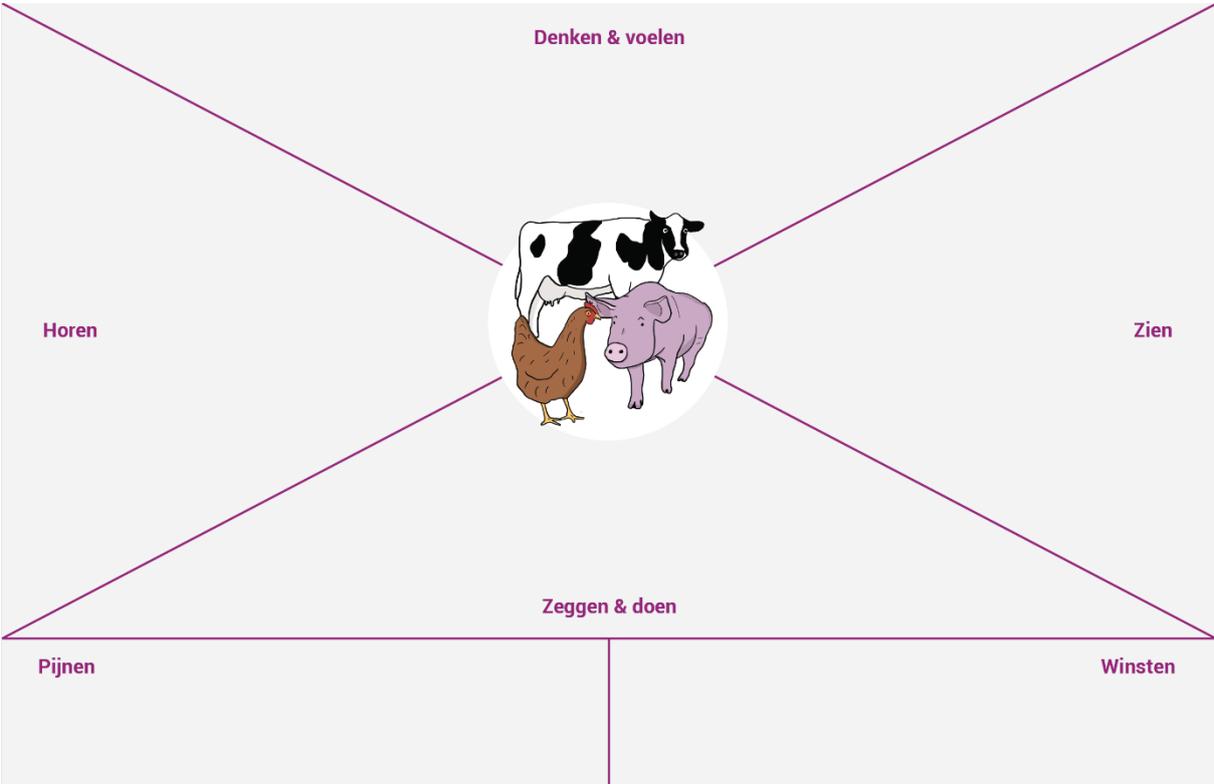
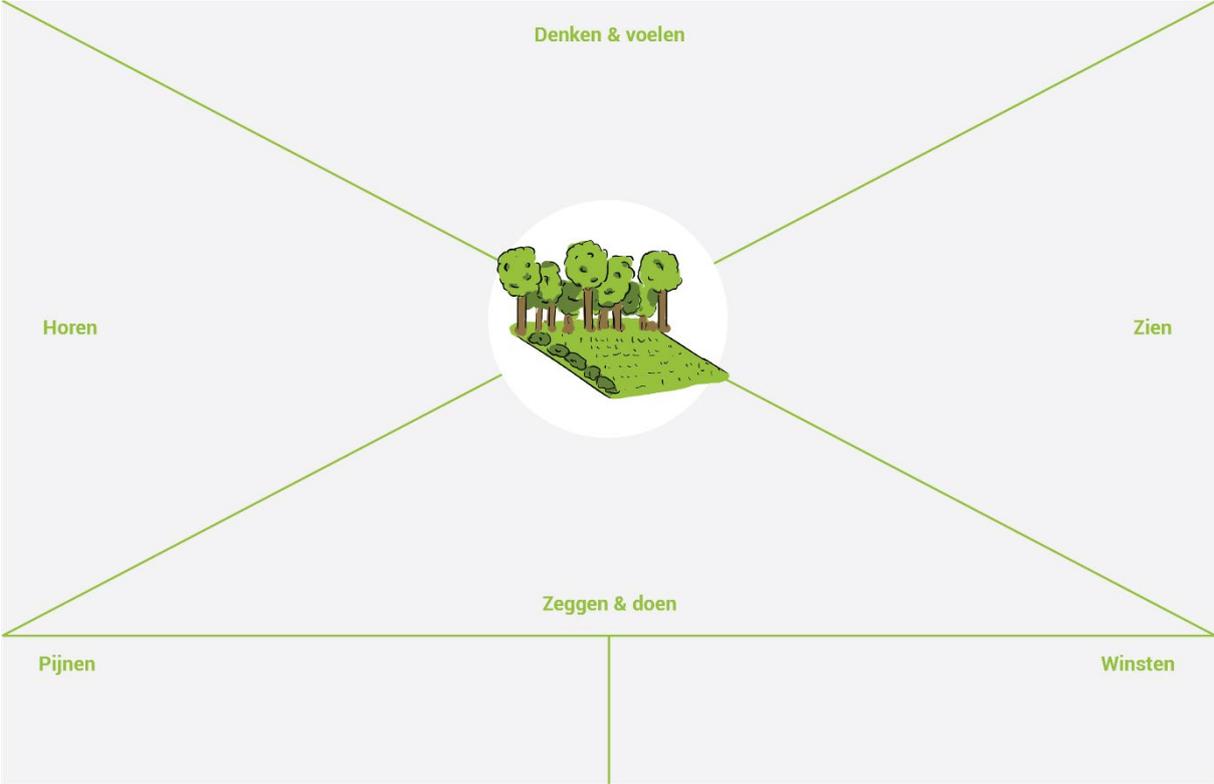
#### Behoeften

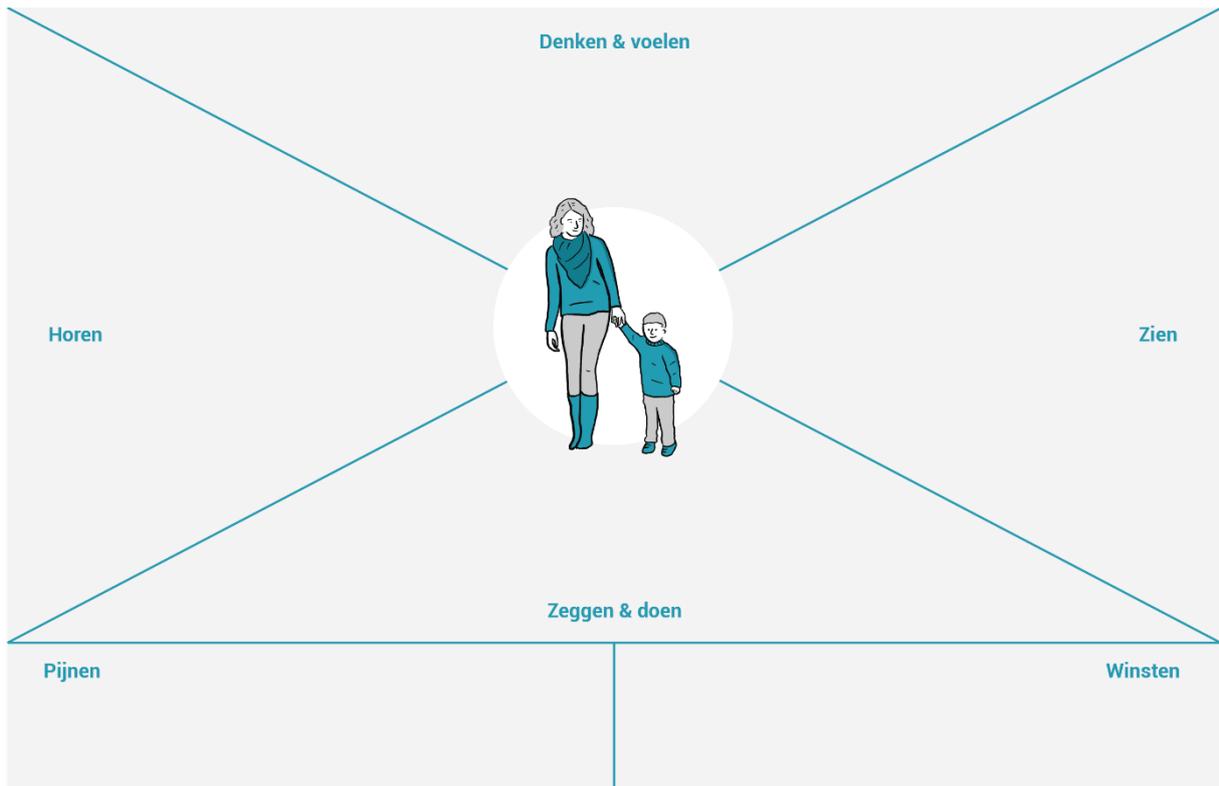
"Ik wil graag dat mijn **grond gezond** is."

"Ik wil dat er op een **zorgvuldige manier** wordt omgegaan met mijn omgeving."

"Ik wil graag **genoeg natuur** kunnen groeien."

"Ik wil dat mijn indeling **risico's zoveel mogelijk voorkomt.**"





### Mogelijke transmissie tijdlijn

	 Dier	 Omgeving	 Dier	 Mens	
Fase	Dier	Omgeving	Dier	Mens	
Uitleg	Vos komt op het terrein van de natuur-inclusieve boerderij	Vos laat ontlasting achter op het terrein van de boerderij	Het varken komt in aanraking met de ontlasting van de vos	De boer komt in contact met een besmet varken	
Winsten	<p>Omg: Mijn omgeving is schoon</p> <p>Boer: Ik merk niks gekks op mijn boerderij</p> <p>Vos: Ik kan een nieuw gebied ontdekken</p>	<p>Vos: Ik heb mijn behoefte gedaan</p>	<p>Omg: De ontlasting is gedecomposeerd</p>	<p>Var: Ik word langzamerhand weer beter</p> <p>Boer: Ik schakel een dierenarts in</p>	
Emotie curve					
Pijnen	<p>Vos: Ik moest door een simpel hek</p>	<p>Omg: Er ligt ontlasting in mijn veld</p> <p>Omg: Dat is niet goed voor mijn grond</p> <p>Boer: Ik heb het idee dat mijn veld vies is</p>	<p>Var: Ik voel me sinds kort niet lekker</p> <p>Boer: Met een varken gaat het niet goed</p>	<p>Boer: Ik voel me zelf ook een beetje ziek</p>	
Waarom slaat het virus over?	<p>De omheining is zodanig makkelijk te betreden door dieren dat ze het terrein betreden.</p>			<p>Er is geen controle op de ontlasting van onbekende dieren over het terrein.</p>	<p>De boer heeft onhygiënisch contact met een besmet varken van zijn boerderij.</p>
Effect op omgeving, dier, mens	<p>Er kunnen allerlei ongewilde dieren zich nestelen in mijn omgeving.</p> <p>Ik kan aangevallen worden door een wild dier of ziek worden.</p> <p>Ik zorg voor natuur-inclusieve landbouw maar niet met de gewenste soorten.</p>			<p>Mijn grond wordt te verzadigd met ontlasting, dat is ongezond.</p> <p>Ik kom allerlei verschillende soorten ontlasting tegen, erg interessant.</p> <p>Mijn terrein is niet meer schoon om in te leven, het kost me wel minder werk.</p>	<p>Ik kan besmet worden met een onbekend virus, niet goed voor mij en mijn imago.</p> <p>Ik kan besmet worden met een onbekend virus, niet goed voor mij en mijn imago.</p>



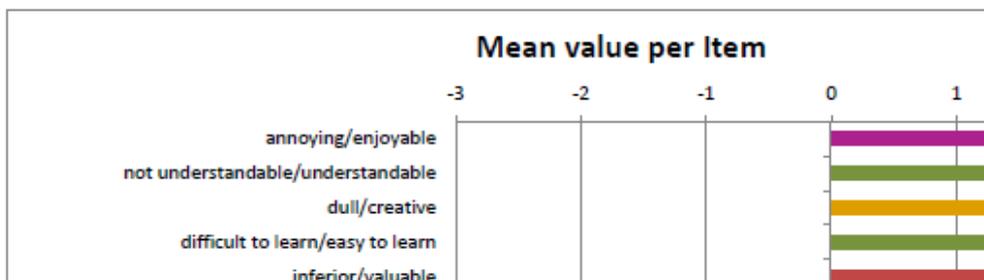
# Appendix F – UEQ results

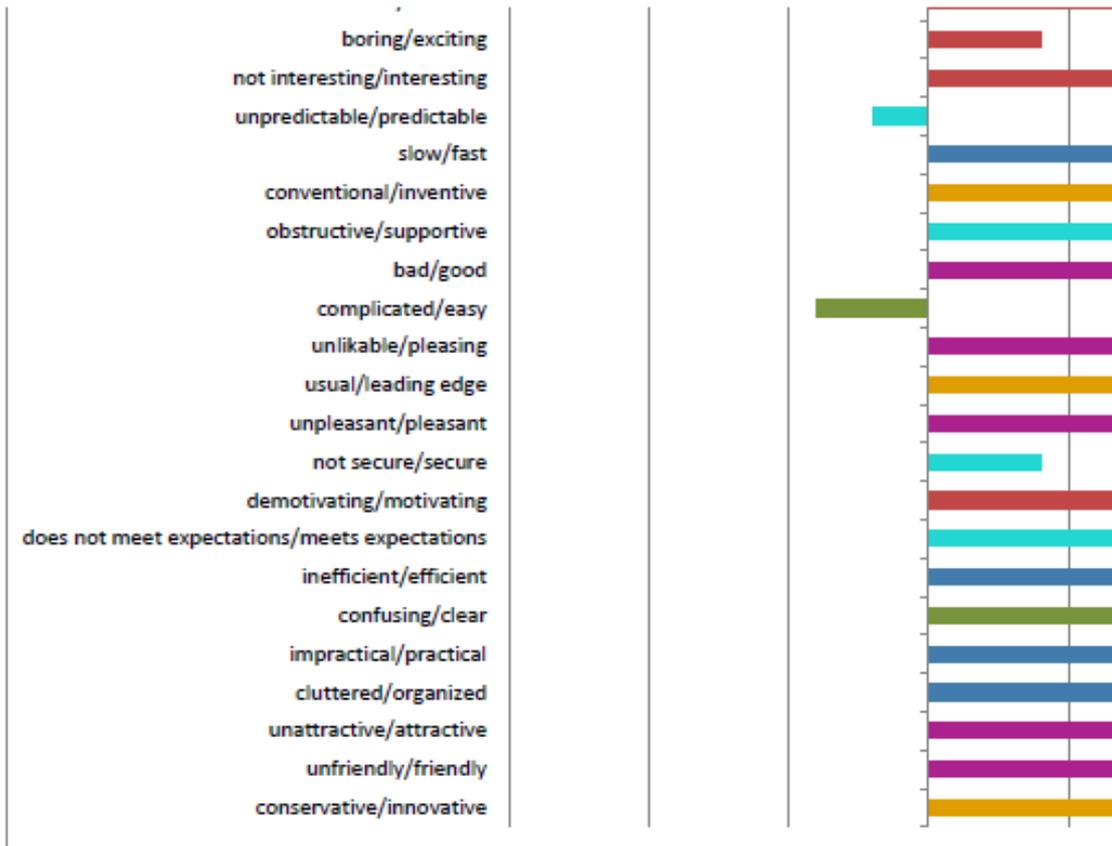
## Results

You can interpret the means of the scales. The UEQ does not produce an overall score for the user experience, as it does not make sense to build such an overall score (for example by calculating the mean over all scales), nor does it detect outliers in the evaluations. If an item shows big deviations to the evaluations of the other items (for example in a special context in your evaluation) by a higher number of participants.

Values between -0.8 and 0.8 represent a more or less *neutral evaluation* of the corresponding scale, while values outside this range indicate a positive or negative evaluation. The range of the scales is between -3 (horribly bad) and +3 (extremely good). But in real applications, in order to compare the results of a range of different persons with different opinions and answer tendencies (for example the avoidance of extremes), it is recommended to use a reduced scale from -2 to +2. Thus, even a quite good value of +1.5 for a scale looks from the purely visual standpoint on a scale range of -2 to +2 as a value that is slightly above the center. Use the figure with the reduced scale -2 to +2 if you communicate the results in situations where you don't want to explain in detail how building mean values and answer tendencies in

Item	Mean	Variance	Std. Dev.	No.	Left	Right
1	↑ 2.8	0.2	0.4	5	annoying	enjoyable
2	↑ 1.8	0.2	0.4	5	not understandable	understandable
3	↑ 1.6	4.3	2.1	5	creative	dull
4	↑ 1.4	2.8	1.7	5	easy to learn	difficult to learn
5	↑ 2.2	0.7	0.8	5	valuable	inferior
6	↑ 0.8	0.7	0.8	5	boring	exciting
7	↑ 2.6	0.8	0.9	5	not interesting	interesting
8	→ -0.4	1.8	1.3	5	unpredictable	predictable
9	↑ 2.0	1.5	1.2	5	fast	slow
10	↑ 1.8	4.7	2.2	5	inventive	conventional
11	↑ 2.4	0.3	0.5	5	obstructive	supportive
12	↑ 2.6	0.3	0.5	5	good	bad
13	→ -0.8	1.7	1.3	5	complicated	easy
14	↑ 2.6	0.3	0.5	5	unlikable	pleasing
15	↑ 2.2	0.2	0.4	5	usual	leading edge
16	↑ 2.8	0.2	0.4	5	unpleasant	pleasant
17	↑ 0.8	1.7	1.3	5	secure	not secure
18	↑ 2.8	0.2	0.4	5	motivating	demotivating
19	↑ 1.4	1.3	1.1	5	meets expectations	does not meet expectations
20	↑ 2.2	0.2	0.4	5	inefficient	efficient
21	↑ 2.2	0.7	0.8	5	clear	confusing
22	↑ 2.0	0.0	0.0	5	impractical	practical
23	↑ 2.0	0.7	0.8	4	organized	cluttered
24	↑ 2.6	0.3	0.5	5	attractive	unattractive
25	↑ 2.8	0.2	0.4	5	friendly	unfriendly
26	↑ 2.6	0.3	0.5	5	conservative	innovative



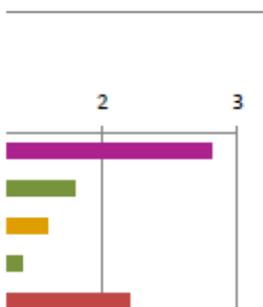
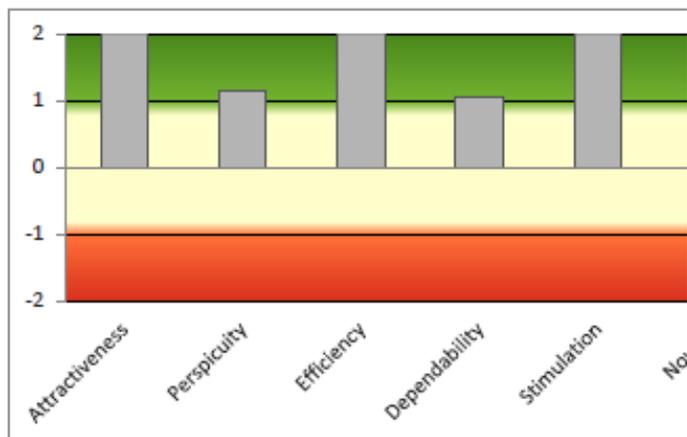
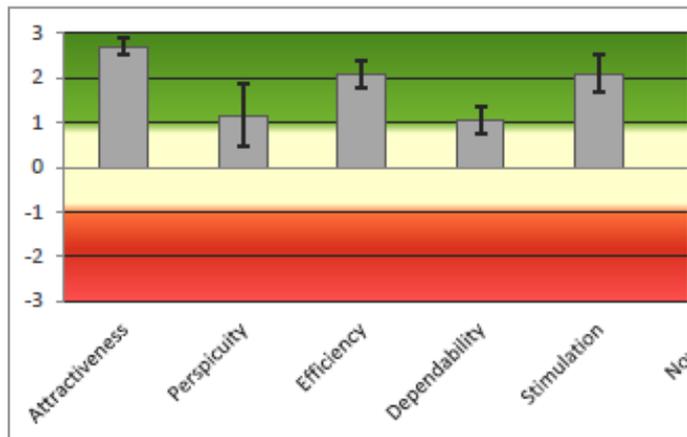


rience (you need to use the KPI extension for this). Because of the construction of the questionnaire it since this value can not be interpreted properly. The values for the single items are listed to allow you is of the same scale this can be a hint that the item is misinterpreted (for example, because of a

ues > 0,8 represent a *positive evaluation* and values < -0,8 represent a *negative evaluation*.  
 general, only values in a restricted range will be observed. It is due to the calculation of means over a  
 'extreme answer categories) extremely unlikely to observe values above +2 or below -2.  
 e of -3 to +3 not as positive as it really is. For this reason this sheet contains two variants for the figure  
 ults to persons that have not much knowledge on the interpretation of this type of data and in  
 influence the observed data.

Scale	
Attractiveness	█
Perspicuity	█
Novelty	█
Perspicuity	█
Stimulation	█
Stimulation	█
Stimulation	█
Dependability	█
Efficiency	█
Novelty	█
Dependability	█
Attractiveness	█
Perspicuity	█
Attractiveness	█
Novelty	█
Attractiveness	█
Dependability	█
Stimulation	█
Dependability	█
Efficiency	█
Perspicuity	█
Efficiency	█
Efficiency	█
Attractiveness	█
Attractiveness	█
Novelty	█

UEQ Scales (Mean and Variance)		
Attractiveness	↑ 2.700	0.05
Perspicuity	↑ 1.150	0.64
Efficiency	↑ 2.083	0.12
Dependability	↑ 1.050	0.14
Stimulation	↑ 2.100	0.21
Novelty	↑ 2.050	0.79

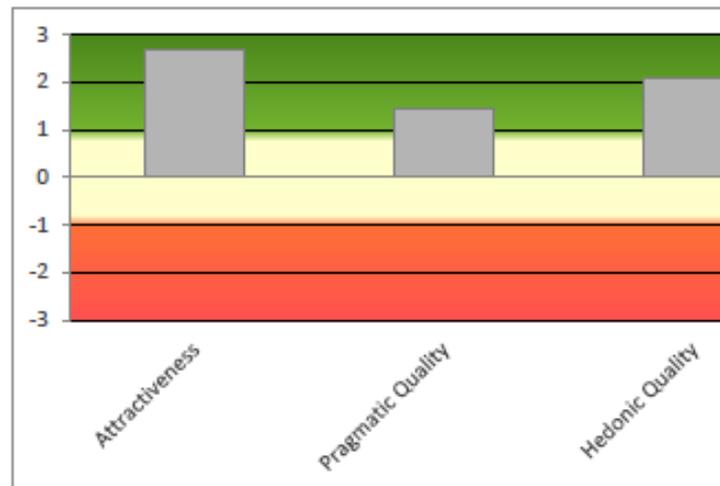


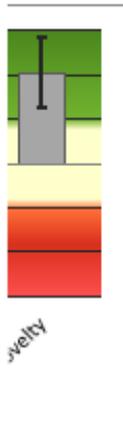
Pragmatic and Hedonic Quality



Attractiveness	2.70
Pragmatic Quality	1.43
Hedonic Quality	2.08

The scales of the UEQ can be grouped into pragmatic quality (Pers Efficiency, Dependability) and hedonic quality (Stimulation, Origin Pragmatic quality describes task related quality aspects, hedonic c non-task related quality aspects. Below the mean of the three pra and hedonic quality aspects is calculated.





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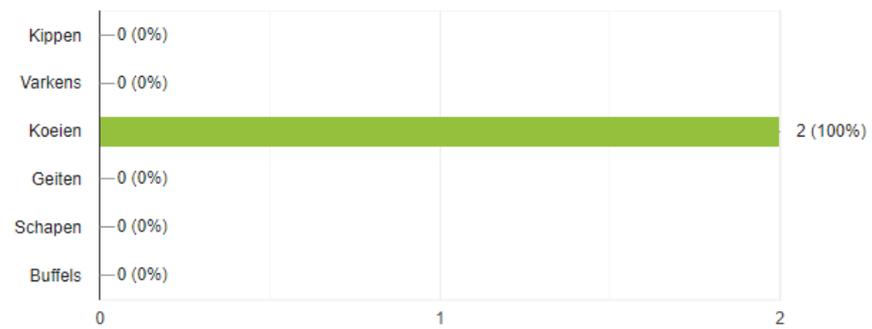
## Appendix G – Questionnaire results + link to video



### Welke dieren houdt u op uw boerderij?

 Copy

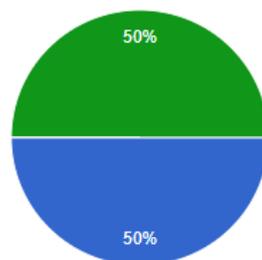
2 responses



### Laat u bezoekers toe op uw bedrijf?

 Copy

2 responses



- Ja
- Nee
- Op afspraak
- ja, benader niet actief groepen mensen.

### Waarom wel/niet?

2 responses

Openheid vind ik belangrijk

transparantie

### Waarom is uw boerderij wel/niet natuur-inclusief?

2 responses

Werk al met de natuurlijke weersomstandigheden grond is te duur om te verwerven

redelijk intensief, koop ruwvoer aan en lever mest terug

### Huidige kennis

#### Weet u wat zoönosen zijn?

2 responses

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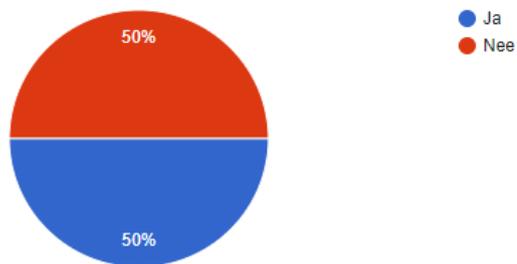


● Ja  
● Nee

Zou u meer over zoönosen willen weten?

 Copy

2 responses



Waarom zou u wel/niet meer willen weten over zoönosen?

2 responses

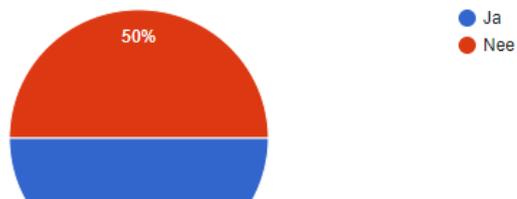
altijd goed om te weten wat van de hoed en de rand

Weet er voldoende van.

Bent u eerder betrokken geweest bij een informatieavond/sessie/workshop etc. over het risico van zoönose binnen veehouderij

 Copy

2 responses



### Waarom wel/niet?

2 responses

Kun je mee te maken krijgen

niet voor benaderd

### Wat weet u van het zoönose risico binnen uw bedrijf?

2 responses

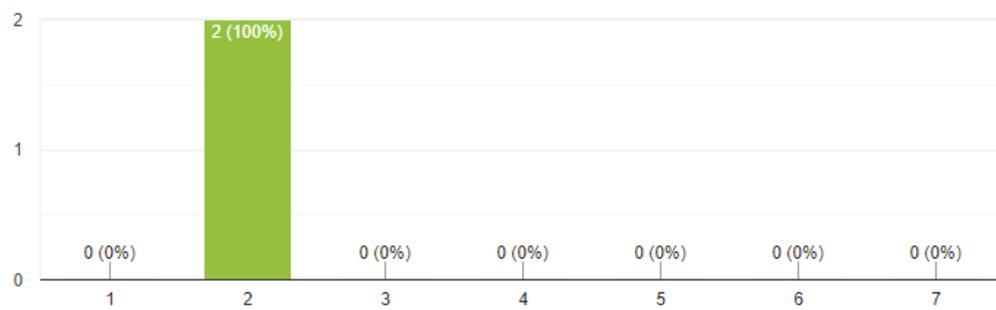
redelijk veel denk ik

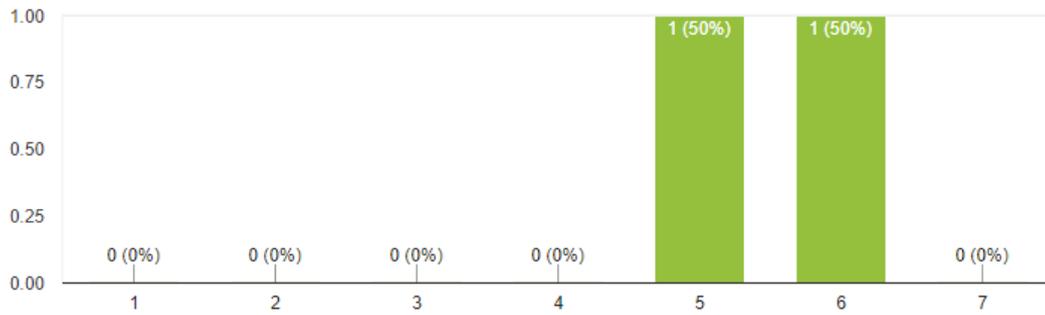
Gering

### Hoe groot denkt u dat het risico op een zoönose is binnen uw bedrijf?

 Copy

2 responses





Wat weet u van het zoönose risico binnen natuur-inclusieve landbouw?

2 responses

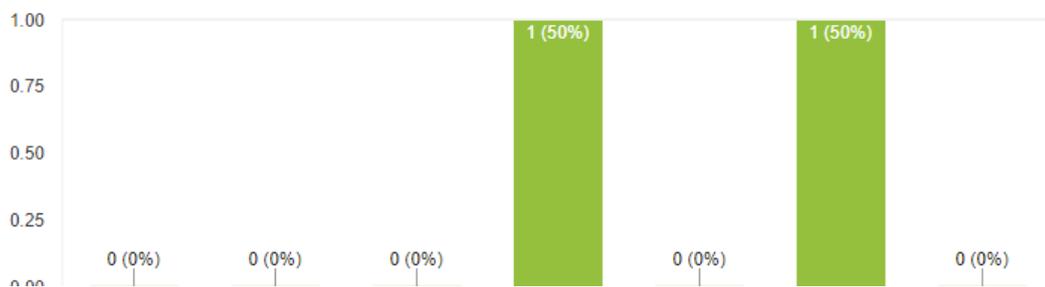
risico is denk ik groter

Ligt niet veel anders dan op gangbaar bedrijf

Hoe verhoudt het zoönose risico binnen natuur inclusieve landbouw zich tot dat van andere vormen van veehouderij?



2 responses



### Waarom denkt u dit?

2 responses

Risico is hoger denk ik vanwege aanraking met (schadelijk) wild

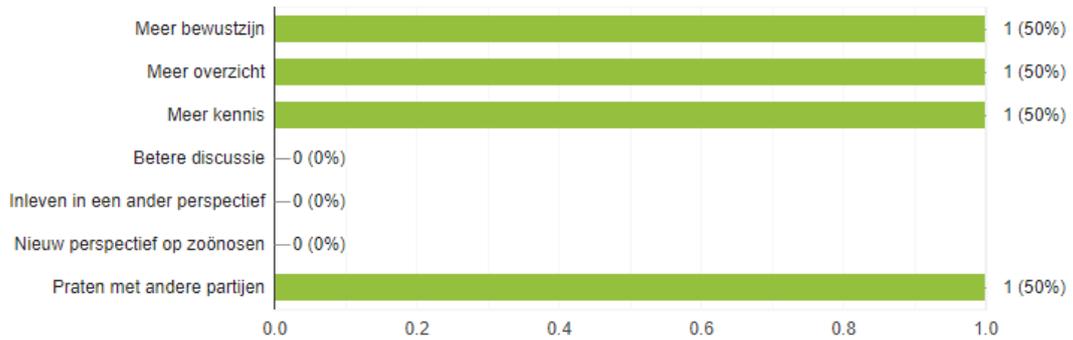
extensievere bedrijfsvoering maakt over het algemeen dat vee minder bevattelijk is voor ziekten en ziektedruk zal daardoor ook lager zijn.

### Video

#### Mening n.a.v de video

Op welke manier denkt u dat de opdrachten binnen de sessie u kunnen helpen om het risico op zoönosen binnen (natuur-inclusieve) landbouw te begrijpen? [Copy](#)

2 responses



### Waarom?

1 response

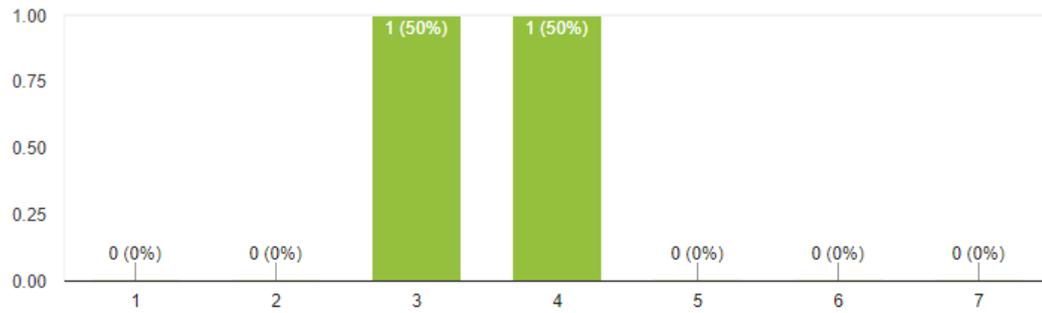
1 response

Mis beheersbaarheid van wild risico wolf aanvallen

In hoeverre denkt u dat de opdrachten binnen de sessie nuttig voor u kunnen zijn om het zoönose risico binnen (natuur-inclusieve) landbouw te begrijpen?

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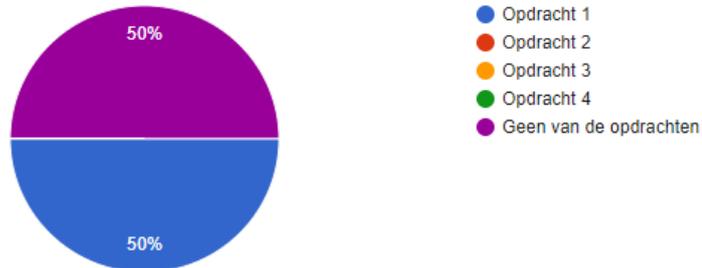
2 responses



Welke opdracht die is gepresenteerd in de video vond u het meest nuttig klinken?

 Copy

2 responses



### Waarom?

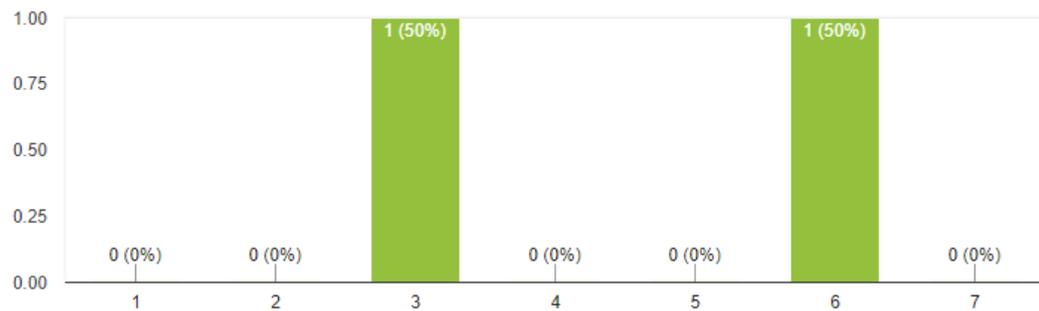
2 responses

moet je in samenhang zien

hoe voorkom je ziekte overdracht van wild op landbouwhuisdieren

Hoe belangrijk vindt u dat het is dat het risico van zoönosen binnen (natuur-inclusieve) landbouw beter in kaart wordt gebracht/er over wordt gepraat? [Copy](#)

2 responses



### Waarom?

2 responses

is wezenlijk van belang als er overdraagbare ziekte wild naar gehouden dieren zijn

ben niet natuurinclusief.

### Waarom?

2 responses

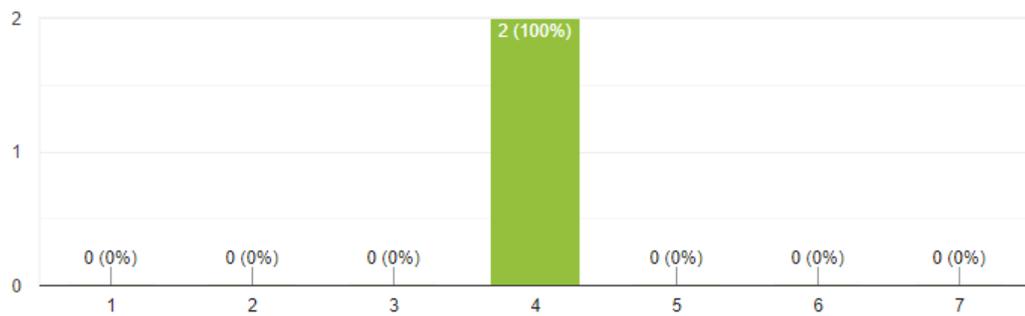
is wezenlijk van belang als er overdraagbare ziekte wild naar gehouden dieren zijn

ben niet natuurinclusief.

### In hoeverre heeft deze video bijgedragen aan het bewustzijn van het zoönose risico binnen (natuur-inclusieve) landbouw?



2 responses



### Op wat voor manier?

2 responses

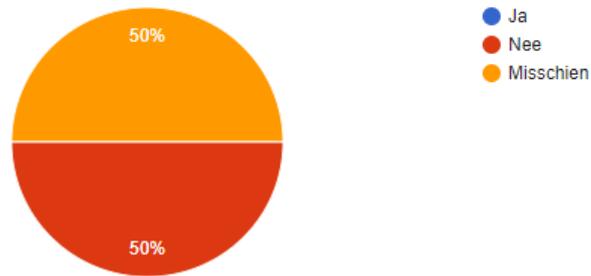
bekeken vanuit meerder sectoren

Dacht nooit zo na over contact tussen wild- en landbouwhuisdier

Denkt u dat u een sessie met dergelijke opdrachten zou bijwonen?

 Copy

2 responses



Waarom wel/niet?

2 responses

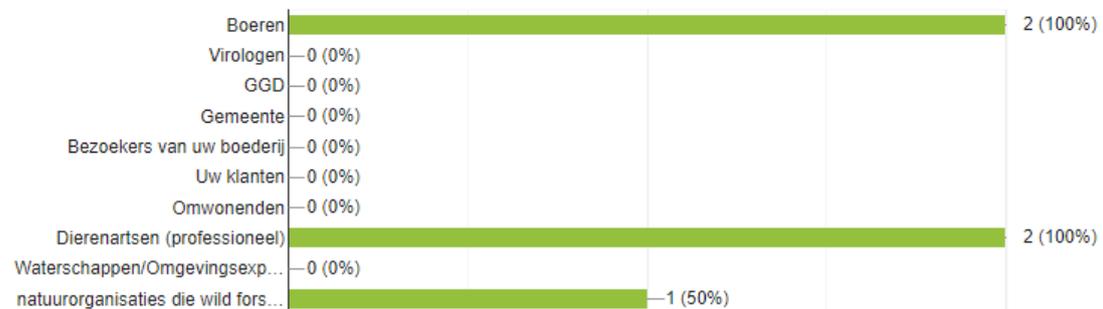
afhankelijk of voor de inbreng en expertise een onkosten danwel dagvergoeding staat

niet geïntereeserd / veel theorie

Zo ja, wie zouden er bij deze sessie aanwezig moeten zijn volgens u?

 Copy

2 responses



Hoe denkt u, na het zien van de video, anders over het zoonose risico binnen (inclusieve-landbouw) landbouw?

2 responses

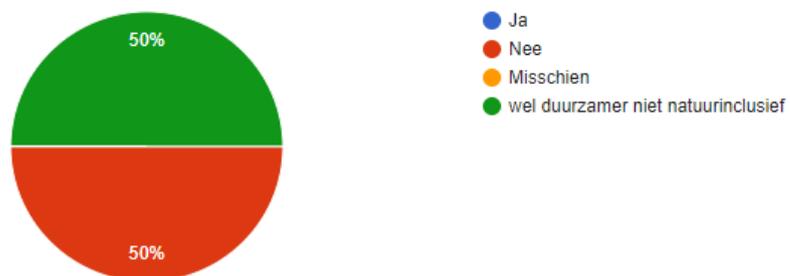
Risico zullen groter worden dan men in eerste instantie dinkt

meer risico dan vooraf ingeschat

Denkt u dat u misschien sneller overgaat naar een vorm van duurzame of natuur-inclusieve landbouw door het bijwonen van een dergelijke sessie?

 Copy

2 responses



Waarom?

2 responses

Risico wordt te groot om met zoonose in aanraking te komen wat niet beheersbaar is

niet mijn ding

Heeft u nog andere opmerkingen over deze enquête of de video die u heeft gezien?

2 responses

nee

nodigt niet uit om er mee aan de slag te gaan. niet pragmatische.

## **Appendix H – Thematic analysis**

### **Contextual inquiry & multi-stakeholder session**

#### **Contextual inquiry:**

Current risk identification & regulation:

- Comparison
- Risk shift
- No regulation
- Idealism

Different perspective on risks:

- Practical view
- Holistic view
- Awareness

Complexity of topic:

- Farmer value
- Low priority
- Idealism

Current practices:

- Tool
- Monitoring
- Awareness

#### **Multi-stakeholder session:**

**Design thinking approach in practice within case study:**

Visualisation and playfulness:

- Design thinking as approach
- Amount of people present
- Timing

Holistic as well as focused:

- Structure
- Assignments within session
- Design thinking as approach

**OH perspective taking:**

- Different perspective

- More awareness
- Effects of assignments
- One Health perspective

Complexity within One Health perspective taking:

- Difficulties within assignments
- One Health perspective
- Iteration on tool

**Knowledge sharing between stakeholders:**

Simplified discussion starter:

- Discussion
- Design thinking as approach
- Better overview

Increased awareness through knowledge sharing:

- Insights within session
- More awareness
- Role of facilitator

Multi-stakeholder presence & connection:

- Iteration on tool
- Different stakeholders present
- Stakeholder target group
- Session for different stakeholders