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THE COMMUNITY OF PRACTICE ‘DIKES & NATURE’

A qualitative analysis of collaboration and transition processes

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Preface

This thesis is written as final assignment for the bachelor of Civil Engineering at the University of Twente. It focuses on how the Community of Practice Dikes & Nature that is part of the National Flood Protection Program (in Dutch: *Hoogwaterbeschermingsprogramma - HWBP*) can continue in a future collaboration setting. Three theoretical perspectives in literature (collaboration life cycle, transition paths, and other collaboration forms (learning communities)) are used to explore the concept of collaboration. These findings will be compared to the insights of participants of the CoP Dikes & Nature that will be collected in interviews and a focus group. Based on the combination of literature and the obtained data from the participants an advice has been written on how such collaboration can continue.

As someone who is primarily interested in the management of processes and projects of Civil Engineering, this topic offered me the opportunity to dive deeper into collaborations that are working on impactful issues. Furthermore, it was a chance to meet people in the work field and talk about the issues they have experienced. This helped me to generate a broader view of Civil Engineering studies, by getting to know all the different fields and stakeholders that are involved in such types of problems. Therefore, I was delighted to get the opportunity to work on such questions and issues.

Hopefully, this thesis supports the National Flood Protection Program and the Community of Practice Dikes & Nature with insights into the process that they went through the previous two years and offers a prospect of continuation. Also, other organizations may learn from the experience of the Community of Practice Dikes & Nature and the proposed ways forward.

It was a pleasure to write this thesis and I hope that it can contribute to the continuation process of the Community of Practice Dikes & Nature. However, I could not have done this on my own. Therefore, I would like to thank my supervisors for their guidance throughout the whole process. They offered me new insights into the topic, but also insights outside of my research. It was a pleasant collaboration where my supervisors always had answers to my questions and found the time to give me feedback and have interesting conversations. Therefore, Joanne Vinke-de Kruijf and Carlos Rivera-Choscó, thank you for all your time and investment in this collaboration/learning process!

Also, I would like to thank the participants of the Community of Practice Dikes & Nature for their time and support during this research project. They made time for me to talk with them and get to know them better. Their insights are crucial for this research, and without them, this research could not have taken place.

Hopefully, you will enjoy reading this thesis and can gain some interesting views/ideas!

With kind regards,
Renske de Vries

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1. SUMMARY

Dike reinforcement is needed in the Netherlands due to climate change and rising sea levels. However, these dike reinforcements projects could take place in protected natural areas. This results in discussion on how dike reinforcement structures can be built with the needs of the environment taken into account. Therefore, in 2022 the Community of Practice Dikes & Nature has been established to address this problem. This is a collaboration that was introduced by the National Flood Protection Program (NFPP) in 2022. With the help of this Community of Practice (CoP), the NFPP wanted to form an answer to the question of how dike reinforcement can be implemented in natural areas (Natura 2000). However, this Community has not defined a future structure on how to continue, due to the ending of the overall project of the NFPP in 2024. Therefore, the project team is looking for opportunities to continue the collaboration and to keep the community alive.

The topic of dike reinforcement implementation in nature-based areas is still a relevant topic that needs attention. Therefore, the CoP (leaders) want to make sure the transition in this field keeps going with the base they built in their collaboration. This results in the following research question: “How can the Community of Practice Dikes & Nature transition to a new collaborative to continue cocreating and disseminating knowledge for the integration of flood management and nature-based solutions in dike reinforcement projects?”

With this pending question, research on three different topics is needed to write a recommendation about the possibilities of continuation of this technical Community of Practice. With the help of three theoretical perspectives in literature (transition paths, the collaboration life cycle and other forms of collaboration (also known as learning communities)) the basis for this research is built. The next step was to set up a focus group and conduct interviews to verify if the insights of the literature review are applicable and relevant to the CoP Dikes & Nature.

The results in this research are based on the collaboration life cycle (phases where a collaboration goes through in their process). An important finding is therefore that the Community of Practice Dikes & Nature spent some time in each of the phases, but for some of the phases they did not take the time they needed. This resulted in that the next phase did not have enough foundation to be completed in the most optimal way. To be precise, the CoP did not spent enough time in the issue phase and the assembly and structure phase (the phases where the problem and the boundaries of the project are defined). Which resulted in confusion in the next phase (productivity phase). With the result of a group of participants that were involved and informed each on different levels.

Moreover, by structuring the collaboration (in some kind of form) and choosing a path that will help to start and keep an implementation of a solution possible (transition paths) the overall productivity might increase. Therefore, it is advised to go back to the issue phase and take the time needed. This research offers a complete model that could guide the Community of Practice Dikes & Nature through this process.

2. INTRODUCTION

In the Netherlands, climate change and rising sea levels are topics that need attention. Due to the large number of rivers that are spread over the country, the impact of rising sea levels is large. As flood protection infrastructure has in some cases been unable to cope with the devastating effects of climatic disasters. These events are unpredictable and thus can be underestimated. Many people are in some way contributing to the solutions to this issue. With many people involved, communication and collaboration becomes more important to make sure all information and knowledge is preserved and used in a plausible way. Therefore, research needs to continue to generate new knowledge on how collaborations can work most effectively on relatable topics.

In that sense, a project such as the Wide Green Dike is a good example of how a collaboration can look like in socio-technical settings. Located in the Ems-Dollard estuary in the northern Dutch region of Groningen, the project explores the possibility of extracting sediment in a way that it can be used as dike reinforcement, also known as a type of nature-based solutions (Marijnissen et al., 2020). With the upcoming nature-based solution possibilities, this field is explored to implement nature-based solutions in areas where the current structures are not approved.

Nature-based solutions are interventions that have nature-inspired roots and are solutions for societal problems (e.g. flooding). The solutions are made considering nature and the environment which makes such solutions sustainable. By implementing such solutions in a correct way biodiversity and the economy could benefit (Sowińska-Świerkosz & García, 2022).

Nature-based solutions became an interesting possible future solution for flood protection issues, including for the National Delta Program. The National Delta program is seeking and implementing this kind of solutions with respect to for example dike reinforcement. Several organisations are part of this Program, one of which is the National Flood Protection Programme (also known as NFPP). A partnership between the Ministry of Infrastructure and Water and 21 water authorities (HWBP, n.d.), which want to prevent the country from flooding by making sure the dikes stay within their safety and building norms.

Further, within the NFPP, an innovation project works on the implementation of dike reinforcement in natural areas and they want to explore opportunities of using nature-based solutions for this kind of settings (Drents Overijsselse Delta, 2023). This project is known as the Community of Practice Dikes & Nature. In this Community of Practice (CoP) participants of different backgrounds are involved. The problem the NFPP works on involves the issue of water safety and the climate adaptation process. This issue has several factors (like nature, economy, safety, etc.) that need to be taken into account. When all these factors are to be taken into account in such societal problems the complexity grows and creates what is called, a wicked problem (Rittel & Webber, 1973).

Wicked problems are problems that are the opposite of tame problems. Tame problems have clear properties and the problems are structured (such as building a bridge between point A and B). On the contrary, wicked problems do not have this clear structure, which means that these kinds of problems do not have a solution and thus need to be monitored and thought of continuously (Rittel & Webber, 1973). A wicked problem can be formulated as an issue that is complex, uncertain, unpredictable and interdependent (Snel et al., under review). Such as the integration of flood management measures (e.g. dike reinforcement) and nature conservation will grow. To illustrate, it is estimated that by 2027, approximately 50% of the projects within NFPP will be next to or inside Natura2000 areas (Ministerie van Landbouw & Voedselzekerheid en Natuur, n.d.). Which causes an increase in the need to integrate

nature-based solutions in flood protection infrastructure in order to ensure environmental quality and climate adaptation.

In order to create innovative solutions to approach this complex problem, NFPP has set up a Community of Practice (CoP). Within this CoP several expertises are connected to combine existing knowledge and develop solutions together. This project started in 2022 and finished in December 2024 with recommendations on the main question: “How can bottlenecks be solved and the value of nature areas and natural solutions be used within NFPP projects?” (Drents Overijsselse Delta, 2023).

The above stated question has many factors to take into account, which makes it according to Rittel & Webber (1973) a wicked problem. With the result that the collaboration and communication could become more complex when a team starts working on the problem. This shows that before discussing the issues itself, the terms of the collaboration should be explored and researched such that there is a structured way of approaching this wicked issue. With the help of concepts like transition pathways (ways of defining how a goal can be pursued with respect to the complexity of the issue) and other forms of collaboration a literature framework is set up.

Moreover, as the CoP has officially come to an end, one of the major concerns among the stakeholders is the preservation, dissemination and further development of the acquired knowledge. In that sense, the CoP Dikes & Nature is looking for solutions on how the CoP can keep contributing to the knowledge continuation without losing the strong network they have created with all the involved experts. Furthermore, this offers an opportunity to improve the collaboration in such way that the development of innovations in the field of dike reinforcement in nature areas is taken to a higher level, which hopefully increases the chance of implementation. However, with this opportunity also challenges are present in the set-up of such a collaboration.

Therefore, in this thesis it is investigated how the CoP can continue with the development and the dispersal of knowledge about the integration process of dike reinforcement and nature conservation.

2.1 RESEARCH QUESTIONS

As stated before, the CoP is currently exploring ways to continue developing and disseminating knowledge on the integration of flood management and nature conservation. They want to obtain insights on how knowledge can be preserved and shared. Moreover, they want to keep the collaboration going, but do not know what forms are possible. Therefore, more information about the possibilities of continuation of this collaboration needs to be gathered, which results in the main focus of this research. Based on this, the aim is to answer the following question:

“How can the Community of Practice Dikes & Nature transition to a new collaborative to continue cocreating and disseminating knowledge for the integration of flood management and nature-based solutions in dike reinforcement projects?”

As the research question has several layers, three sub-questions need to be formulated:

- How can the collaboration(phases) of the Dikes & Nature ‘CoP’ be defined?
- What transition path was followed and what path is the most potential for the future collaboration?
- How can other forms of collaboration be recognised in the CoP structure of Dikes & Nature and what are the potentials for continuation of the collaboration Dikes & Nature?

2.2 SCOPE

This research focuses on the Community of Practice Dikes & Nature in the Netherlands, which leads to that other CoP's and forms of collaboration of other projects not being investigated. Therefore, the involved literature and qualitative data will be analysed only from the perspective of CoP Dikes & Nature and the participants of the CoP. Moreover, only the concepts of Community of Practice, transition and collaboration theory will be reviewed in the literature, and compared with the qualitative data of the CoP Dikes & Nature.

This research has been done with the project leader of Dikes & Nature CoP, and thus not with the NFPP itself. Therefore, the perspective of this research is more focussed on the CoP itself and therefore not on how it is structured within the whole organisation (and their influences).

Besides, the only used data collection methods are literature review and empirical data collection. This means that other methods are excluded form this research. Furthermore, due to time constraints only about 10% of the Community of Practice Dikes & Nature were interviewed, which results in a selected view as the Community of Practice has around 60 members and that the research relied on finding participants who wanted to participate in this study. A minimum of 8 participants was needed to have an acceptable range of views.

Furthermore, the success rate of the results of CoP Dikes & Nature will not be studied. All the content-related results of the CoP will not be taken into account.

Therefore, this thesis will come up with recommendations only specified for this project. However, overall statements or insights for other (future) projects could be obtained and thus to a certain extent the outcomes are generalizable.

2.3 OUTLINE OF THE THESIS

In this thesis several elements that contribute to the clearness of this research are presented.

Chapter 3 presents the outcomes of the literature review about the subjects of collaboration life cycle, transition paths and other possible collaboration forms.

Moving on to chapter 4, the methodology that is used can be found. This research was executed with the help of empirical data collection and analysis.

Chapter 5 shows the results of the empirical data research and will be compared and evaluated in chapter 6, the discussion.

Lastly, chapter 7 presents the conclusions and recommendations of this research, with the support of references in chapter 8 and the appendices in chapter 9.

3. THEORETICAL FRAMEWORK

The research question of this thesis focuses on the collaboration and transition aspects of addressing a problem. Therefore, as a first concept, the life cycle of a collaboration, with a special focus on the productivity phase will be investigated. Moreover, how can transition pathways be used in a collaboration setting and what are the advantages and disadvantages? Lastly, the concept of Community of Practice and other forms of collaboration will be investigated to obtain a clear understanding. Those three concepts are chosen based on conversations with participants and attending sessions of the Community of Practice, being most useful for this research.

For each concept, an explanation is provided explaining the most important insights and building a basis for the questions that will be asked in the empirical data collection.

3.1 COLLABORATIVES AND THEIR PRODUCTIVITY

Collaboration is a concept that has been researched by many scholars. The concept has been relevant in both research and practice due to its potential benefits to help address complex problems. However, the perspectives on the concept are broad and therefore there is a plethora of definitions in current literature. According to Morris & Miller-Stevens (2016), there are five reasons why this is the case:

1. An exact definition of the term is hard to find, as everyone interprets the concept differently.
2. The development of collaboration is an ongoing process (evolvement of the process).
3. Different perspectives can be present to the term collaboration (organisational process or the structure of a collaboration for example).
4. Not all collaborations will be the same, as different types develop through constant evolvement.
5. Collaboration happens in diverse settings, which results in having different groups and behaviours present.

To obtain a deeper understanding of why collaboration is an important concept, Thomson & Perry (2006) illustrates their perspective. They emphasise that collaboration success lies in the process and that through the process results can or may be generated. According to their definition, one action in a collaboration will result in another activity: “A collaboration is a set of inputs and preconditions, which in turn lead to a series of identifiable work and management processes, which result in the production of outputs “ (Thomson & Perry, 2006).

Nevertheless, according to Agranoff & McGuire (2003), the emphasis of collaboration lies in the social dimension. Looking at the definition, the social and collective aspects of a collaboration are highlighted: “A collaboration is the result of a group of loosely connected individuals who share common interest, and work together to achieve common goals” (Agranoff & McGuire, 2003). This could be interpreted as a more human-centred approach, which implies that goals are only achieved when collectiveness and group dynamics are at the core of collaboration. However, Thomson & Perry (2006) show that the structure of the collaboration is determinant to achieve a goal. Therefore, it could be stated that both structure and the involvement of the participants are equally important to make collaboration as productive as possible for that certain case.

Moreover, according to Thomson & Perry (2006), there are three possible settings in which a collaboration could be started:

- A group or individuals with a similar interest;
- Several organisations;

- A combination of the above;

Each of these elements can influence the success of collaboration and therefore, if a collaborative is successful in achieving its goals. Due to these possible settings, the level of communication and understanding of each other's arguments can differ and thus influence how productive the collaboration is and how the goal is reached.

This results in the fact that each collaboration context is different. However, there are also commonalities such as the challenge of aligning and governing complex stakeholder networks with diverse perspectives and interests. How can this be done in the best way possible and what is needed to strengthen the whole process of a collaboration?

As stated earlier the structure and the composition of a collaboration have an influence on the result. Besides these elements, the phases the collaboration goes through have influence on the results and the success rate. According to Morris & Miller-Stevens (2016), six phases can be distinguished (Figure 1):

1. Issue phase: the problem of a collaboration will be defined. A close look is taken at what is necessary to come up with a solution. Criteria and agreements are defined and the productivity phase is prepared.
2. Assembly and structure phase: in this phase, the ambition is to set a common goal, address roles to the participants and a structured work environment is generated.
3. Productivity phase: during this phase, the focus is namely on resolving problems together and formulating solutions. The goal is to come up with solutions as efficient as possible, such that time and money investment is as optimal as possible.
4. Rejuvenation phase: from this point on the collaboration can follow two paths. On the one hand, it could be that new ideas are emerged and new people join the collaboration, to make sure a new stimulus of knowledge is present. On the other hand, hick-ups could be experienced with respect to a collaboration setting, due to the absence of new information or a stimulus.
5. Decline phase: the phase in which the collaboration can stagnate if there are not enough resources, the goals of the collaboration are achieved, or there is no new input which can formulate a new solution.
6. Dissipation phase: the last phase of a collaboration where the goals of the collaboration are reached or there is no more interest in continuing the collaboration, which could result in the ending of the complete life cycle of collaboration.

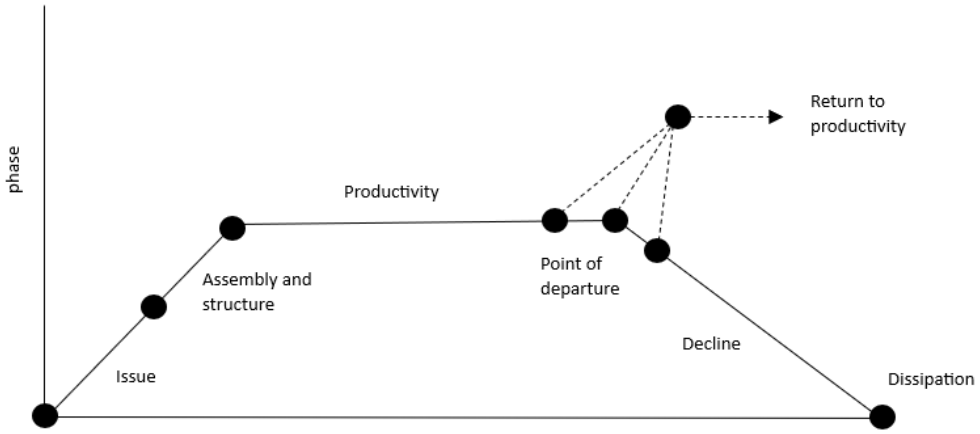

Figure 1 – Phases of collaboration (Morris & Miller-Stevens, 2016, p. 181)

Figure 1 shows how the above-described phases and corresponding processes normally occur. As shown in the image, a crucial point in a collaboration's life cycle is the point of departure, where depending on the existing condition, the collaboration could fall into the decline phase or return to productivity through a rejuvenation phase (point of departure).

Table 1 shows the characteristics of how the phase is addressed and from which perspective.

Table 1 - Phases and their characteristics according to Morris & Miller-Stevens (2016)

Phase		**Characteristics of the phase**
1.	**Issue phase**	• Different interested parties/stakeholders, due to that a problem most of the time affects multiple persons/groups. • The problem can be a 'tame' or a 'wicked' problem depending on the complexity and the involvement of (multiple) parties. • A shared interest in a problem/case is necessary to let the collaboration flourish.
2.	**Assembly and structure phase**	• The focus of this phase is on network growth. • Resources that are necessary to start working on the problem are gathered. • A structured work environment with clear agreements need to be written down and communicated.
3.	**Productivity phase**	• Learning together and from each other to develop solutions for the problem. • Changes in the collaboration need to be managed and cooped with (e.g. participants leaving).
4.	**Rejuvenation phase**	• Avoiding the decline phase, by integrating a positive stimulus in the generation of knowledge and thus access to new knowledge/resources.
5.	**Decline phase**	• The collaboration is stagnating. There are different states of stagnation: o Participants do not see the changes that need to be made in the collaboration. o Participants do not undertake any action. o People leave the collaboration
6.	**Dissipation phase**	• When the goals are reached or if there is no interest anymore in collaboration, this will end.

3.2 COLLABORATIVE FORMS

As stated, collaboration is a broad subject that can be interpreted and used in multiple ways. Therefore, different forms of collaboration are possible and thus investigated.

3.2.1 Defining a Community of Practice

A CoP is a concept that is used frequently, but in literature the definition is ambiguous. To illustrate this Table 2 presents three definitions from the literature, each with its own focus.

Table 2 - Definitions of the concept Community of Practice

Definitions	Focus points
"Practises that are the property of a kind of **community** created over time by sustained pursuit of **shared** enterprise." (Wenger, 1998)	Focus on the common and the shared.
"A community of practice is a **social network** where people in an organisational context **come together** around a common topic, passion or interest and regularly **interact** on- and offline with a focus on **knowledge management**, innovation, **learning** and social networking." (Vollenbroek, 2019)	Focus on learning new knowledge, network and the common goods.
"Communities of Practice can be an organic or purposefully **organised social structure** to **collectively learn** and **share** situated knowledge" (Thomson et al., 2022)	Focus on the organised structure, and learning and sharing together.

Although the focus of the definitions does not overlap, some similarities can be found. In each of the three different definitions the topics of knowledge sharing, group formation and interaction are mentioned.

Looking beyond the definitions of a CoP, certain criteria of a CoP can be formulated. According to Snyder & Wenger (2010), three requirements are the most important:

1. Domain: it needs to be clear what the topic of the CoP is, including the boundaries of this topic and collaboration, to make sure the topic/issue will not be too large for the amount of participants and available time.
2. Community: a group of participants who build/have a relationship with each other. Therefore, a strong leader is necessary to bind the participants and make sure the quality of this relationship maintains.
3. Practise: a community of practice needs to have activities for knowledge sharing. During these activities learning from each other should be the main goal.

In addition to Snyder & Wenger (2010), Vollenbroek (2019) also researched on the topic of the requirements for a Community of Practice. As they both state the domain is a crucial requirement for a CoP. Two additional requirements from the perspective of Vollenbroek (2019) are mentioned below:

1. Interaction: agreements should be made about the ways of communication within the CoP and the engagement of each participant.
2. Communal resources: participants are responsible as a group for the knowledge that is shared and created.

Table 3 shows a summary of the five elements identified in both of the perspectives mentioned before.

Table 3 – Five requirements of a Community of Practic (Snyder & Wenger, 2010; Vollenbroek, 2019)

	Requirement	Explanation
1.	Domain	People with **interests and expertise** within a specific kind of field are **connected** with each other. The domain is the aspect of the CoP that binds the stakeholders and makes that the conversation starts.
2.	Community	A large group of people within the same domain. It needs **someone who leads**, to make sure the community is productive and held together.
3.	Practice	**Several forms of knowledge sharing** need to be used, to make sure the CoP meetings keep interesting. This stimulates the creation of new knowledge.
4.	Interaction	To create **mutuality** in the group. Interaction stimulates knowledge growth when more knowledge is **exchanged** between group members.
5.	Communal resources	To make sure everything is **shared and owned** by the group/Community of Practice.

In this thesis, it is asserted that a full-fledged CoP should comply with all the above-stated requirements. However, the definitions each have a different focus as can be seen in Table 2. This makes the interpretation of the exact requirements ambiguous.

3.2.2 Forms of collaboration that share similarities with a CoP

As stated before, the CoP is an option to structure a collaborative, but there are more forms that can be explored and used. However, in this thesis the focus lies on the option of Learning Community, as this concept has some commonalities with a CoP but also a broad range of possibilities of collaboration alternatives that go beyond the boundaries of a CoP.

According to Endedijk et al. (2024) the terms Learning Communities, PLC (Professional Learning Community and CoP (Community of Practice) are not used in the right context. The difference in these forms remains in the attainability. The PLC and the CoP only look and do research within the boundaries and the possibilities of the collaboration itself and not beyond that. Learning Communities stimulate crossing these boundaries and look beyond the set boundaries by collaboration. Within the category of Learning Communities there are multiple options that can be introduced as form of a collaboration. Endedijk et al. (2024) gave an explanation of three forms (ecosystem, field lab and open innovation team). In Table 4, these concepts are explained.

Table 4 - Learning communities and their meaning (Endedijk et al., 2024)

	Ecosystem	Field lab	Open innovation team
Composition	Representation of the most important **stakeholders**	Experts come together in **different compositions**, sometimes including **users/citizens**.	**Experts** and **users** of different background meet up in a team to work on concrete challenges (linked to the reality of todays issues).
Goal	Development of **strategies** to initiate systematic changes	The creation of a (part of a) **strategy**, roadmap, evaluation and **feasibility**.	The development and implementation of **innovations**, formulation of answer on **complex questions/issues**.
Activities	Strategy meetings, network activities, counselling meetings	Experiments, common knowledge development, researching.	Experiment together outside of practices, diving into new perspectives.

Outcomes	A **supported vision** with accompanying commitment and investment of the most important parties.	Social or technological **innovations**/new **knowledge** and insights.	Changing of **routines**, new **collaborations**.

In each of the collaborative types a resemblance can be seen that could indicate the most important aspects that are needed to let a collaboration succeed in the first place. Primarily, you need a representative group of participants which cover almost every perspective of knowledge that is needed in the collaboration. Furthermore, the diversity of participants stimulates knowledge sharing and growth. Nevertheless, a diverse group of people causes an increase in different perspectives but will become more complex with respect to the interaction with and understanding of each other. Lastly, it is important to define who is involved in the collaboration and what their role is. This all comes down to the identification of stakeholders and an eventual stakeholder analysis (Huxham & Vangen, 2000).

3.3 TRANSITION PATHWAYS FOR COLLABORATIONS

Collaborations want, most of the time, to achieve a goal. However, the way this goal will be pursued is different for each collaboration as there are multiple strategies that can be followed. Such strategies that indicate the goal and what the collaboration wants to change are called transitions. The literature shows that such transitions can be initiated by different pathways, also known as governance pathways. According to Termeer et al. (2024) there are three different pathways (big plans, small wins and rules/regulations). Each of these pathways has its own focus and goal.

- Big Plans: the goal is to change entire systems, thus the transition will be started on all the aspects of a system. An example is the program 'Room for the River' (Rijkswaterstaat, n.d.). This project wants to create room in the Netherlands for rivers to flow and thus manage the high water levels.
- Small Wins: fast and easy changes are implemented to start a transition. For instance, a pilot project can be used. As in this kind of project, small changes can lead to bigger ones over time.
- Rules/Regulations: new rules and laws will be introduced which will make the system change slowly, for example institutionalisation.

However, besides choosing one of the pathways described above, it is important to look at how the collaboration will be designed and if it is even possible to start a transition in this collaboration (depending on the topic/complexity). For this analysis, the Model of Meadows from the paper of Abson et al. (2017) can be used. In this model, four-dimensional characteristics of systems are presented. Each characteristic encompasses three leverage points that can be used and therefore support systemic transitions.

The leverage points show how deep a certain aspect is intertwined in collaboration and how hard it is to change certain aspects. To give an example in Figure 2, number 12 – parameters, could be seen as a tame problem as this can be solved through systematic approaches like laid out procedures. However, number 3, the goals of the system, is a deep leverage point which links to a wicked problem, which means that it is harder to make changes to. As the goal of a system is connected to the values of a project, it costs more energy, time, money to change such a perspective. Multiple stakeholders/participants are likely involved in the system, which causes an extra degree of complexity to deal with. Therefore, it is important to investigate where the change in the system will be made, and what type of change (and energy) is needed.

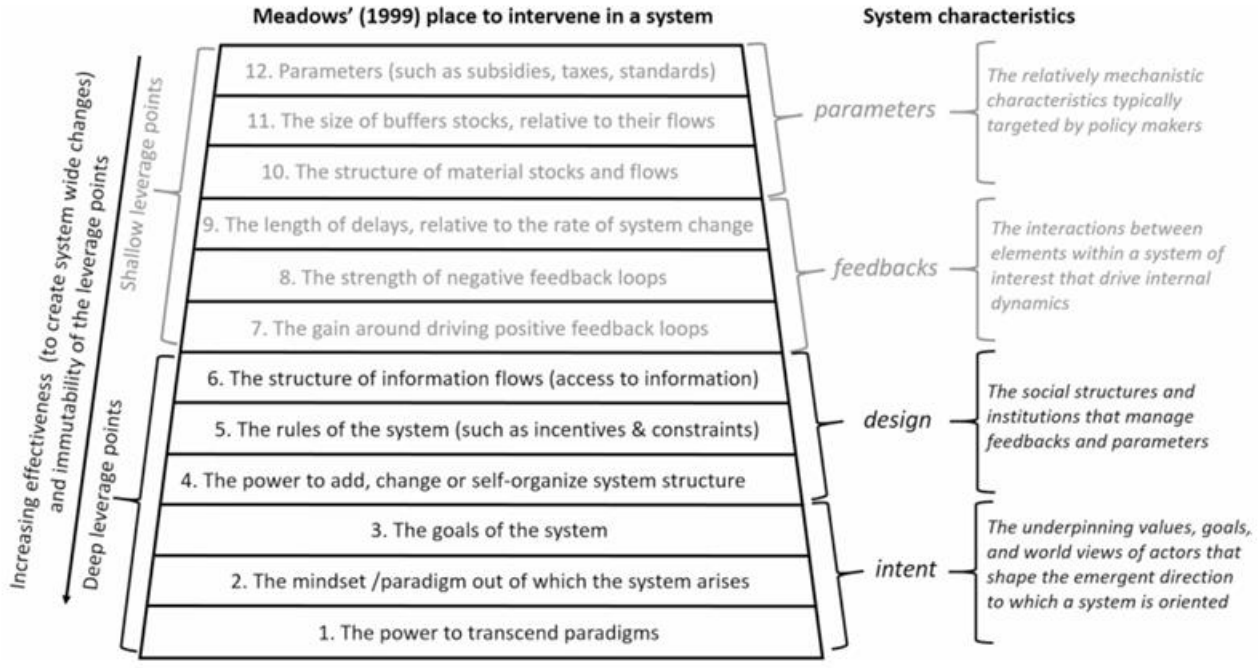

Figure 2 - Meadows leverage points (Abson et al., 2016, p. 32)

However, the above-stated is relatively complex. Therefore, it is hard to determine where change needs to be made at the meso- and microlevels. Therefore, Abson et al. (2017) simplified it to three areas that are most important when it comes to transition in collaboration: re-structure, re-connect, and re-think. The statements below are all based on the insights of Abson et al. (2017).

Re-structure

With re-structure, the focus lies on the learning side of collaboration. Moreover, changing the structure and also the stability are important elements. With these changes some benefits of these leverage points can be noticed, as the following examples show:

- When a crisis comes up, this pushes the collaboration to transform and adapt to a new situation.
- The collaboration can become unstable, which means that this is a trigger to look at making changes to the organisation of the collaboration.
- There is room for analysis, and thus the structure of the organisation can be investigated.
- Situations in a collaborative can become unsolvable due to several reasons, however by re-structuring the organisation and the problems the choice can be easier made to end of continue such collaboration.

Earlier the pathways of 'Big plans', 'Small wins', and 'Rules/regulations' were mentioned. The re-structure phase can be seen in each of those pathways, however, the impact of re-structuring is larger on 'Small wins' than on 'Big plans' for example, due to the focus being on adaptation and structure. A small change in the pathway 'Small wins' could result in major direction changes in prospective solutions. For example, by changing the leader in the project, the direction of each small step could be completely different from the original direction.

Re-connect

In collaboration there are often non-tangible rules that are not always addressed when setting up collaboratives. Examples of these rules are behavioural rules, appropriate dress code, etc. By re-

connecting them, a collaboration needs to think about by those implicit regulations and thus obtain insights into the complete behaviour of the participants that supports the goals of the collaboration.

Bringing these insights together with the pathways, 'Big plans' has a major role in this point of view. 'Big plans' can only be established by working together with people in all sorts of collaboration forms, which results in non-tangible rules becoming more important due to different backgrounds of participants. When this is not respected a productivity phase can stagnate, whereas a collaboration can go from the rejuvenation phase back to the productivity phase due to connecting with each other again. This is also the case for the 'Small wins' and the 'Rules/regulations' pathways, but the impact is much smaller.

Re-think

To start a transformation, re-thinking the knowledge that has already been acquired could be useful. It provide insight in how knowledge into the collaboration is stimulated and saved for further use. Moreover, what methods can be used to re-think the already obtained knowledge? There are three elements that can be distinguished when re-thinking knowledge:

1. The research needs to be focussed on the problem and the solution.
2. Learning processes in the collaboration can be in society and science (or a combination).
3. Values, context characteristics, and norms are included in the process of the re-thinking research.

When combined with the pathways of transitions, 'Rules/regulations' will experience the most impact from this re-thinking perspective. By re-looking at the knowledge that has been obtained, it could be the case that new insights are found which alter the current knowledge. For instance, a rule about dike reinforcement is implemented, but a couple of months later a new piece of information is found about the structure of the sediment used. This could result in redefining the rule/regulation of a certain project which could lead to more flexibility, more time that can be spent, and money that can be saved for instance.

3.4 SYNTHESIS

There are a few crucial elements that can be highlighted. These will be used as the basis for this research. It consists of four elements:

1. Collaboration is crucial within a CoP. In this sense, collaboration needs to be nurtured in order to maintain the productivity of the CoP. To achieve this, implementing strategies to avoid a decline phase is necessary since going back to productivity is difficult. Based on this, the constant rejuvenation of the collaborative can be beneficial to facilitate innovation and maintain the productivity of the collaboration (J. C. Morris & Miller-Stevens, 2016).
2. The definition of a CoP is not clear in current literature since scholars have different understandings of the terms. Yet, the term is used in practice as a tool for collaboration, resulting also in different approaches that vary significantly. Nonetheless, based on Wenger (1998) and Vollenbroek (2019), an overview of the critical aspects of such collaboration is established. This means that an overall definition can not be given, but requirements in a certain direction can be provided.
3. Other types of collaborative structures could be useful to foster successful collaborative settings (Endedijk et al., 2024).
4. To keep the transition going (from the point of view of a CoP), the restructuring of the problem/solution and behaviour changes of the human being are the most important elements (Kanger et al., 2020). This restructuring process takes time and has a strong link with

how a CoP collaborates. The method of re-structure, re-connect and re-think supports this process and provides criteria on how to set a transition in motion (Abson et al., 2017).

Those four insights show that the CoP is a complex organisation with several forms of expertise. Table 5 shows a summary of the literature review. These are the basis for the comparison between the literature and the empirical data.

Table 5 – Summary of the literature review

1.	**To keep the collaboration going (Morris & Miller-Stevens, 2016)**
	A definition of the phase where the CoP currently is with respect to collaboration theory (lifecycle). The project can be anywhere, except the decline phase.
	Besides the collaboration the context, results and social capital need to be watched and adjusted where needed.
	The agreements in each of the six phases of a collaboration written down between the participants.
2.	**Criteria to proceed a CoP (Vollenbroek, 2019; Wenger, 1998)**
	A set and shared domain.
	A community with a leader.
	A variation in practices to share and create knowledge.
	Interaction between participants/stakeholders of the CoP.
	The obtained knowledge is shared between all participants.
3.	**Other forms of collaboration** (Endedijk et al., 2024)
	Each form of collaboration had (dis)advantages. Therefore, research needs to be done about what kind of collaboration is the most fitted. However, the form of Learning Communities and especially 'ecosystem', 'field lab', and 'open innovation team' are suitable options due to the similarities of approaches used.
4.	**To keep the transition of knowledge going in a group/CoP is needed:**
	A clear description of paths and processes of the CoP that will/are followed (big plans, small wins, rules/regulations (Kanger, 2021; Termeer et al., 2024)
	The possibilities with the re-structure, re-connect and re-think structure are clear and can be applied to the context of the CoP (Termeer et al., 2024).

4. METHODOLOGY

This chapter describes the methodology of the research. First an approach is given followed by the data collection and analysis.

4.1.1 Approach

This research follows a qualitative single-case study methodology in order to study the CoP Dikes & Nature. With this approach, all context-specific aspects can be retrieved, which helps to deliver actionable knowledge. A qualitive approach was conducted in order to understand the context-specific intimacies of the CoP. This approach in combination with the literature review allows to develop both context-specific an generalizable insights.

This helps to create a deeper understanding of the case study and what specific recommendations can be made based on existing theoretical and empirical knowledge.

Figure 3 shows a schematic overview of this approach with more information about the concepts and forms of data collection and analysis.

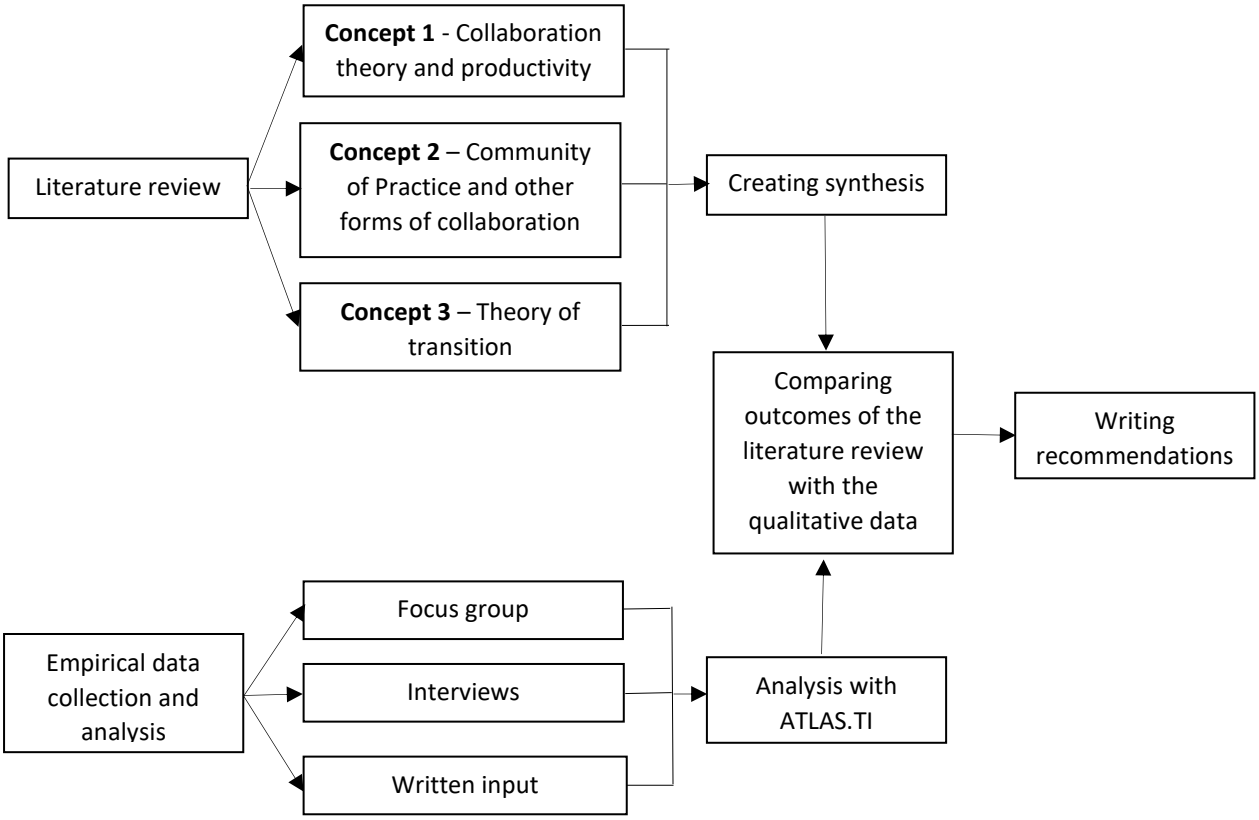

Figure 3 - Schematic overview of the approach of this research

4.1.2 Data collection

The data collection of this research consists of two parts. The first part is the literature review, which has been presented in the theory section. This review is done by with the help of key words and concepts (e.g. collaboration (phases), transition paths, learning communities, Community of Practice). The papers that came up based on these search words where scanned and find useable when the writer saw links or additional information that could be interesting in the foundation of the theory about collaboration.

Secondly, empirical data is collected by doing a focus group with multiple participants. It is done to obtain insights from a communal discussion. Moreover, interviews are done with several participants of the CoP Dikes & Nature to gather different perspective on the topics.

1. Focus group

The focus group with four participants of the Community of Practice was held at the 7th of March 2025 from 09:00 till 10:30. Those four participants were part of the core team of the CoP Dikes & Nature:

- Projectmanager Dikes & Nature;
- Communication advisor at WDO Delta;
- Specialist in Watersafety at WDO Delta;
- Senior Advisor on water quality and nature management (Rijkswaterstaat)

This session lasted 1,5 hours, where the themes of the literature review were discussed. It was supported by four people from the University of Twente, each with a different role:

- PHD Candidate at the University of Twente. Role: makes sure we keep within the timeframe.
- Associate Professor in Civil Engineering & Management and supervisor of this thesis. Role: gives a synthesis after each of the topics discussed, and helps leading the conversation.
- PHD candidate and supervisor of this thesis. Role: writes down remarkable comments.
- Bachelor student Civil Engineering and writer of the thesis. Role: leads the focus group.

All the participants were informed at the start of the focus group that the session would be recorded (a refusal could be made), this correspondence can be found in Appendix A. Furthermore, the transcript of the session would only be used for this research and not for other purposes.

2. Follow-up interviews

Besides the focus group five other interviews were also conducted. In order to broaden the perspective on the continuation of the CoP Dikes & Nature. The same questions were asked as in the focus group. However, these interviews were be held online and took about 30 – 45 minutes. The interviewees had the following backgrounds:

- Advisor water barriers (Sweco)
- Senior Projectleader and Earth scientist (Waddenvereniging)
- Manager NFPP ‘Veilige Vecht’ (WDO Delta)
- Assistant professor at Wageningen University and previous participant in the CoP
- Programmanager (Deltares)

All the interviewees were informed at the start of the interview that it would be recorded (a refusal could be made). Furthermore, the transcript of the interview would only be used for this research and not for other purposes. The mail that was sent to the interviewees can be found in Appendix A, during the interview the informed consent was again given. More detailed information about the interviewees can be found in Appendix B.

3. Supporting documents

Besides the focus group, the whole understanding of the process of the Community of Practice is based on the documents in Table 6. This is used as background knowledge, but taken into account in the formulation of the results.

Table 6 - Supporting documents to the empirical data collection

	Document	Authors	Obtained insights
1.	Notes of the CoP meeting at 14th of April 2022	CoP Dikes & Nature	Background information about the CoP
2.	Notes of the CoP meeting at 16th of June	CoP Dikes & Nature	Background information about the CoP
3.	Notes of the CoP meeting at 17th of November 2022	CoP Dikes & Nature	Background information about the CoP
4.	Notes of the CoP meeting at 9th of March 2023	CoP Dikes & Nature	Background information about the CoP
5.	Notes of the CoP meeting at 24th of June 2024	CoP Dikes & Nature and Renske de Vries	Insight in the meeting notes and the writter observed this session to understand the context better.
6.	Final Plan of Approach of phase 2	CoP Dikes & Nature	Background information about the set up of the CoP

4.1.3 Data analysis

The collected data were analysed and compared to the findings in the literature review. In advance, a plan on how to execute this was made:

1. The focus group and interviews are transcribed in ATLAS.ti, the codings for this transcription can be found in Appendix C.
2. The outcome of the coding is compared to the literature review;
3. Recommendations on the continuation of the Community of Practice are given based on the qualitative data analysis and the literature review.

Appendix C shows a detailed overview of the coding in ATLAS.ti with the corresponding questions asked in the focus group and interviews.

Further, a deductive approach is chosen. This means that based on theoretical concepts the cases will be analysed.

4.1.4 Reliability and validity

Reliability in this thesis is built upon the set up scientific approach and the correct documentation. Which results in that other researches can execute this same approach again, and maybe obtain the same answers. Validity in this research is based on including as many as possible participants from different perspectives, such that the change of all kinds of possible answers will be covered. Due to the interpretative and qualitative nature of the study, the perspective and previous experiences of the author might influence the outcomes of the research. To reduce this chance the interviews will all be conducted in the same setting and open questions are asked. Furthermore, the outcomes of the focus group and interviews will be analysed with the software ATLAS.TI, to create an overview that can be checked and revised by other people.

Moreover, data triangulation was used. Two types of data triangularity will be used:

- Methodological data triangulation: different types of data collection are used. In this research, this is a focus group, interviews and a literature review, which allows for reliability and validity of the results.
- Theoretical data triangularity: the main question of this research is about the continuation form of the Community of Practice Dikes & Nature. However, to come to an answer, different perspectives on each of the three research topics (collaboration and productivity, transition pathways, and alternative collaboration forms) are included. This results in overlap and deviations are found within the literature. This strengthens the reliability of the theoretical insights. Furthermore it indicates the validity and generalizability.

5. RESULTS

This section presents an overview of the outcomes of the focus group and the interviews. It will be presented in three subsections each based on a theme that was stated for the focus group. Afterwards, a summary of the final results will be shown.

5.1 PRODUCTIVITY OF THE COLLABORATION

In the focus group and the interviews the productivity of the Community of Practice Dikes & Nature was researched with the help of the participants' answers to several questions.

Two questions were therefore asked during the focus group and the interviews:

1. Why was the Community of Practice Dikes & Nature productive? (read also 'what kind of elements contributed to this productivity?).
2. What does the Community of Practice Dikes & Nature need to stay productive in the future?

During the interviews, it was remarkable to notice that all the perspectives were different, but overlap especially was noticed in certain absence/skipped phases, the positive influences of having a leader and the suggestion about multiple project lines with one leader and several sub-leaders.

Phases in the collaboration life-cycle

During the focus group and the interviews it was noticed that certain phases in the process of the Community of Practice have been absent in the previous years. This was mentioned in the focus group directly, and gave the participants insights in why the collaboration was not always working most optimally:

"I have to confess that I would have wanted this insight earlier, because this explains something. I think that because of all the tension on the subject, the tension reflected on the collaboration."

– Anonymous participant of the focus group

The main reflection of the participants in the focus group and interviews is that the issue phase did not take long enough, which resulted in consequences for the other phases of the collaboration life cycle. The next phase, the assembly and structure phase, was therefore mostly absent, with not having a clear collaboration structure and thus also problems with addressing the issue as a result.

With already issues in the set up of the Community of Practice, the productivity phase could not function optimally, and therefore the decline phase was early in the process coming closer with the risk of missing the point of departure and not entering the possibility of rejuvenation.

Productivity in the Community of Practice Dikes & Nature

Table 7 and Table 8 shows the aspects that were mentioned in the focus group and interviews. It is structured in such way that most related information from the focus group and the interviews are presented in a row. It can be noticed that the answers are all in some way in the same direction. Some elements with regard to the productivity of the CoP in the last two years were mentioned multiple times:

1. A leader: necessary for having a driving force behind the CoP, otherwise it will not function;
2. Knowledge sharing: creates a network, but also new insight for the projects outside of the CoP in each of the participants' work.
3. Having a joint goal: creates a sense of community. The participants were all in collaboration with the same vision/end point.
4. Building a network: getting to know new people and learning from their experiences gave participants (new) insights in their own projects/work.

In addition, looking at the elements the participants think a collaboration needs in the future, there are a couple that have been mentioned additionally to the first question by multiple participants:

1. Structure and promotion: the structure of the collaboration needs to be set with a clear endpoint, during the collaboration phase also more communication with outside parties is necessary to show the productivity and outcomes to other stakeholders.
2. More people: with more people involved it becomes difficult to create a structure for a form of collaboration, but more mass can start a transition more easily.

This could indicate that the answers to both questions can help to create a stronger collaboration. However, the elements that are also mentioned but fewer times could also be valid elements for a prospect collaboration. Nevertheless, those are less seen by the participants which could indicate that those aspects are less important.

However, the participants also mention that it is important that all the factors mentioned are included in a collaboration. It could be the case that one element drives on the other, or that missing one of the elements will cause a lack of energy in the group.

Table 7 - Results of why the CoP Dikes & Nature productive is according to the focus group and interviewees

Element of reflection		Focus group	Interviews
1.	**Leadership**	The CoP has a **leader**, who helps to keep the Community of Practice on track. Besides a leader, multiple people who form a team that will guide all the participants of the CoP are needed.	A **leader** was present, also for the sub-groups the CoP worked in.
2.	**Network/connections**	The CoP has **a close connection** to the **NFPP**. As the addressed problem was initiated by them, and this CoP was a result to create answers.	The **network** that the participants build. Sharing all kinds of knowledge helps to understand each other issues better.
3.	**Impact of participants**	Several ways of **knowledge sharing.**	The participants have the feeling they can **contribute** to coming-up with a solution for the implementation of nature-based solutions in the Netherlands.
4.	**Goal of the CoP**	Having a **joint goal** with all the participants/stakeholders	With the help of the tracks ('sporen') they saw a certain **goal**.
5.	**Participants**	The **number of participants/stakeholders** involved. The more people involved, the more mass is created to push a transition.	Learning from **each others experiences** was helpful for their own work/projects, which created a sense of community.
6.	**Location**	The **location of the meetings** of the CoP. They work in an inspiring way, as the participants are closer to the problems itself.	Not mentioned.

Table 8 - Results of what is needed to stay productive in the future according to the focus group and the interviewees

Element of reflection		Focus group	Interviews
1.	**Work environment**	A **landing site**, which is not too one-minded. Thus a network with participants with different perspectives is needed. Thus the collaboration needs to be proceeded in an organisation that supports this view.	**An assessment of the projects that are linked to the CoP**, and see what information can be retrieved/used and if a collaboration is possible, to prevent doing double work.
2.	**Clear goals**	The collaboration needs **a clear start and end point** (thus goal formulation and timespan).	To make the CoP more effective, the group could be **split up into different projects** with each having a different nature perspective. This will result in working on a real-time issue for specifically that field.
3.	**Leadership**	Not mentioned.	Currently, after the meetings the attention of the CoP members goes back to their work, and 'forget' the CoP. Therefore, a **leader** needs to be present.
4.	**Number of participants**	Not mentioned.	**Mass**, more people are needed to start a transition.
5.	**External communication**	Not mentioned.	**More promotion**, thus showing the world what the collaboration is doing and what their goals are.

5.2 TRANSITION PATHS

A goal of the collaboration was to start a transition and keep this going. Transitions can begin with different goals, which result in following a certain path. Therefore, the following research question is stated:

"What transition path was followed and what path is the most potential for the future collaboration?"

Supporting this main question, the following questions were asked in the focus group and the interviews:

1. Which path did the CoP follow in the past two years?
2. Which path do you think is the most ideal for the future and why?

The followed path

Of each of the paths, the participants saw elements. However, it could be noticed that over all the participants' feeling was that there was a main goal but small steps were taken to reach it. With the final knowledge of not reaching the goal that was set in the beginning of the project (to solve the problem of the implementation of dike reinforcement in natural areas including benefitting from the surroundings), the small steps track was acknowledged by most of the interviewees. The Rules/Regulation path was difficult for many participants, as they saw elements like changes that were needed in the legislation, but did not proceed from here.

"I am not going to choose, because I think we used all three of the transition pathways. And maybe that is a shame, because you will not get the most optimal effort." – Anonymous interviewee

The statement shows that there was doubt about the chosen path as it had not been clearly stated before the beginning of the collaboration and that the combination of paths could have resulted in less optimal solutions.

Most optimal path in the future

A statement that was made by most of the participants was that the bigger picture needs to be kept in mind, thus the big plan path would be the most suitable choice. However, they mentioned that the support of the small wins is needed to keep the energy in the group going and counteract dropouts (Table 9). They indicated that a combination of the big plan path and the small wins would be the most optimal.

Furthermore, the rules/regulations pathway can not be forgotten. As almost all parties mentioned working with legislation needs to be broader and more flexible. According to some of the interviewees the legislation already offers a lot of options in dealing flexibly with their boundaries. Only some participants of the CoP are keen on not exploring/narrowing those boundaries, which reduces the insights in other possibilities within this legislation.

Table 9 and Table 10 presents the elements that the interviewees and the participants in the focus groups matched with the different transition paths. With thus the overall outcome that big plans is the most mentioned transition path, but that small wins and rules/regulations are needed as support.

Table 9 - Results the followed transition paths

Transition paths		Focus group	Interviews
1.	**Big plans**	• Only the project team/leaders saw the final goal • At the beginning of the project they stated that the goal was to even go beyond the Netherlands with their solutions ("Go to Brussel")	• They saw that the whole system needed to be changed to start the transition.
2.	**Small wins**	• Learning from the reference projects.	• With the help of small wins getting closer to the big plan. • Will be used as an example to create small steps at other aspects of the problem. • Needed to show the participants that something was happening, to thank them for joining the community.
3.	**Rules/regulations**	• Changes in the law are needed, but they are beyond our scope and …	• A look was taken at the possibilities in this path. • NFPP follows this path.
Overall result		Big plan was the path that they wanted to follow, but shifted in the conversations and tasks to the small wins.	Small wins was the path that was followed, but in the background the big plan was initiated. However, the focus remained on small wins.

Table 10 - Results most ideal transition path in a future collaborative

Transition paths		Focus group	Interviews
1.	**Big plans**	*Big plans* • The overall goal needs to be more clear to keep moving further. • Depended on the politics at the moment. • Boundaries need to be clear, where does the big plan end for the collaboration.	*Big plans* • Emphasis on the bigger picture is needed to start the transition.
2.	**Small Wins**	• Focus on the small wins to collect energy to make steps towards the big plan/goal.	• A combination of rules/regulations to make the big plan happen is needed.
3.	**Rules/regulations**	• More freedom in the legislation is needed to broaden the scope of the project. • More attention is needed to the space that the current rules/regulations show, as people are drawn to think even between those boundaries. Thus changing the interpretation of the legislation, not the rules itself. • You do not want to become involved in politics, that is outside of the scope of Dikes & Nature	• Legislation needs to become more flexible to even start such a transition.
Overall result		Big plans need to be kept in mind, but small steps need to be made to keep celebrating the wins that are made. Rules and regulations is not a necessary path that need to be included.	Big plans need to be kept in mind, but a rules/regulations point of view in combination with the celebration of small wins is needed to succeed in the big plan.

5.3 TYPES OF COLLABORATIVES

As the form that the collaboration took place in was a CoP, the question arises if this was the most applicable form. Therefore, the following research question is stated:

"How can other forms of collaboration be recognised in the CoP structure of Dikes & Nature and what are the potentials for continuation of the collaboration Dikes & Nature?"

To answer this question, three questions were asked during the focus group and the interviews:

- Was the CoP Dikes & Nature a CoP according to the five criteria from the literature review?
- Which form of learning community could the CoP have been?
- Which form of learning community would be the most ideal one for this collaboration?

The five criteria of a CoP

The goal of the collaboration was to have a solution to implement dike reinforcement in natural areas with the help of nature-based solutions. The form the NFPP chose was a Community of Practice. Nevertheless, when asked to reflect on the five elements of a CoP found in literature, the participants concluded that the collaborative did not fully meet these criteria. For example, Table 11 shows the

answers of the participants in the focus group and the interviews. It is noticed that certain aspects overlap and are clear by different stakeholders it was present in their Community of Practice:

1. A leader is needed to keep the collaboration going (Community);
2. Working in a shared context leads to knowledge growth and better understanding across multiple fields (Domain);
3. Network building was the mostly named benefit (Interaction);

Table 11 - Results if the requirements of a CoP are recognized by the focus group and interviewees

CoP requirements		Focus group	Interviews
1.	**Community**	• A leader is present • Passionate people • Supported by each other • Participants from different backgrounds	• A leader is necessary • The feeling of struggling with the same issue.
2.	**Domain**	• Shared problem (context) • The leader shows/sends reminders about the domain/issue/problem	• Having the same theme that you are working on (thus the same boundaries)
3.	**Communal resources**	• Some participants had other goals, which made some information not feel as shared and supported by everybody • When it becomes too shared/supported people will drop out.	• There was a sense of all being the owner of knowledge
4.	**Interaction**	• The involvement of people in the CoP is high (by certain people) • Enthusiastic leaders, lead to encouraged followers/participants • Direct contact between people from different locations and work backgrounds in the Netherlands	• Direct connection with the involved stakeholders. • The possibility of knowledge transfer.
5.	**Practice**	• Interaction between people from different backgrounds	• Sharing experiences besides the knowledge.

As the criteria Community, Domain and Interaction were mentioned, a discussion was held about the Practice and the Communal Resources. The interpretation of these criteria where different per participant which resulted in not having a clearly stated vision if those criteria were present in the past collaboration.

"Of course there is a lot of tension on the subject. And with that, I think people can never participate value free in a community." – Anonymous participant in the focus group.

Other options: Learning Communities

Looking further than the collaboration form of a Community of Practice are Learning Communities. In both the focus group and the interviews, it did not become clear which form was acknowledged the most in the previous year. As from each form, there were some elements recognized by some of the participants (Table 12).

Recognizable is that the most named options of Learning Communities were the ecosystem and the field lab, the characteristics of the open innovation team had some overlap with the CoP but were not acknowledged by the participants in the focus group (Table 12 and Table 13).

A solution was therefore difficult to find in which form the participants wanted to continue, as they mentioned mostly having a combination of all the forms (or only the ecosystem and the field lab) would contain all the elements needed.

Table 12 - Results of what kind of learning community it was according to the focus group and interviewees

Learning community		Focus group	Interviews
1.	**Ecosystem**	• Network activities were present	• Network activities were present
2.	**Field lab**	• With respect to the reference projects, the goal was to develop knowledge and experiment.	• Collectively developing knowledge and experimenting. • Was not recognized, however, a roadmap was made.
3.	**Open Innovation Team**	• Was not named explicitly	• Had a concrete challenge • The CoP did not implement or develop certain aspects. • The problem was a kind that could be treated in this form (wicked problem).

Table 13 - Results of what kind of learning community would be the most suitable in the future according to the focus group and interviewees

Learning community		Focus group	Interviews
1.	**Ecosystem**	• Feels more flexible to exchange knowledge and organise network activities.	• A change is needed in the system, thus structural/systematic changes need to be made
2.	**Field lab**	• There was in the beginning a wish to introduce the Community of Practice with the characteristics of a Fieldlab. However, due to time restraints, this was not executed further. • Match with the goals and the time the CoP had. • A leader/team needs to be present that will guide the fieldlab	• Not explicitly named
3.	**Open innovation team**	• Was not named explicitly	• People from different backgrounds, and thus with all kinds of knowledge. • Getting to know other perspectives (in the dike reinforcement sector)

5.4 SYNTHESIS

As stated above, for each of the topics, the deviation in answer of the participants is broad. However, when a closer look is taken some elements can be discovered that were mentioned multiple times on each topic, which could indicate that the participants find this important in the collaboration. Table 14 shows an overview of the mostly named elements of each discussed topic in the focus group and the interviews.

Table 14 - Overall results

Topics of review		Mostly named elements
1.	**Productivity of CoP**	• A **leader** • **Knowledge sharing** • Having a **joint goal** • Building a **network**
2.	**Future productivity**	• All the **elements** of the productivity of the CoP • **Structure**, with respect to the phases of a collaboration (back to the issue phase and walk through this properly with enough time) • **Promotion**, thus show and tell more to the people outside of the network • Have more **mass**, thus more people who want to contribute.
3.	**Transition path**	There is a deviation of the participants on this topic. But the overall statement is that the goal was to **follow the big plan** path, but eventually, they were **stranded on the small wins**, due to the time that was spent on learning from reference projects and showing the participants of the CoP with small steps the progression of the collaboration.
4.	**Future transition path**	It needs to be **a combination of the three paths**. The **'Big Plan' needs to become the main path**, but is **supported with the 'Small Wins'** to make sure the participants keep the energy to contribute (because they see they are making progress). Moreover, the **'Rules/Regulation' also needs to be included** more in a supporting role to the 'Big Plans' to look at the flexibility and the options within the legislation.
5.	**Criteria CoP**	• The criteria **Community** was present, as there was a leader • The **Domain** was set clearly. • **Interaction** was present due to the network building.
6.	**Learning Community**	Not specifically one form of Learning Community could be recognized in the CoP Dikes & Nature collaboration and thus also not in a future form. Therefore, **a combination of the three forms** would be a solution for the participants.

6. DISCUSSION

The similarities and the differences of the findings in literature review and the empirical data analysis are explored in this section.

Reflection on method

It should be mentioned that in this research a qualitative data method is used, which could be sensitive to the opinion of the author. In the interviews, it could be the case that the author unconsciously stimulated the participants to answer in a certain direction due to the already obtained knowledge from other parties and literature. Therefore, the results are an indication of the direction that was indicated by the participants.

Moreover, 9 stakeholders with different backgrounds of the CoP Dikes & Nature participated in this thesis. However, these are not all the stakeholders involved in the CoP, which results in the possibility of finding additional indicators in further research. Therefore, it is suggested to see the upcoming results as a starting point for a new collaboration, but further research and conversations are needed.

Reflection on results

First of all, the productivity of the CoP is discussed. The literature shows that collaboration always goes through certain phases (J. C. Morris & Miller-Stevens, 2016) and the participants and the surroundings have an influence on how the progression will be. The issue and the assembly & structure phase are important steps to build the basis of a collaboration, which is exactly where the CoP went off the chosen route. They did not take enough time to define the real issue/problem (issue phase) due to having to many insights in how it can be solved already. The step of defining, communicating and sticking to the main problem was sometimes overlooked. which resulted in that the participants were not seeing the long term goal clearly enough. However, the creation of the subgroups (each with a subgoal) helped to see the smaller goals.

Also, with a deadline, the timeframe was too short to go through all the phases and have the attention they needed. Therefore at the end of the collaboration, the CoP Dikes & Nature were still in the productivity phase already leaning towards the decline phase, as there was no new input and people started to withdraw (as they no longer saw the greater goal). According to J. C. Morris & Miller-Stevens (2016), the point of departure is currently not being used and therefore the decline phase sets in.

Secondly, the transition paths were part of the research. From the focus group and the interviews, it became clear that none of the participants had a straight answer to the question of which path they had followed. This indicated again that in the assembly & structure phase, steps were skipped. This indicates that further in the process the clearance on the goal and the structure of the collaboration will cause issues, which will have a negative effect on the productivity. In contrast, participants had a clear vision of how the path of collaboration in the future needs to be looked at. The ‘Big Plan’, thus the main goal, should be the most important one. With the help of ‘Small Wins’, the energy of the participants would remain at high level so that productivity stays up and the rules/regulations would be a side track that could be investigated to create more flexibility for the generation of solutions. In literature, Termeer et al. (2024) stated that each pathway has its own benefits, which are now not fully used in the CoP Dikes & Nature according to the participants of the CoP.

Resulting that based on Termeer et al. (2024), a recommendation can be made that combining too many paths will cause a less clear structure. As a consequence people did not know what the expectations are and what they are getting into. Therefore, a clear and close look needs to be taken at these structures.

Lastly, the form of collaboration is a discussion point. By the NFPP a Community of Practice was introduced, with the goal of having them do research for the project and come up with advice. As this was a new form for the leader, research has been done on the concept before starting the collaboration itself. However, the CoP did not remain in the purest form as there was always a form of project management involved (this was a well-considered choice by the leaders). This results in the Community of Practice being a CoP in name, but not in the execution. This could be found especially in the criteria of Communal Resources and Practise introduced by Vollenbroek (2019) and Snyder & Wenger (2010) respectively. Discussion about these criteria came up, as some of the participants did not have the feeling that all the generated knowledge was owned by them and the practices they had, not everybody was always present and involved.

Comparing this with other forms of collaboration, also known as Learning Communities several elements of each form could be noticed. As there is not a clear view of which collaboration form is the most effective one, as in the previous form (CoP) all kinds of elements of the Learning Communities are interwoven. This results again, that in the assembly & structure phase, a closer look needs to be taken on how the collaboration will work and thus in what form it will collaborate. As the answers of the participants on what form the most effective one is for the future, are not realigned, a final advice on this aspect could not be given in a collaboration form. However, the suggestion can be made that the ecosystem and the field lab option were mentioned by multiple participants, which could indicate that a combination of those two would be a proper starting point.

However, it could be stated that at the beginning of the collaboration, a discussion should be held on how the collaboration will work. This could also be a combination of all kinds of forms, but again with the warning of losing the structure and overview for the participants.

7. CONCLUSION & RECOMMENDATIONS

This research aimed to answer the following research question:

"How can the Community of Practice Dikes & Nature transition to a new collaborative to continue cocreating and disseminating knowledge for the integration of flood management and nature-based solutions in dike reinforcement projects?"

Based on the empirical data collection and analyses it shows that the participants, and thus the stakeholders in the CoP Dikes & Nature, all had different views on how the collaboration functioned and what the direct goal was. Therefore, it can be assumed that the first hick-ups started in the issue phase, which results in more problems later in the collaboration life cycle. The subgoals (or subgroups) had direction to the end goal but were not underpinned enough to make sure the end goal became clear to all the participants. Therefore, a focus was more on the 'Small Wins' instead of seeing the 'Big Plan', speaking in transition paths.

Going to the next phase, the assembly & structure phase shows that the collaboration did not have strict boundaries about participation and clear enough expectations of the stakeholders, as there were a lot of stakeholders that came on board later in the process or ended the collaboration earlier. This resulted in a lot of time going lost in making sure enough people were present, which made it even more difficult to maintain the set-up structure. Diving further into the set-up, the choice had been made before the collaboration was established that the CoP was not a Community of Practice that would always be driven by the criteria stated in the literature, also a project management view would be included. This results in that the criteria of the CoP would be more vague to the participants and thus can not be used as a basis.

This all resulted in a collaboration that had many plans and wanted to set a transition into motion but did not take long enough for the first two phases of the collaboration life cycle (the issue and the assembly & structure phase). This resulted in productivity issues in the next phase and stagnation of productivity due to adding and extracting participants. With the help of the rejuvenation phase, the collaboration can again come to life. It is needed to see the 'Big Plan' and only use the transition paths of 'Small Wins' and 'Rules/Regulations' to support this view. Moreover, this needs to be communicated clearly with all the stakeholders and kept in sight through the whole collaboration process. When this is accomplished, the collaboration could bloom and new impulses (like new participants, new insights/knowledge) are needed to keep the productivity alive.

All this together gives the collaboration three options to continue with each its advantages and risks:

1. <u>The Community of Practice:</u> staying a CoP is a possibility. However, the requirements are highly stated and the first step is to know who will be the client of the CoP (or the supervisor/leader) because this will have an influence on the direction of the CoP. Furthermore, it is important to start the process again by defining the issue and walking through the assembly & structure phase at a slower pace. However, an advantage is that the current members know the concept of a CoP, and are not introduced to new collaboration forms, which could cause disturbance/confusion.
2. <u>A Learning Community:</u> a switch to a learning community could be made. The criteria are less defined and this gives more space to explore. However, the question arises of which learning community would be the most effective. This depends again on the issue and the leader/client of the collaboration. With the risk of not seeing which LC is the best form for the collaboration, and stranding in the same place the collaboration is currently in.

3. A combination of a CoP and LC: it could be the case that there are different layers in a problem, which need each other's approaches. Therefore, a main CoP/LC could be chosen with several sub-CoP's and LC's. However, the risks with this option are that a structured overview needs to be made and also a manager/leader needs to be present to make sure everything goes smoothly.

All-in all, this research shows the importance of going through the collaboration cycle steps correctly. Moreover, structure, transition paths and collaboration forms need to be established before the whole collaboration starts. Therefore, it is advised that all the interests and goals of the parties will become clear in further research, especially the one of the client. Furthermore, conversations and interviews with the stakeholders need to be done to get a more detailed overview of their needs. Lastly, the participation rate needs to be measured when certain forms are chosen, as some of the participants mentioned that some forms are not supported within their work environment.

This all will help with an even better understanding of how the collaboration form of Dikes & Nature can continue in the most productive and structured form.

Recommendations to the CoP Dikes & Nature

The main recommendation is based on the Life Cycle of Collaboration. The Community of Practice Dikes & Nature did go through all the phase, but did not stayed long enough in each of the phases to establish a foundation for the next phase, which resulted in problems further along. This has also a connection with the chosen transition path and even the form of a collaboration itself. They are all intertwined with each other and a collaboration will be less productive if the structure and the goal of these tools/directions are not clear.

Therefore, in order to continue leveraging on knowledge co-creation, it could be beneficial for the CoP to go back to the issue phase. By redefining new goals and an action route based on the already existing knowledge, the CoP could follow the suggested path in Figure 4 (A better readable version can be found in Appendix D). In the issue phase, it is critical to know who the client is and what are the restraints for the collaboration (thus their needs). Furthermore, the problem needs to be clearly defined for all parties and also underlying questions need to be asked and formulated. Only then a progression can be made to the assembly and structure phase. This phase is the most critical one as multiple steps can fail. Choosing a collaboration form needs to be done based on the main problem (also the 'Big plan' path), when the most suitable collaboration form is chosen the next step is to take into account the sub-questions. According to the interviewees it could be that each sub-question that is formulated in a collaboration needs attention in some other way, and thus maybe in another collaboration form. This could result in having an overall Community of Practice, with several supporting Learning Communities. For example an overall ecosystem with several sub- Communities of Practice and field labs, with each their own problem to address. Nevertheless to build up such a system, a proper walk through the phases of a collaboration needs to be done and thus with enough time to spent at the first two phase.

Furthermore, if this is the case, documentation and communication to all parties are crucial. Based on the chosen collaboration form the set up of the transition paths that will be followed can be drawn, but again with in mind that for the sub-questions this might differ from the main question. When entering the productivity phase, the most important aspects are keeping multiple people connected to the collaboration (as only then a transition can move forward), sticking to the communication plan internal and external, promoting the topic that will be worked on, and always checking if the joint goal is still clear with all the stakeholders. From there on, due to time constraints, it could be that the decline phase will be entered, but this should not be an issue when all the products/solutions are

ready. However, if this is not the case, the only chance to start again is to create new impulses to start the rejuvenation process. This is exactly the case for the current collaboration.

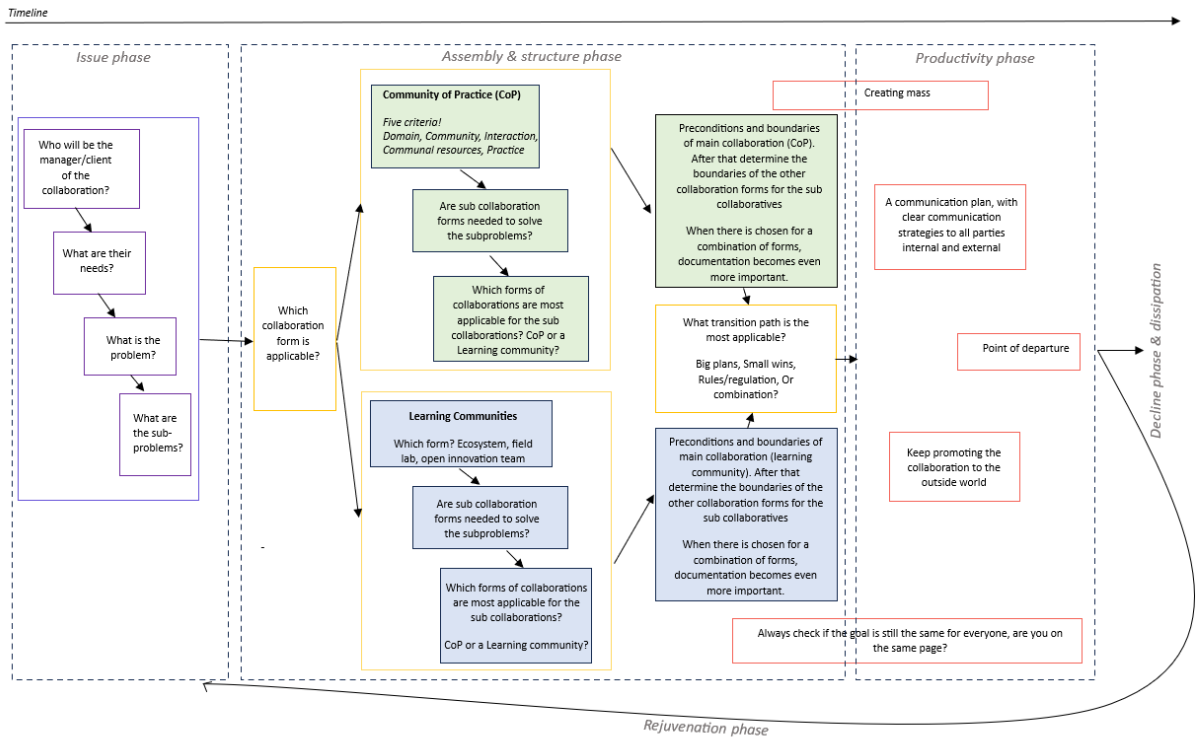

Figure 4 - Recommendation collaboration set-up Dikes & Nature

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9. APPENDICES

9.1 APPENDIX A – INFORMED CONSENT FOCUS GROUP AND INTERVIEWS

The focus group was held in Dutch, therefore the communication was also in Dutch.

Beste allemaal,

Ontzettend fijn dat jullie willen deelnemen aan de brainstormsessie voor mijn afstudeeronderzoek met betrekking tot de CoP Dijken & Natuur. Aan de hand van jullie beschikbaarheid is de datum voor deze sessie vrijdag 7 maart van 09:00 tot 10:30 uur geworden. Via de mail hebben jullie hier ook een Teams link voor gekregen.

In deze mail wil ik jullie alvast kort meenemen in de sessie. Daarnaast vinden jullie in de bijlage de agenda voor 7 maart.

Afstudeeronderzoek Dijken & Natuur
Sinds december 2024 ben ik bezig met het schrijven van mijn Bachelor thesis voor de studie Civil Engineering aan de Universiteit van Twente. Aangezien ik de management tak binnen de civiele sector het meest interessant vind, ben ik in contact gekomen met Karin Snel en Joanne Vinke-de Kruijf. Samen met hun heb ik gekeken wat het meest passend is als opdracht en daar kwam al snel de link naar de CoP Dijken & Natuur uit. Naar aanleiding van gesprekken met Marjolein en het bijwonen van een aantal CoP bijeenkomsten heeft de volgende hoofdvraag zich gevormd:

“Welke aanbevelingen kunnen worden gedaan betreft de CoP Dijken & Natuur om te zorgen dat de voortgang van kennis van projecten over het implementeren van natuur gebaseerde oplossingen van dijkversterkingen doorgaat, ondanks dat de subsidies en het project ten einde lopen?”

Aan de hand van literatuur en een kwalitatief onderzoek wil ik data ophalen om de aanbevelingen te onderbouwen.

Inhoud sessie
De sessie op vrijdag 7 maart zal 1,5 uur duren. In deze 1,5 uur zullen we samen gaan brainstormen. Het doel van de sessie is om vanuit jullie perspectief tot richtingen/antwoorden te komen binnen bepaalde thema’s (zie de agenda in de bijlage).

Voordat elke brainstorm begint zal ik jullie meenemen in een stuk literatuur/theorie als onderbouwing/inleiding van het vraagstuk.

Als iedereen akkoord is zou ik graag de sessie opnemen, zodat ik deze later kan analyseren (wordt alleen hiervoor gebruikt, niet voor andere doeleinden). Mocht er iemand bezwaar hebben, dan hoor ik dat graag uiterlijk woensdag 5 maart.

Mochten jullie vragen hebben, dan hoor ik het graag.
Ik kijk er naar uit en tot 7 maart!

Met vriendelijke groet,
Renske de Vries

Student Bachelor Civil Engineering
University of Twente
r.devries-11@student.utwente.nl

The communication with respect to the interviews was also in Dutch. Therefore, the following email is also written in Dutch.

Beste persoon x,

Van persoon y heb ik jullie contact gegevens gekregen aangezien jullie betrokken zijn/waren bij de CoP van Dijken & Natuur.

Mijn naam is Renske de Vries en ik ben momenteel aan het afstuderen voor de Bachelor Civil Engineering aan de Universiteit van Twente.

De reden dat ik jullie mail is aangezien mijn afstuderen over de CoP Dijken & Natuur gaat en ik input aan het ophalen ben bij verschillende betrokkenen over hoe zij de CoP hebben ervaren en hoe zij een eventueel vervolg voor zich zien. Deze data heb ik nodig om uiteindelijk op basis van literatuuronderzoek en een kwalitatief data onderzoek aanbevelingen te doen.

Ik vind het belangrijk dat zoveel als mogelijk alle perspectieven worden meegenomen, vandaar dat ik jullie nu benader.

Zou daarom één van jullie in de komende weken de tijd hebben om een aantal van mijn vragen te beantwoorden?

Ik hoop dat er mogelijkheden zijn en ik zie graag jullie reactie tegemoet.

Met vriendelijke groet,
Renske de Vries

Student Bachelor Civil Engineering
University of Twente
r.devries-11@student.utwente.nl

9.2 APPENDIC B - DETAILED INFORMATION ABOUT THE INTERVIEWS

The interviews are held online through MS Teams, and the questions are asked by Renske de Vries. Each interview was about 30 – 45 minutes. The following people participated in the interviews:

- Advisor water barriers (Sweco)
    - At the 27th of March from 16:30 to 17:15;
- Senior Projectleader and Earth scientist (Waddenvereniging)
    - At the 14th of April from 10:30 to 11:15;
- Manager NFPP 'Veilige Vecht' (WDO Delta)
    - At the 7th of May from 09:00 to 09:45;
- Assistant professor at Wageningen University and previous participant in the CoP
    - At the 19th of May from 13:30 to 14:00;
- Programmanager (Deltares)
    - At the 19th of May form 14:30 to 15:15;

9.3 APPENDIX C - CODING IN ATLAS.TI

Table 15 shows the codes used in ATLAS.ti. Some codes were introduced to support others, those are written in grey.

Table 15 - Coding labels in ATLAS.ti

Theme (stated in the literature chapter)	Topic	Code	Research question
Collaboration and their productivity	Collaboration Life Cycle	Issue phase	Why was the Community of Practice Dikes & Nature productive?
		Assembly and structure phase	
		Productivity phase	
		Rejuvenation phase	
		Decline phase	
		Dissipation phase	
	Indicators of productivity	Positive influence on the productivity	What does the Community of Practice Dikes & Nature need to stay productive in de future?
		Negative influence on the productivity	
		Neutral influence on the productivity	
Ways of starting a transition	Transition pathways of the CoP	Small Wins	Which transition pathways did the CoP follow in the past two years? Which path do you think is the most ideal one for the future and why? Is the most ideal path also the most feasible one?
		Big plans	
		Rules/regulations	
	Transition pathways of the future collaboration	Small wins future	
		Big plans future	
		Rules/regulations future	
	Leverage points	Re-structure	
		Re-connecting	
		Re-thinking	
Collaboration forms	Community of Practice	Domain	Was the CoP Dikes & Nature a CoP according to the five criteria from the literature review?
		Community	
		Practice	
		Interaction	
		Communual resources	
	Alternative forms of collaborations	Ecosystem	Which form of learning community could the CoP have been? Which form of learning community would be the most ideal one for this collaboration?
		Field lab	
		Open innovation team	
Other	Remarkable aspects		
	Conclusions		

9.4 APPENDIX D - RECOMMENDATION SCHEME