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Collaborative Strategies for Transboundary Green Infrastructure Management

Insights from an Internal Stakeholder Analysis

Huub Visser

S3625346

h.t.n.visser@student.rug.nl

Supervisor: Gunnar Mallon

Master: Cultural Geography – Climate Adaptation Governance

Campus Fryslân

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DECLARATION BY THE CANDIDATE

I hereby declare that this thesis, “Collaborative Strategies for Transboundary Green Infrastructure Management: Insights from an Internal Stakeholder Analysis”, is my own work and by my own effort and that it has not been accepted anywhere else for the award of any other degree or diploma. Where sources of information have been used, they have been acknowledged.

Name: Huub Visser

Date: 05/06/2024

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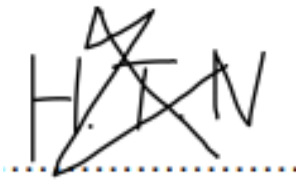

DISCLAIMER

I hereby, in order of full transparency, acknowledge the use of generative AI tools in accordance to the *UG Policy in AI in teaching (Version 19.3. 2024).* To be more precise, this thesis utilised the OpenAI (GPT-4) tool in accordance with point 1 of the UG Policy in AI in teaching, which states:

[“AI tools may be used as aids to support general functionalities (study tool/assistant/input for own work). General functionalities include, for example, **brainstorming, gaining inspiration, summarizing general information, fine-tuning own work (language correction, language assistant), translation, and independent study/sparring partner** (generating mock exam questions and answers). Please note: AI tools are not reliable academic sources and their output must always be processed critically in accordance with academic ways of working. Students are always responsible for their own submitted work.”]

For this thesis I utilised OpenAI (GPT-4) specially to gain inspiration, summarise general information, translation of quotes, and fine tune my own work, specifically language correction and improving sentence structure.

Abstract

This master's thesis was written for the programme Cultural Geography: Climate Adaptation Governance at the Rijksuniversiteit Groningen. The Rhine river corridor is an important ecological corridor between the Dutch and German nations, containing heavy international cooperation through initiatives such as the Green Blue Rhine Alliance and 'de Rijn Verbind' that aim to improve natural connectivity. As extant literature is limited on the planning and management of such transboundary rural and natural Green Infrastructure (GI), especially those involving multiple stakeholders and public participation, this paper aims to bridge the gap by providing a clear analysis of the *internal* stakeholders involved in *transboundary* GI projects. By creating an internal stakeholder analysis, this paper aims to contribute to the academic research and societal benefit by constituting the particular stakeholders involved and how the engagement of stakeholders is of crucial importance when implementing GI policy in a particular cross-border region. The main objective is to answer the main research question: "What are effective strategies that stimulate efficient collaboration between internal stakeholders during planning and managing transboundary Green Infrastructures (GI) that facilitate environmental services in response to climate change across the Dutch – German border?" In order to do so, this research employed an internal stakeholder analysis, operationalised by (semi-) structured in-depth interviews that is supported by a document-analysis. In terms of operationalisation, 6 interviews were conducted with a total of 9 participants. Participants included several internal stakeholders from both the GBRA and DRV, i.e., Rijkswaterstaat, Waterschap Rijn & IJssel, Verenigd Nederlands Cultuurlandschap, ARK Rewilding and Naturschutzzentrum im Kreis Kleve. These interviews were conducted with careful consideration of ethical implications involved. Subsequently, they were transcribed and coded in accordance to the inductive analysis method. The analysis showed that effective strategies stimulating collaboration between internal stakeholders during planning and managing transboundary Green Infrastructures, are based on: the incorporation of effective 'stakeholder engagement'; the consideration and addressing of key ecological, social and policy factors; and the four collaborative methods of finding counterparts, acknowledge differences, mutual learning and using stakeholder expertise. Incorporating these strategies into the planning and management of transboundary GI projects enables effective collaboration between multiple internal stakeholders in facilitating climate adaptation efforts like environmental services in response to climate change across the Dutch – German border. More specifically, this research highlights the necessity of active

stakeholder engagement, as it creates a deeper understanding of issues, diverse perspectives, and potential solutions. The consideration and addressing of key influential factors in planning and managing transboundary GI, as multiple different stakeholders, due to their organisational nature, experience a variety of factors that they the deem influential; and the incorporation of collaborative methods that create stronger internal relationships between internal stakeholders. These strategies work to create more closely knitted and efficient collaboration between internal stakeholders in transboundary GI projects. All in all, this contributes to the overall field of research by identifying and explaining effective strategies that enhance the collaboration between internal stakeholders within transboundary GI projects.

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Introduction

The Rhine has linked the German and Dutch nations for generations, significantly shaping the landscape, water systems, nature, economy and human activities (INTERREG 2022, 1). In the last decade the 'Green Blue Rhine Alliance' (GBRA) and 'de Rijn Verbind' (DRV), consisting of multiple Dutch and German partners in the Rhine-Waal region, aimed to strengthen natural passages across the German-Dutch border region. In these projects, 10 German and Dutch partners including, governmental water bodies, NGO's, nature and fishing organisations worked collaboratively to develop a professional network that aims to strengthen and manage ecological corridors, as well as knowledge development and nature education (INTERREG 2022, 1). Due to the growing understanding of the need to integrate approaches that link natural and social factors, the concept of 'ecological corridors' has evolved over the years to encompass interconnected networks that support ecological functions, and human well-being. The European Union defines this as Green Infrastructure (GI), "a strategically planned network of natural and semi-natural areas with other environmental features, designed and managed to deliver a wide range of ecosystem services, while also enhancing biodiversity" (European Commission, 2024, 1). This "network of blue (water) and green (land) areas can improve environmental quality, natural connectivity and the condition of natural areas, which can further improve the quality of life and health of citizens" (ibid, 2024, 1). To promote GI, the EU has constructed the 'EU Green Infrastructure Strategy', which aims to "preserve, restore and enhance GI to help halt the process of biodiversity loss and allow ecosystems to deliver their services to people" (ibid, 2024, 1). Municipalities are of significant importance for the practical implementation of activities on the ground, therefore the EU aims to help European cross-border regions with the EU Interreg Program, which brings cooperation across borders between regional and local governments, as well as the private sector, through project funding and communication. GI projects include the European Green Belt and the Green Blue Rhine Alliance, with the latter being the focus of this thesis paper.

GI is seen as a beneficial policy that can be used to create habitats for various biota, which protect ecosystems both on land and in the ocean (Demazure *et al.,* 2014; EEA, 2011; Ignatieva *et al.,* 2011; Wang & Banzhaf, 2018, 758). Within the academic community GI has become a very relevant topic, as various scholars have broached the necessity and benefits of connecting green spaces, including sustainable development (Cortinovis & Geneletti 2018; De Valck *et al.* 2019), climate change adaptation (Geneletti & Zardo 2016; Takács *et al.* 2016;

Escobedo, Giannico, Jim, Sanesi, & Lafortezza, 2019; Ying *et al.* 2021, 344), mitigating the urban heat island effect (Wang & Banzhaf 2018), improving stormwater management (Pappalardo *et al.* 2017; Raei *et al.* 2019), minimising environmental pollution (Livesley *et al.* 2016; Ying *et al.* 2021, 344), and connecting natural habitats (Kilbane, 2013; Angelstam *et al.*, 2017; De La Fuente *et al.,* 2018). In terms of societal benefits, GI can "improve the built environment, give people more chances to connect with nature, enhance the beauty of landscapes, and promote social equality, thereby boosting social well-being and human health" (Coutts & Hahn, 2015; Ko & Son, 2018; Sun et al., 2019; Ying *et al.* 2021, 344). Furthermore, various economic activities and aspects of human wellbeing depend on how ecosystems work. For example, "food security relies on fertile soil; we breathe air filtered by plants; soil infiltration, dune systems, riparian forests protect us from flooding; and access to green spaces can benefit our mental and physical health" (Assessment, 2005, Alcock *et al.*, 2014; Liquete *et al.* 2015, 268). GI maintains these 'ecosystem services', creating "beneficial flows from nature to people, which can help contribute to provisioning (e.g. food supply, clean air, water and materials), regulating (e.g. water and climate regulation, pollination, fertile soil formation, nutrient cycling), or cultural (e.g. recreation opportunities)" (European Commission 2024, 1). This particular multi-functionality is what makes GI so attractive, as both our societies and ecosystems depend on healthy ecosystems and the services they provide (Hansen & Pauleit; ibid 2024).

Despite the vast array of literature, academic research has primarily focussed on the implementation of GI in urban areas within national borders, as also noted by Chatzimentor, Apostolopoulou & Mazaris (2020). Yet, academic research on the implementation and management of cross-border rural/ natural GI networks besides Rüter, Vos, van Eupen & Rühmkorf (2014) and An, Shen, Zhong & Li (2023) is limited. Rüter *et al.* (2014) concluded that optimising transboundary networks and developing corridors is a suitable adaptation strategy for forest species; and An *et al.* (2023) contributed by identifying transboundary ecological networks as a practical tool for pinpointing crucial areas that need protection and restoration in at-risk landscapes, is lacking. Nevertheless, academic research, including the aforementioned papers, primarily focuses on the creation of policy in GI, yet research on the planning and management of GI projects, particularly where this has involved multiple stakeholder and public participation is limited (Civic & Jones-Walters 2014).

Therefore, this project aims to provide a clear analysis of the *internal* stakeholders involved in *transboundary* GI projects, with the border of the Netherlands and Germany in particular. By creating an internal stakeholder analysis, this paper aims to contribute to the

academic research and societal benefit by constituting the particular stakeholders involved and how the engagement of stakeholders is of crucial importance when implementing GI policy in a particular cross-border region.

Study objective & Research Questions

Based on the findings of the literature review and the gap in research, this Master Thesis aims to create a better understanding of effective collaboration of transboundary GI projects. By conducting an internal stakeholder analysis of the Rhine river corridor between the Netherlands and Germany, using this area as a case study, this paper aims to shed light on how transboundary GI collaboration can prove successful. Overall, this paper aims to contribute to the extant literature by examining how the findings can be applied to other cross-border GI projects, with the Dutch – German border in particular. Therefore, these are the following research questions:

Main research question:
What are effective strategies that stimulate efficient collaboration between internal stakeholders during planning and managing transboundary Green Infrastructures (GI) that facilitate environmental services in response to climate change across the Dutch – German border?

Sub-question 1: How can stakeholder engagement be effectively integrated into the planning and management process of transboundary GI to address diverse interests and perspectives?

[This sub-question addresses the practical aspects of planning and managing cross-border GI projects. Stakeholder engagement is crucial in ensuring the success and sustainability of such initiatives. Understanding how to integrate stakeholder input and balance competing interest is important in developing inclusive and adaptive management strategies.]

Sub-question 2a: What are the key ecological factors that influence the success of transboundary GI initiatives in promoting species movement and resilience to climate change?

Sub-question 2b: What are the key socio-economic factors that influence the success of transboundary GI initiatives in promoting species movement and resilience to climate change?

Sub-question 2c: What are they key policy factors that influence the success of transboundary GI initiatives in promoting species movement and resilience to climate change?

[The second sub-question is divided in order to address different critical factors that determine the success of transboundary GI initiatives. Understanding key ecological dynamics, socio-economic considerations, and policy frameworks is essential for designing effective strategies to promote species movement and enhance resilience to climate change. By identifying these factors, the research can contribute to the broader discourse on conservation planning and climate adaptation strategies with the insights gained.]

Sub-question 3: How can these factors, identified in SQ2, be effectively addressed and leveraged in corridor planning and management strategies?

[This question bridges the gap between theoretical knowledge and real-world implementation. By focusing on effectiveness and practicality, this question ensures that research outcomes have tangible impacts on the ground. This can be done by interviewing both policymakers and project leaders.]

Objective of the study:

- Perform an internal stakeholder analysis of the transboundary projects in the Rhine corridor.
- Identify the importance of collaboration between the stakeholders involved.
- Identify strategies for well managed stakeholder engagement.
- Gain insights in the effectiveness of GI policy implementation.

Conceptual Framework

This section explains the important concepts of ‘climate adaptation, ‘green infrastructure’, and ‘stakeholder engagement’, how they interrelate, and how they are central to this thesis.

Climate Adaptation

Climate change is bringing more frequent and intense weather events, i.e., floods, droughts, and heatwaves, threatening many nations and communities. Despite the many efforts made to mitigate the process of climate change, these ramifications are very much present and are likely to increase in the future. Therefore, in the short-term, it is important for nations and communities alike to adapt to these climatic changes. As defined by the IPCC, ‘climate adaptation’ refers to the “adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC 2022, 2898). More precisely, it entails proactive steps to prepare for and adapt to the current and anticipated effects of climate change. (GCA 202,4 1). These involve adjustments that are aimed to “reduce the vulnerability and increase the resilience of regions and communities to the effects of climate change” (IPCC 2024, 1). Adaptation efforts vary widely in contexts and are influenced by distinct factors, including politics, power dynamics, motivation and cultural values. Consequently, initiatives that are effective in one community may yield different outcomes in another (Owen 2020, 1). Furthermore, effective adaptation relies not merely on governmental efforts but also on the continuous engagement of various stakeholders, such as local communities, national, regional, and international entities, public and private sectors, civil society, and other relevant actors, along with efficient knowledge management (United Nations, 2024, 1). This means, that in order for adaptation measures to be effective it is important that various actors and stakeholders engage with each other in order to create cohesive and encompassing actions that enhance adaptive capacity, as one action can impede another. Therefore, in order to create and implement effective adaptation efforts it is important to identify the strategies involved when it comes to stakeholder engagement. By conducting a stakeholder analysis this paper explores how stakeholder engagement can be effectively integrated into transboundary climate adaptation efforts that aim to address climate change impacts. As Green Infrastructure (GI) is increasingly seen as ideal policy response for climate change adaption, this paper focuses on transboundary GI as a nature-based solution (Sussams, Sheate & Eales 2015, 184).

Green Infrastructure (GI)

'Green Infrastructure' (GI) emerges, with ecological networks at its core, as "a strategic tool to safeguard a functional ecosystem network through meticulous land-use planning" (Civic & Jones-Walter, 2015; Benedict & McMahon 2006; Honeck *et al.* 2020, 2). This green approach, blue when involving waterways, entails the careful design and management of an interconnected network of semi-natural and natural spaces in order to yield various social, economic and ecological benefits (Benedict & McMahon 2006; EEA 2014; ibid 2020, 2). Increasingly recognised as a nature-based solution or a more natural and cost-effective substitute to traditional grey infrastructure, GI plays a pivotal role in reducing environmental ramifications, climate change adaptation, and fostering societal resilience (Cohen-Shacham *et al.* 2016; ibid 2020, 2). A fundamental strength of GI lies in its emphasis on landscape multifunctionality, which involves creating spatial areas capable of serving multiple purposes concurrently (EEA 2014; ibid 2020, 2). Unlike grey infrastructure, which typically serves singular functions such as habitation, transport, or economy, GI addresses a spectrum of demands, contributing to solutions for various environmental, social, and economic pressures (Naumann *et al.* 2011; ibid 2020, 2). More specifically, GI maintains ecosystem services, including water quality, water retention, wildlife conservation, and physical and mental well-being, that are important to both the natural and social sphere. Maintaining and enhancing these services are important elements that play in the Rhine-Waal corridor and are a significant part of the GBRA's end result (Botman & Neefjes 2021, 18-62). Municipalities, NGO's and private organisations play a crucial role in executing practical activities on the ground. In support of this, the EU Interreg Program assists European cross-border regions by fostering regional and local cooperation through project funding and communication (European Commission 2024). Transboundary GI extends beyond political boundaries and requires coordinated stakeholder engagement in planning and management across jurisdictions to be effective. Therefore, understanding the dynamics of engaging stakeholders in planning and managing GI at the (transboundary) regional or municipal level is essential for developing strategies that foster collaboration and address shared challenges related to climate change adaptation. By exploring strategies related to GI, the study contributes to more sustainable and climate-resilient practices. Given the collaborative and multi-stakeholder nature of GI initiatives, understanding the perspectives, priorities, and roles of various stakeholders is crucial for effective decision-making and implementation.

Stakeholder Engagement

The term ‘stakeholder’ refers to “individuals or groups with a vested interest in a specific decision” (Garnder, Dowd & Ashworth 2009, 11). Their interest may arise from their ability to affect the decision-making process and/or from the possible impact the decision may have on them. Stakeholders often operate either as individuals or as representatives of larger collective entities (ibid 2009, 11). The phrase ‘stakeholder engagement’ denotes “any process where stakeholders are actively involved in collaborative efforts aimed at a decision, potentially involving future planning and/or behavioural adjustments” (ibid 2009, 11). Stakeholder engagement in public policy involves systematically gathering and analysing information to understand the interests and involvement of various actors in a policy or program. The level of collaboration can range from basic information sharing to more extensive and enduring relationships among participants” (Ravichander 2022, 1; ibid 2009, 11). This is an important aspect when trying to effectively implement climate adaptation measures like GI, as these large projects require more extensive and enduring relationships among stakeholders due to its complex nature, often requiring multiple perspectives and considerations that no single sector can implement on their own (Bgreen 2022). GI projects require the collaboration of variable stakeholders, each bringing their individual expertise. Together, through engagement, these stakeholder can work together to achieve their common goal (ibid, 2022).

The process of stakeholder engagement is especially crucial during the following key stages: a) Agenda setting, identifying the need for a policy by the government; b) Analysis, gathering and analysing information to assess the importance and urgency of a new policy; c) Formulation, designing and creating analysis-based policies; d) Evaluation, assessing the effectiveness and value of the policy; e) Implementation, carrying out the actions outlined in the policy (Ravichander 2022, 1). During this process of stakeholder engagement there are three key attributes that considered important: 1) Clarity, to clearly grasp the objectives at hand; 2) Iterative, to acknowledge the interconnectedness among diverse stakeholders; 3) Collaborative, to consider everyone’s desires comprehensively before shaping policy decisions (ibid, 2022).

Stages of Stakeholder Engagement. Source: Ravichander 2022.

Engaging stakeholders in decision-making offers various benefits, generally enhancing decision outcomes by facilitating clear communication and information exchange among involved parties. This is crucial, especially in complex and context-dependent climate adaptation efforts like green infrastructure. Engaging stakeholders in complex projects can foster a comprehensive understanding of issues, diverse perspectives, and potential solutions (Jetoo 2019; Mkonda 2022; Gardner, Dowd & Ashworth 2009, 11-12). By conducting an internal stakeholder analysis, the research seeks to understand their motives, perspectives, and assess their influence on collaborative efforts in planning and managing transboundary GI.

Connecting the Concepts

The three concepts are intensively interrelated and central to this thesis. The aim of this thesis is to find effective strategies that enhance collaboration in GI projects, therefore the concept of GI is central to the research. Planning and developing GI plays a significant role in improving the resilience and robustness of landscapes, ecosystems and its services, to the ramifications of climate change. Increasing resilience in an area or ecosystem, by adjusting ecological, economic and social systems, is central to climate adaptation, therefore connecting GI and climate adaption. As this thesis analyses GI projects incorporating adaptive solutions, i.e., providing environmental services and increasing resilience, climate adaptation and GI have a central role. The concepts are vital in understanding the necessity of creating the right strategies in planning and managing GI that address the consequences of climate change in order to maintain robust and connected ecosystems that provide services to us. Yet, in order to collaboratively plan and manage GI projects with multiple parties, ‘stakeholder engagement’ is necessary in order to create extensive and enduring relationships that improve collaboration. As part of it research methodology, this thesis conducts an internal stakeholder analysis of transboundary GI projects that aim to address the consequences of climate change, in order to identify the motives, perspectives and influence of these stakeholders on the collaboration in planning and managing of transboundary GI projects. Therefore, connecting all three concepts with each other and their position within this thesis.

Research Methodology & Study Area

The research takes a qualitative research approach in accordance with the *internal* stakeholder analysis design. A 'stakeholder analysis' is "an approach or toolkit designed to gather information about actors, both individuals and organisations, to comprehend their behaviours, intentions, relationships, and interests" (Varvasovszky & Brugha 2000, 338). It also aids in evaluating the influence and resources they wield in decision-making or implementation processes (ibid 2000, 338). The stakeholder analysis provides valuable insights in understanding policy development and evaluating the feasibility of future policy directions. It also aids in facilitating project implementation, particular decisions, or organisational goals, while concurrently developing strategies for managing important stakeholders (ibid 2000, 338). In project management, an internal stakeholder analysis is conducted in order to increase project success through enlightening their design, preparation and implementation, yet it can also be used an evaluation during the project or after completion (ibid 2000, 339). All this is conducted in order to enhance the effectiveness of policy/ project implementations and management.

This paper conducts an analysis on the cross-border Rhine-Waal river corridor between Germany and the Netherlands as its case study (see Study Area). The internal stakeholder analysis consists of (semi-) structured in-depth interviews of various stakeholders, supported by a document analysis, a "systematic procedure for reviewing or evaluating documents" (Bowen 2009, 27). The interviews take approximately 45 to 60 minutes per participant, allowing for ample time to address a set of 20 to 25 questions, divided into three themes (stakeholder engagement, crucial factors, and transboundary collaboration). Participants are recruited by purposive sampling from initiatives and organisations previously identified in a scoping review of the GBRA and DRV projects. To improve data quality, yet taking in consideration the thesis' time frame, this research conducts interviews with at least one, ideally two participants per stakeholder. In total 6 interviews are conducted with a total of 9 participants. Participants included several internal stakeholders from both the GBRA and DRV, i.e., Rijkswaterstaat, Waterschap Rijn & IJssel, Verenigd Nederlands Cultuurlandschap, ARK Rewilding and Naturschutzzentrum im Kreis Kleve. Participants are asked a set of questions that aim to gather information regarding what strategies are involved regarding stakeholder identification, management and incorporation into the decision-making process if applicable, during the GI project. Furthermore, questions focusing on critical ecological, socio-economic, and policy factors were created in order to gain an understanding of how

these factor apply when dealing with internal stakeholders and how they influence the success of cross-border GI initiatives. When these factors are identified, if applicable, the interview delves deeper in to how these factors can be addressed and leveraged during GI projects. Moreover, the interviews delve deeper in the experience of collaboration between the internal and transboundary stakeholders All in all, the interview method allows for the generation of primary data of the case study, providing more in depth and more grounded data on the implementation of GBI policy on the ground. Subsequently, this research paper supports the (semi-) structured interviews with data gathered from a document analysis. According to Bowen (2009, 28), document analysis frequently complements other qualitative research techniques as a form of 'triangulation', which Denzin (1970) defines as "the combination of methodologies in the study of the same phenomenon" (p. 291). The analytical process involves locating, choosing, evaluating (interpreting), and integrating data extracted from documents (Bowen 2009, 28). Through document analysis, data such as excerpts, quotes, or complete passages are obtained and subsequently structured into significant themes, categories, and case illustrations, particularly employing content analysis methods (Labuschagne, 2003; ibid 2009, 28). This triangulation method can considerably complement the document analysis. Therefore, in terms of data collection, this research gathers both primary and secondary data. Primary data is gathered by conducting interviews in the form of audio recordings (see Research Ethics). These recordings are transcribed into tangible primary data by the program Whisper, which transcribes and stores the data on my personal computer without the use of the internet. Before starting the analysis process, the transcription were proofread in order to maintain integrity of the data. Secondary data is gathered through an internet-based document analysis. Valuable sources for this project include, journals, news articles and organisational and institutional reports regarding GI projects in the Rhine-Waal corridor.

The Analysis Process

The transcriptions created were uploaded to the Atlas.ti program, a qualitative coding program licensed by the Rijksuniversiteit of Groningen that facilitates the data analysis process. In this program the gathered primary data is analysed according to the inductive qualitative analysis approach. Inductive analysis entails careful examination of the data and pinpointing emerging themes, patterns, codes and categories (Saldaña & Omasta, 2017; Miles *et al.*, 2020; Bingham 2023, 2). This means that codes and categories are not predefined, yet

they are discovered and labelled during the data review process. A common method in inductive analysis used is open or initial coding, which is also employed by this thesis. Open/ initial coding involves pinpointing and labelling key themes and patterns in the data (Glaser & Strauss 1967; Charmaz 2014; Bingham 2023, 2). During the inductive analysis, the researcher actively engrosses with and determines the data, forming the connection between initial coding and the development of theories and themes (Charmaz 2014; Bingham 2023, 2). Overall, this paper used the inductive analysis, as described by Bingham & Witkowsky (2022), to derive meaning from the data, determine findings, codes, themes and categories. As well as, identifying representative data to support these findings and explain them using the literature and theory gathered from the document analysis (Bingham 2023, 2). Translated to the data analysis process, the initial raw data from the interviews are meticulously reviewed and assigned preliminary codes that capture the essence of each data segment. This open coding process was continuous, with assigned codes constantly refined and adjusted. Similar codes were combined to form more comprehensive and refined codes, ensuring that the data was accurately presented. Following this, a thematic analysis was employed. This involved grouping the refined codes into recurring themes, identifying common threads and patterns across all interviews. These themes were carefully traced to follow the red line of the participants' experiences and perspectives. Ultimately, the primary recurring themes provided answers to the sub-questions, offering a cohesive understanding that contributed to addressing the main research question.

Study Area

With a length over 1200 kilometres, the Rhine has served as a pivotal European river for centuries. Not only is it one of Europe's major logistical arteries, but it also stands as a critical ecological corridor, as a river connects habitats and ecosystems along its path (Rinaldo 2018; ARK Rewilding 2024b, 1). In the Rhine-Waal transboundary region of Germany and the Netherlands, various governmental bodies and conservation organisations in both countries are dedicated to protecting and enhancing these habitats. However, collaboration between Dutch and German organisations in terms of management and design remains limited. Consequently, the landscape fails to function as a cohesive unit. Bridging disparate natural areas into a robust, ecologically functional network could remedy this issue (ibid, 2024b, 1). In order to so, ten German and Dutch partners have joined forces in the Green Blue Rhine Alliance (starting 2019). Collaborating in the field of water and nature in the Rhine-Waal

Valley, spanning from Nijmegen to Düsseldorf, the alliance focuses on knowledge development regarding the design of floodplains, the establishment of ecological connections for otters and migratory fish, enhancement of professional networks, as well as communication and education initiatives (ARK Rewilding, 2024b, 1). In October, 2023, Rijkswaterstaat announced that they would lead the new initiative, 'de Rijn Verbind'. This collaborative effort builds forward on the foundations laid by the GBRA and involves, similar to the GBRA, 10 German and Dutch organisations that aim to revitalise the Rhine, fostering a greener, healthier, and more dynamic waterway (Rijkswaterstaat 2023, 1). The Rhine corridor between the Netherlands and Germany is of particular relevance as a case study, due to the fact that 1) river systems are very useful GI systems (Rinaldo 2018); 2) the Green Blue Rhine Alliance, finished in 2022, was deemed successful; 3) a new project, building on the GBRA, 'de Rijn Verbind' was launched in 2023. To be more precise, the Rhine river corridor is an important ecological corridor between the Dutch and German nations, furthermore international cooperation is very present in terms of cross-border GI projects. Therefore, using the Rhine river corridor as a case study can provide valuable insight in how the implementation of these projects were so successful.

Research Ethics

The conduction of interviews is entirely voluntary with potential participants being selected and contacted beforehand through email. Before the interview, an information sheet containing all the necessary information regarding the purpose of the study, methods (recoding the interview), data storage and data processing, will be sent a considerable time in advance (See Appendix). This allows potential participants adequate time to review the information thoroughly before agreeing to participate. Furthermore, the information sheet emphasis the voluntary nature of the interviews, giving participants the ability to withdraw at any moment during the interview. At the start of the interview, participants are once again asked if they have read the information sheet carefully and if they have any questions, subsequently participants are required to provide explicit consent regarding the interview to be audio recorded. Only when a participant agrees and signs, by signature, the Interview Consent Form will the interview proceed (See Appendix).

In terms of positionality, I am a 25-year-old white male born in a Dutch educated family. Currently, I am in my sixth year of studying in Groningen, where I have attained my Bachelor's degree in International Business, and am now pursuing a Master's degree in both International Relations and Climate Adaptation Governance. During my live I have been

supported by my parents both mentally and financially, therefore I have been privileged relative to others. My personal interests and academic journey have shaped my perspective on various aspects. In particular, I view the consequences of climate change from a multidisciplinary approach, as climate change effects consist of social, economic, and politic impacts on both society and nature. I believe that transboundary cooperation is essential in enhancing climate change resilience and maintain healthy ecosystems, with the primary barrier being political and social will. My background has led me to believe that collaboration is inherently open and beneficial for all. However, I do acknowledge that my perspective is shaped by my personal experiences. For this research, as I am not German, I lack the understanding of the cultural nuances and their implications for collaboration. Furthermore, I have not personally experienced marginalisation or discrimination in the workplace, which could influence my perception of cooperation and inclusivity. Therefore, my positionality is informed by my Dutch heritage, academic pursuit, and a strong believe in collaborative efforts to address climate change. I remain optimistic about the potential for cooperation, however I do recognise the need to remain aware of cultural differences and the diverse experiences of others in the field.

The data gathered data from the interviews, the audio recordings, will be transcribed using the program Whisper, which directly transcribes the recordings on my computer without the use of the internet, therefore maintaining data security. Once transcribed, all the names and identifiable information from the interviewees will be removed, anonymising the data in the progress. Subsequently, the data will be safeguarded and stored on my personal password protected computer. After the transcribing process is complete, the data will be analysed using the Atlas.ti. This is a qualitative data analysis program, downloaded on my personal computer, that is licensed by the Rijksuniversiteit Groningen. Direct quotes and passages from the data will only be referred to has the organisation and not the direct interviewee, in order to maintain anonymity. After completing the thesis, all the data will be deleted securely from my personal computer in order to protect the privacy of the participants.

Results & Analysis

This section will, based on the analysis, portray the primary recurring themes and address the sub-questions systematically, ensuring a comprehensive understanding that leads to answering the main research question effectively.

Integrating Stakeholder Engagement

This sub-section explains the major recurring themes that address how stakeholder engagement can effectively integrated into the planning and management process of transboundary GI to address diverse interests and perspectives.

Stakeholder Identification – Choosing the Right Partners

Effective stakeholder engagement starts with the orientation phase at the very start of a GI project, as identifying and choosing the right internal stakeholders is important for effective stakeholder engagement. Identifying the right stakeholders is accomplished through various means: a) looking at the immediate geographical proximity (also across the border), as organisations located in the same area have similar and complementing knowledge of this area; b) leveraging relationships with stakeholders from previous projects and, this allows for existing relationships to continue; c) networking through partners' recommendations, allows for the introduction of similar and consentient stakeholders. Subsequently, when a potential stakeholder is identified, it is, as expressed by ARK Rewilding, important for interested parties to understand the potential outcomes and benefits they can achieve through their involvement in the project.

"You have to get something out of it as an organisation, so you have to be very clear of, what is your interest as an organisation?" (Transcript: Interview ARK Rewilding).

If stakeholders cannot achieve their desired outcomes through participation, their engagement and interest in the project may diminish. Therefore, ensuring that stakeholders have a clear understanding of what they can accomplish within the project is essential for maintaining their engagement and commitment. Essentially, clear communication of project goals and objectives at the start ensures alignment between stakeholders' interests and project objectives.

After identifying potential stakeholders there are several criteria important to consider, including shared vision and goals, similarities in thematic focus, compatibility and chemistry, and adherence to INTERREG conditions. Stakeholders are chosen based on their alignment with the project's vision and goals. Examining proposed topics helps reveal the extent to which partners' interests intersect, guiding the selection process towards those with closely aligned objectives.

"If you want to build a corridor like that. You kind of have to be facing the same direction." (Transcript: Interview ARK Rewilding).

Stakeholders sharing similarities, i.e., thematic focus or are located in similar surroundings, are favoured, as these promote coherence and synergy within the projects. Furthermore, assessing compatibility and chemistry among internal stakeholders is considered important. Therefore, evaluating how well partners complement each other and their ability to collaborate effectively ensures harmonious project dynamics and fruitful engagement. Besides these qualities, adherence to INTERREG conditions is significant, as these guidelines dictate the criteria and terms for selecting the right components (stakeholders) in order to get grants.

Stakeholder Collaboration - Building relationships between internal stakeholders

After the orientational talks and selection of fitting internal stakeholders, the process of building relationships between the internal stakeholders is of significant importance. This process begins with getting to know each other. An effective method is to invite one another to showcase different ways of doing things, involving a lot of talking over time. It took the partners of the GBRA project two years to get the ball rolling, understanding how each partner worked and how they could complement each other. Building relationships involves various methods, such as workshops, excursions, meetings.

"The most important step is to know the other people and to know who is responsible for that and who is the best contact for all kinds of stuff." (Naturschutzzentrum Kleve).

Building relationships on a personal level is significant in creating effective stakeholder engagement, as personal relationships ease the formalities between stakeholders and makes it easier to be involved and contact others. Additionally, understanding each partner's vision and goals within the project is essential in complementing each other effectively. For example,

two partners of the GBRA project, Naturschutzzentrum im Kreis Kleve and VNC, found considerable similarities in terms of goals, vision, and execution. They noted that their relationship blossomed over time. Despite the linguistic differences, they felt they could communicate effectively in terms of ideas and vision.

"You notice very quickly that, despite the cultural difference and language barrier, the other person often understands what you mean after saying a few things. After a few nods, recognition occurs, and usually you don't need to explain further." (Transcript: Interview VNC)

Stakeholder Management – Communication & Discussion

Even though all internal partners primarily work together to achieve the same end goal, differences are still present, especially in terms of varying perspectives in execution; and in the differences in organisational structure and culture between the Dutch and German partners. This has caused some challenges in transboundary cooperation; however, it also was a considerable gain of the GI projects, stimulating learning processes. Two key themes frequently emerged when discussing how to ensure effective collaboration among internal stakeholders: communication and collaborative problem-solving.

Effective collaboration hinges on open communication and the respectful discussion of differing perspectives. Partners need to enable discussions in a way that acknowledges and respects each other's perspectives, providing a platform to explore alternative approaches. As expressed by ARK Rewilding,

"And the only effective thing is, despite all the different is still to just have the conversation with each other, that's it." (Transcript: Interview ARK Rewilding)

This sentiment is echoed by Rijkswaterstaat, stating,

"That's what the steering meetings are for, to discuss it together and if something difficult comes out of that, then we should try to come out with some kind of consensus with the parties." (Transcript: Interview Rijkswaterstaat).

These quotes highlight the importance of maintaining continuous dialogue to navigate and reconcile different perspectives.

In addition to effective communication, working through issues collaboratively is essential. Naturschutzzentrum emphasised the importance of collective problem-solving, noting,

"And we just tried to get them all into discussion and talk together and work out different points and solutions with each other." (Transcript: Interview Naturschutzzentrum Kleve).

A similar sentiment is expressed by ARK,

"And then what is the bottleneck? And when you find a bottleneck, you look at, okay, this is the bottleneck, shall we just discuss that? And how are we going to address that bottleneck?" (Transcript: Interview ARK Rewilding).

By bringing all partners into discussions, they can collaboratively work out various points and find mutually agreeable solutions. Overall, effective stakeholder engagement involves fostering open communication, discussing varying perspectives respectfully, and engaging in collective problem-solving. Understanding and integrating these elements are important for achieving the project's shared goals despite the inherent differences among partners.

Stakeholder Management – Project Leader Supervision

Interviewees consisted of both project leaders and internal stakeholders, both parties expressed the necessity of stakeholder supervision of internal stakeholders during the project. In managing stakeholders, project leaders oversee various aspects crucial to project success. They regularly assess progress and align tasks with the organisation's objectives to ensure effective execution. Vigilant time management involves monitoring spending budgets, as highlighted by VNC,

"You were open there, because then, of course, you don't want the kind of crooked eyes on who decides, who gets what money from that, or when do you then as a project manager at some point go and say, okay, I've given yes five times now to make up that money, and you're really not going to succeed." (Transcript: Interview VNC).

Which is important to maintain transparency in resource allocation and project management. Furthermore, maintaining accountability among partners is vital for collaborative projects, as emphasized by ARK,

"So that's also a way to, yes, if one party does a project, then the responsibility lies entirely with that party. But if you do it together, then you also say, no, we have to consider this and that, or we've already thought about that, and then you also keep each other on their toes." (Transcript: Interview ARK)

This ensures that responsibilities are shared and partners remain focused on project objectives. Overall, project leaders play a pivotal role in supervising stakeholders, showcasing results, ensuring effective execution, managing time and resources, and maintaining accountability throughout the project lifecycle.

Key Influential Factors

To comprehensively explain the influence and stakeholder considerations of key factors, the major themes addressing sub-question two and three are explained together. More precisely, this section explores the key ecological, socio-economic, and policy factors that influence the success of transboundary GI initiatives in promoting species movement and resilience to climate change. Additionally, it explores how these factors, identified in SQ2, can be effectively addressed and leveraged in corridor planning and management strategies.

Ecological Factors

The Dutch KNMI outlined the potential effects of climate change for the Netherlands through various climate scenarios (KNMI, 2015; Dorenbosch *et al.* 2022, 16). For major rivers and adjacent floodplains, the impacts of climate change occur at different levels (ibid 2022, 16). The most significant influence on the effectiveness of GI, according to the interviewees, are the more frequent and prolonged summer droughts together with lowering of the river bed, which causes drying of the soils and lower river water levels, leading to earlier drying of shallow floodplains waters; more frequent winter inundations due to increased precipitation; and increased likelihood of summer inundations due to extreme rainfall. ARK Rewilding states that the combination of frequent droughts together with the lowering of the riverbed and the increasing floods, pose a significant challenge in managing healthy GI in the Rhine corridor. The lower riverbed causes water level in the rive to drop more rapidly, drying out the floodplains. Exacerbating this process is the frequent floods, that drop a layer of clay in the floodplains every time, heightening the floodplains and increasing the difference even further. All in all, the combination of both increasing droughts and variability inundation is significant ecological challenge that influences the success of a GI project.

Therefore, important aspects to improve species movement and cope with climate change, according to stakeholders, include: a) increasing the resilience and robustness of the natural landscape and its ecosystems along the Rhine river; and b) enhancing ecosystem services to increase water retention. Increasing the resilience and robustness of green infrastructure is essential in realising the survival of flora and fauna. As Rijkswaterstaat states:

"Yes, it is essentially about survival. That all species can survive. And because those corridors are in good condition and species can spread out from that. That's kind of the idea

the stronger that is, the stronger those corridors are in between, the better the system is." (Transcript: Interview Rijkswaterstaat).

An important method for GI resilience is increasing the natural connectivity of various habitats along the border region, which is done by identifying bottlenecks along the corridors, increasing the quality of habitats and creating stepping-stones in between. For example, in the GBRA project the internal stakeholders aimed to enhance species movement for otters by identifying the bottlenecks along the infrastructure project. A major bottleneck for the otter was the presence of grey infrastructure (roads, bridges, etc.), as it was either to dangerous or to daunting to cross. Therefore, the partners of the GBRA started by creating a problem map. First, all potential issues in the project area were identified and assessed using uniform criteria based on the otter. Four categories were distinguished, from 1 'very dangerous' to 4 'least dangerous' (Botman & Neefjes 2021, 20). Over the following months, the assessments were verified multiple times through photos and field visits. In spring 2018, all data was compiled into a cross-border problem map, differentiating between issues with planned solutions and those without. Priority issues without planned solutions were then selected for immediate action by GBRA partners. This included the creation of various otter passages, such as bridges, gangways, etc., in order to ensure safe passage for the otter (ibid, 2021, 20-21).

Besides identifying bottlenecks along the corridor, improving the quality of habitats along the rivers is important, especially the floodplains. The continuing soil erosion of the Rhine and declining groundwater levels are drying out these protected areas. Consequently, species and habitats that thrive in moist conditions are diminishing in both quality and quantity. In order to cope with this event, internal stakeholders conducted research to determine the necessary, feasible, and practical measures to halt and potentially reverse biodiversity loss. The first phase involved assessing the current situation, including the geological and anthropogenic history of the Lower Rhine and collecting environmental data (climate, precipitation, river and groundwater levels). This also included installing seven groundwater monitoring points, multiple surface water monitoring points, and conducting partial surveys with drones. The second phase focused on potential water management improvements and conservation measures for species and habitats. Measures included constructing dams to slow surface water runoff, supplying surface water, groundwater, or Rhine water, creating and restoring water bodies, and expanding retention areas through soil removal. In the third phase, the feasibility (general and technical feasibility, effectiveness, approvability) and cost of the proposed measures were evaluated. Experts then prioritized the

measures. These recommendations will guide the future development and protection of the studied areas (Botman & Neefjes 2021, 58-59).

Socio-Economic Factors

GI projects are not merely defined as ecological corridors, seeking to integrate the social benefits of humans as well. The data showed there are some social factors considered during planning and managing, which might influence GI projects to a certain extent. However, economic factors were not significantly present. The primary recurring factors were creating recreational opportunities and raising awareness. In terms of recreation, stakeholders consider creating recreational opportunities in order to allow people to enjoy nature as a goal. Both Rijkswaterstaat and Waterschap Rijn en Ijssel mentioned that the creation of recreational opportunities in these projects is definitely a goal that they keep in mind during the projects. This often includes the creation of walking and cycle paths through the floodplains along the rivers and nature areas.

"We made a bike path through the area, on that, of course, we also received a lot of positive feedback from people cycling around there. So, where people can enjoy, where recreation is possible" (Transcript: Interview Waterschap Rijn en Ijssel).

"Yes, recreation authority. That should come from Rijkswaterstaat. We see that as part of our environmental management" (Transcript: Interview Rijkswaterstaat).

Furthermore, both VNC and ARK Rewilding emphasise the importance of nature and its enjoyment, aiming to raise further awareness within the GBRA and 'de Rijn Verbind' projects. In addition to creating recreational opportunities to appreciate nature, both projects achieve this through exhibitions in museums such as 'De Bastei', also stakeholder in the projects. By showcasing the results and methodologies of these projects, the partners aim to highlight the importance of living and connected ecosystems. The GBRA and DRV have worked to raise awareness about the importance of a healthy river, water, landscape, and nature in the border region through nature education for schoolchildren, students, residents, and the press (Botman & Neefjes 2021, 64). By teaching young people about otters and migratory fish and sharing nature lessons and excursions, the stakeholders highlight the importance of cross-border nature conservation.

"We have to include people into our projects and then the understanding and the general opinion towards it is much better" (Transcript: Interview Naturschutzzentrum Kleve).

"We also give field trips. Those are priorities. Yes, we show this is how it can be done. Yes, we have to intervene anyway. So, awareness is important" (Transcript: Interview ARK Rewilding).

The goal of the GBRA was to provide a shared nature experience for German and Dutch children during field excursions in the river area, focusing on otters and migratory fish, through 30 educational events for German and Dutch schoolchildren (ibid 2021, 64).

Policy Factors

Policy factors are crucial in transboundary GI projects due to the diverse policies that various institutions and organisations must navigate. Based on the data, influent factors occur on different levels, as policies are created at provincial, national, and European level. Stakeholders have to adhere and work within the framework of these policies, as they are binding. In terms of national and provincial policy, national policy is translated to the specific context of a specific region or province. Therefore, the interviewees expressed that the regional policy is very influencing in planning and managing GI projects. For governmental bodies, such as Rijkswaterstaat and Waterschap, these policies are guiding principles in which they work, as they have to proceed with their day to day proceedings, which is to maintain water security and keep the water levels optimal. Therefore, during planning and managing GI they work with these principals in mind.

"We have to coordinate everything with regional project management." (Transcript: Interview Rijkswaterstaat).

An important factor to consider is the political colour of the governmental bodies drafting the policies. These policies dictate the regulatory environment and allocate resources, thus shaping the direction of GI projects. As noted by VNC and ARK, changes in political priorities can alter the emphasis placed on GI development and management. For example, the current elections in the Netherlands have drastically altered the political sentiment of the government. The upcoming new cabinet aims to alter the way ecological and Natura 2000 zones are dictated and is removing the current reduction of methane policy, which can lead to

repercussions for the stability of GI between these areas (NU 2024, 1). Therefore, a change in the political landscape can heavily influence the acceptance and success of new and existing GI projects. It is important to consider the current political landscape for effectively implementing and sustaining GI projects in the long run.

"Political relationships are pretty important for when you are going to put it [project initiatives] before committees." (Transcript: Interview Verenigd Nederlands Cultuurlandschap).

In terms of overarching European policies, interviewees mentioned the Water Framework Directive (WFD), Kaderrichtlijn Water in Dutch, drafted in the year 2000, specifically. This policy focuses on maintaining both the quality and quantity of water. It aims to reduce and eliminate pollution while ensuring sufficient water to support wildlife and meet human needs. Since 2000, the WFD has been the primary law for water protection in Europe. It applies to inland, transitional, and coastal surface waters, as well as groundwater. The directive ensures an integrated approach to water management that respects the integrity of entire ecosystems by regulating individual pollutants and setting corresponding standards. It is based on a river basin district approach, encouraging neighbouring countries to cooperate in managing shared rivers and other water bodies (European Commission 2024a). Both sides of the border mentioned that this overarching policy is an important factor in determining the proceedings of transboundary GI projects, as, especially governmental, stakeholder have to adhere to this policy

"You have at any rate the Water Framework Directive. We are bound by that, of course, but so are the Germans. That's just a European regulation." (Transcript: Interview Waterschap Rijn en Ijssel).

In order to cope with the policy factors, internal stakeholders have heavily engaged in aligning their goals with partners in accordance to the policies. For instance, Rijkswaterstaat, as the new project leader, can only convey new policies to other internal stakeholders, who must then adhere to these policies. Different provincial and national policies, influenced by distinct cultural and organisational structures, require careful coordination. Internal stakeholders, such as biological centres in Germany, rely on public funding and thus must follow local government policies.

Collaborative Strategies

This section aims address the major recurring themes that directly address the main research question. Data analysis identifies four major recurring themes, or the 'Red Thread', that contribute to effective strategies that promote effective cross-border collaboration.

The Red Thread – Find your Counterpart

Stakeholders finding their counterparts in large-scale GI projects is of significant importance for GI planning and management. Collaborating with a counterpart that operates at the same level, shares the same convictions, and employs similar methods makes the collaboration in GI projects much more effective and efficient. This has been acknowledged by both the VNC and Naturschutzzentrum. Their effective collaboration was enabled by a strong sense of chemistry and a shared mindset.

"You notice very quickly that, despite the cultural difference and language barrier, the other person often understands what you mean after saying a few things. After a few nods, recognition occurs, and usually you don't need to explain further." (Transcript: Interview VNC).

On the other hand, when a counterpart is not present across the border, it becomes challenging to work efficiently and effectively to reach your goals. Differences in operational levels, methods and convictions hinder proper collaboration, as was the experience of Waterschap Rijn & Ijssel.

"Yes, you don't have an organization that works exactly as we do. We have a clear responsibility for our waters, but of course we don't do anything in Germany. In Germany, you don't have a water board that carries out similar measures very actively. So, you're actually missing some kind of counterpart." (Transcript: Interview Waterschap Rijn & Ijssel).

"They [Waterschap Rijn & Ijssel] did not find a match in the project, and therefore are not participating now." (Transcript: Interview ARK Rewilding).

The governmental body felt that there was no equivalent waterbody on the other side of the border. In Germany, waterbodies are typically smaller and attached to local governments,

whereas Dutch counterparts manage much larger regions. This difference in organisational structure significantly impacted effective collaboration on GI projects. Although in a different position, Rijkswaterstaat expresses a similar sentiment, highlighting, as sole governmental body in ‘de Rijn Verbind’, the importance of having more governmental bodies participate in GI projects. This participation is crucial for creating long-term strategies and ensuring that projects are supported by local and regional governments in both management and funding.

“And I do think it's important for us as a government to have those other governments in particular well involved in the project.” (Transcript: Interview Rijkswaterstaat).

“But of course, it's great if the governments that are in that area support that as well.” (Transcript: Interview Rijkswaterstaat).

Therefore, finding a counterpart who understands and shares the same goals is crucial for the success of transboundary GI projects, as the right partner can bridge cultural and operational differences, ensuring a cohesive and effective collaboration.

The Red Thread – Acknowledge Transboundary Differences

In order to effectively cooperate in transboundary GI projects, the interviews showed that acknowledging differences is a significant strategy in creating efficient collaboration. Even though both countries are perceived very similar, crossing the border opens a door to a very different culture and organisational structure. In terms of cultural differences, the most recurring theme was caution, Germans tend to have a more cautious approach compared to the Dutch. More specifically, Germans tend to be more careful when formulating an answer, ensuring that it is well thought out and reflects their stance. On the other hand, Dutch people may express opinions that are less thoroughly considered initially, yet they are more flexible in adjusting their views. Additionally, Germans are often held to a higher level of accountability, therefore they are careful and have less mandate to make immediate decisions.

“Not everyone is like this, but the modus operandi as a whole differs in the caution and the pursuit of well-considered decisions with a plan and the aim to follow through” (Transcript: Interview VNC).

According to Dutch stakeholders, the German organisational structure is quite hierarchical. Employees often need approval from higher-ups before starting a project or agreeing to a certain approach. However, once they get approval they are very reliable and committed to achieving the end goal.

"That the organisational structure is very hierarchical, ... you actually have to look at who you need to coordinate with now, who you can talk to, and who you can't." (Transcript: Interview Rijkswaterstaat).

The Dutch, according to the Germans, have more room for experimentation. Trying out different approaches to counter a problem. In addition, they are considered more flexible to change their opinion.

"The Dutch are a lot more flexible. They are very creative, and they have an idea about what they want to do. But when difficulties arise and they realize, it doesn't work like we wanted to do, they're very open to changing." (Transcript: Naturschutzzentrum im Kreis Kleve)

Interviewees expressed that in order to work together effectively, it is essential to respect each other, be patient, flexible, and adapt to the other's way of working.

"Yes, by adapting ourselves and letting them have their dignity though, because that's just how they have it and that's how they interact." (Transcript: Interview Rijkswaterstaat)

"And that there are just big differences and they are allowed to be there" (ARK Rewilding)

The Red Thread – Learn from each other

All interviewees mentioned the knowledge they gained from learning from each other. The exchange of ideas, methods, and perspectives enabled the internal stakeholders to broaden their horizons and see things in a new light.

"Only we do try to air our ideas as well, so that they also start thinking of, hey, how do we do it here? And of course, we have that with their ideas as well." (Transcript: Interview ARK Rewilding).

This knowledge exchange allowed stakeholders to show alternative ways of thinking and doing. Presenting alternative methods gave stakeholders opportunities to implement new approaches in their own contexts, which could potentially be very successful.

"But on the other hand, it also worked the other way around, basically seeing what have the other party done that we haven't done before, which worked out, which can we implement and use." (Transcript: Interview Naturschutzzentrum).

"Because we're learning from each other, and also, we're learning with each other, and since so many different heads with different point of views and ideas are actually working together," (Transcript: Interview Naturschutzzentrum).

The Red Thread – Use Internal Stakeholder Expertise

Knowledge networks are one of the significant benefits of GI projects, as exemplified by 'de Rijn Verbind', it ensures the exchange of knowledge, methods and expertise. Leveraging the expertise of others enhances both efficiency and effectiveness of GI. As ARK expressed, using the monitoring expertise of the Biologische Zentrums in Germany enabled them to upscale the GI project since information across multiple areas in the corridor was readily available. Moreover, in the creation of otter passages, Dutch stakeholders had previous experience with measures to help otters safely cross dangerous roads. However, this was new territory for the Germans. Therefore, a German-Dutch workshop was held to share knowledge and experience, involving otter experts and representatives from German and Dutch water and road management authorities. The workshop included an excursion to high-risk areas in Germany and successfully addressed sites in the Netherlands. This initiative raised awareness among responsible road, water, and land managers in Germany about the traffic risks for otters and possible solutions (Botman & Neefjes 2021, 20). Furthermore, VNC noted that the expertise of NABU was considerably beneficial in applying for new initiatives to INTERREG programs or institutions,

"But what I did make a lot of use of was their expertise in getting that new project through. And say, all those sensitivities, also with the NABU for example. They just know exactly how that is. And they also had some experience in applying for Interreg." (Transcript: Interview VNC).

Discussion

This section discusses the major recurring themes that addressed both the sub-questions and the main research question directly, connecting them to the overarching concepts of climate adaptation, green infrastructure and stakeholder engagement. Subsequently, based on the discussion this section aims to provide an encompassing answer to the main research question.

SQ1 - Stakeholder Engagement

The first sub-question aimed to find out how stakeholder engagement can be effectively integrated into the planning and management process of transboundary GI to address diverse interests and perspectives. Based on the result, to effectively integrate stakeholder engagement into the planning and management of transboundary GI projects, it is essential to begin with thorough stakeholder identification and selection, ensuring alignment with project goals and mutual benefits. After choosing the right stakeholders it is important to build strong relationships through initial activities, including workshops and meetings, this fosters trust and creates mutual understanding, which contributes to overcoming cultural and language barriers. During the project, maintaining open communication channels and encouraging respectful, continuous dialogue allow for diverse perspectives to be acknowledged and integrated, keeping stakeholders engaged. An important aspect of overcoming the diverse interests during the projects is collaborative problem-solving, where stakeholders collectively address challenges and find solutions, which promotes a sense of shared responsibility. Maintaining cohesive stakeholder engagement requires effective supervision by project leader and designating clear roles and responsibilities of stakeholders in order to ensure accountability and efficient resource management. These collective efforts correspond to the conceptual framework, as engaging stakeholders in complex and context-dependent GI efforts foster a comprehensive understanding of issues, diverse perspectives, and potential solutions, which ensure that diverse interests and perspectives are addressed and integrated into the project. All in all, planning and managing GI projects, integrating climate adaptation efforts, becomes more feasible when stakeholders are actively engaged.

SQs 2 &3 - Ecological, Socio-economic and Policy Factors

The second and third sub-questions sought to identify the ecological, socio-economic, and policy factors that influence GI projects and how they can be addressed and harnessed in order to ensure success. Based on the data, addressing key factors through coordinated efforts is necessary to plan and manage successful GI. More specifically, influencing ecological factors include, the drying of floodplains and increasing variability of the river level due to unpredictable inundations periods. To address these problems, stakeholders aimed to enhance ecosystem resilience by improving habitat quality and connectivity. Social factors that are considered in GI are the creation of recreational opportunities and raising awareness of the importance of nature for our health and landscapes. The most influential aspect of GI is the adherence to policies at various levels, requiring effective communication and proactive alignment, working inside the frameworks set out by policies. Ultimately, the themes show that, as explained in the conceptual framework, GI a multi-functional concept addressing multifaceted factors to ensure an encompassing project that is not only ecologically beneficial but also socially inclusive and in accordance with policy regulations. Therefore, is important to consider and address various ecological, social and policy factors that influence the planning and management of transboundary GI projects, as multiple different stakeholders, due to their organisational nature, experience a variety of factors that they the deem influential.

Major Themes - ‘The Red Thread’

During the analysis four major recurring themes were identified that directly contribute to effective collaboration in transboundary GI projects. These include, finding a suitable counterpart, acknowledge differences, learn from each other, and leverage stakeholder expertise. Finding a suitable counterpart within the project who operates at the same level and shares the similar convictions fosters strong relationships that contribute to project efficiency. A prominent example is the successful collaboration between Naturschutzzentrum and VNC, as the stakeholders shared a similar mindset and strong chemistry, which enabled mutual understanding and easy communication. On the other hand, not finding a suitable counterpart, as faced by Waterschap Rijn & Ijssel who experienced a mismatch in terms of operational level across the border, can hinder collaboration. Therefore, in order to stimulate effective collaboration between transboundary actors it is important to select internal stakeholders who align in shared conviction, executional method and the level at which they operate. Further

improvement of collaboration involves acknowledging transboundary differences by recognising and respecting both cultural and organisational differences. Germans are considered more cautious and careful in their approach, as experienced by the Dutch, carefully thinking before fully committing. The Dutch, on the other hand, are considered more flexible and bolder, however this can sometimes translate to impulsive decision-making. Yet, when faced with challenges they are very flexible in adjusting their views. In terms of organisational structure, both German and Dutch interviewees mentioned the hierarchical organisational structure at the German side of the border, which can translate to stakeholders having less mandate and difficulties in finding the right person. Overcoming these differences and ensuring effective collaboration, requires patience, flexibility and mutual respect. Moreover, transboundary collaboration create opportunities for mutual learning. The exchange of ideas, methods, and perspectives allows stakeholders to broaden their horizons, resulting in the implementation of innovative solutions. This interchange helps to address challenges more effectively, further enhancing collaboration and the outcomes of GI projects. Therefore, continuous learning from and adapting to other stakeholders are essential in improving practises and achieving project goals. Complementing this knowledge network, is leveraging the expertise of other stakeholders. Utilising the skills and knowledge of other internal stakeholders can facilitate more coordination and increase the scope of the project, as internal stakeholders do not have to do tasks on their own, which also increases efficiency and reduces duration. Workshops, shared experiences and joint initiatives, i.e., the otter passages, show the value of using internal expertise in addressing specific challenges.

Strategies for Transboundary GI Collaboration

Therefore, based on the answers of the sub-questions and the recurring ‘Red Thread’, effective strategies that stimulate efficient collaboration between foreign partners during planning and managing transboundary Green Infrastructures, are based on: the incorporation of effective ‘stakeholder engagement’; the consideration and addressing of key ecological, social and policy factors; and the four collaborative methods of finding counterparts, acknowledge differences, mutual learning and using stakeholder expertise. Incorporating these strategies into the planning and management of transboundary GI projects enables effective collaboration by multiple internal stakeholders in facilitating climate adaptation efforts like environmental services in response to climate change across the Dutch – German border. In terms of the conceptual framework, active stakeholder engagement addresses

diverse interests and perspectives, which, consequently, enhances collaboration between internal stakeholders, as it creates a deeper understanding of issues, diverse perspectives, and potential solutions. Furthermore, key influential factors influence the planning and management of transboundary GI projects, as multiple different stakeholders, due to their organisational nature, experience a variety of factors that they the deem influential. Therefore, as GI is a multi-functional concept addressing multifaceted factors, these factors are important to consider to create GI that is not only ecologically beneficial but also socially inclusive and in response to climate change. Moreover, strategies improving internal stakeholder collaboration in transboundary GI projects are directly shown by the four collaboration methods. Employing these methods can lead to stronger internal relationships between internal stakeholders and create more efficient methods in planning and managing transboundary GI. All in all, the results of this thesis show the effective strategies involved in creating more closely knitted and efficient collaboration between internal stakeholders in transboundary GI projects.

Conclusion

This master's thesis set out to explore the effective strategies that stimulate efficient collaboration between foreign partners during the planning and management of transboundary Green Infrastructures (GI) that facilitate environmental services across the Dutch – German border. Through 6 interviews with 9 internal stakeholders, this thesis was able to identify several effective strategies that foster effective collaboration between internal stakeholders during the planning and management of transboundary GI projects across the Dutch-German border. These include, collaborative strategies, i.e., finding suitable counterparts, acknowledging and adapting to cultural and organisational differences, promoting mutual learning, and leveraging internal expertise; effective stakeholder engagement; and addressing key ecological, socio-economic, and policy factors. Collectively these strategies enhance project efficiency, foster strong relationships between partners and ensure the successful planning and management of transboundary GI projects in response to climate change. Therefore, this research paper contributes to the overall field of research by identifying and explaining effective strategies that enhance the collaboration between internal stakeholders within transboundary GI projects.

In terms of strengths and weaknesses, the choice of semi-structured in-depth interviews allowed for a more comprehensive and deeper understanding of the aspects involved in large-scale transboundary GI compared to other methods. However, this research paper could have structured the interview questions regarding the key influential factors in a more specifically. Currently, the questions, while focused on certain aspects, can be considered broad and could be more specific in order to gain a deeper understanding of the most influential factors to address in planning and managing GI. Nevertheless, the questions allowed for similar themes to occur during the analysis process, enabling a comprehensive answer to the sub-questions.

Although the prominent recurring theme in this interview was the search for counterparts across the border and within GI projects to enhance collaboration, it remains important to consider the fact that organisations should not merely operate inside their separate silo's with similar organisations. Therefore, for future recommendations, research should focus on how to overcome these silo's in which organisations and institutions operate during large-scale GI projects. This can contribute to further incorporation and consideration of multiple different perspectives and increase further collaboration within GI projects. Ultimately, more enhanced collaboration and better understanding between internal

stakeholders could potentially improve the multifunctionality of transboundary GI projects, as stakeholders work more intensely with each other than alongside each other.

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Appendix

Interview Guide – Internal Stakeholders

Interview Guide – Internal Stakeholders

Master Thesis CG: Climate Adaptation Governance

Introduction:

1. Introduce myself shortly.
2. Discuss the Informed Consent Form. Ask if the participant fully understands the Information Sheet and gives consent to the audio recording of the interview.

Role & Affiliation:

- What is your role within the green-infrastructure projects of GBRA and DRV?
- What is the role of your organisation within these projects?

Core:

Theme 1: *Internal Stakeholder identification, management and incorporation in the decision-making process.*

1. Stakeholder Identification:
    a. How was your organisation identified as a relevant partner for green infrastructure projects, such as the GBRA and DRV?
    b. How was your organisation approached for the GBRA and DRV projects?
    c. At what phase of the project was your organisation involved?

1. Stakeholder Management:
    a. How has your organisation been involved by the project leader and other partners throughout the green infrastructure project?
    b. How did you experience the collaboration between other partners with different interests?
    c. Did you experience conflicts between stakeholders, and if so, how were they resolved?

2. Incorporation in Decision-making Process:

a. How has your organisation been involved in the decision-making processes of green infrastructure projects?
b. To what extent was your input and feedback considered in shaping project plans?
c. Can you provide examples of how stakeholder perspectives influenced project decisions?

Theme 2: *Ecological, socioeconomic and policy factors*

1. Ecological Factors:
    a. What are the key ecological factors considered during the planning and management of green infrastructure projects for the enhancement of ecosystem services?
    b. And for the movement of species?
    c. How did you address these ecological factors during the planning and management of green infrastructure projects?
        i. Can you provide an example of a successful approach that has been used to address and leverage these important factors?

1. Socio-economic factors:
    a. What socio-economic factors do you consider when evaluating the impact of green infrastructure projects?
    b. How do you deal with these factors during the planning and management of green infrastructure projects?
        i. Can you give an example of successful approaches that have been used to address and leverage these critical factors?

2. Policy factors:
    a. What policy factors do you consider when planning and managing GI projects?
    b. Are there cross-border agreements between the Netherlands and Germany that affect the implementation of green infrastructure initiatives?
    c. How do you deal with the aforementioned policy factors during GI planning and management?

i. Can you give an example of a successful approach that has been used to address and leverage these critical factors?

Theme 3: *Cross-border cooperation and partnerships*

1. Cooperation and partnerships:
    a. How did you experience the collaboration with the other partners within the projects in addressing complex challenges?
    b. What differences in working methods did you experience between the Dutch and German partners during the projects?
    c. What benefits did you derive from the expertise of other partnerships during these projects?
    d. What would you do differently next time with regard to the cooperation of cross-border GI projects?

Conclusion

Thank the participant for their participation. Ask if you could email them in case of additional questions.

Interview Guide – Project Leaders

Interview Guide – Project Leaders

Master Thesis CG: Climate Adaptation Governance

Introduction:

1. Introduce myself shortly.
2. Discuss the Informed Consent Form. Ask if the participant fully understands the Information Sheet and gives consent to the audio recording of the interview.

Role & Affiliation:

- What is your role within the green-infrastructure projects of GBRA and DRV?
- What is the role of your organisation within these projects?

Core:

Theme 1: *Internal Stakeholder identification, management and incorporation in the decision-making process*

1. Stakeholder Identification:
    a. How do you identify stakeholders relevant to green infrastructure projects, such as the GBRA and DRV?
    b. What criteria do you use to prioritize stakeholders in the planning and execution phases?
    c. Can you describe any challenges that have arisen during the process of identifying stakeholders?

2. Stakeholder Management:
    a. What strategies do you apply to engage and manage stakeholders throughout the lifecycle of the green infrastructure project?
    b. How do you ensure effective collaboration between various stakeholders with divergent interests?
    c. Have you experienced conflicts between stakeholders, and if so, how have they been resolved?

3. Incorporation into decision-making:
    a. How are stakeholders involved in the decision-making processes of green infrastructure projects?
    b. To what extent are stakeholder input and feedback considered when shaping project plans?
        i. Can you provide examples of how stakeholder perspectives have influenced project decisions?

Theme 2: *Environmental, socio-economic and policy factors*

1. Ecological Factors:
    a. What are the key ecological factors considered during the planning and management of green infrastructure projects for the enhancement of ecosystem services?
    b. And for the movement of species?
    c. How did you address these ecological factors during the planning and management of green infrastructure projects?
        i. Can you provide an example of a successful approach that has been used to address and leverage these important factors?

2. Socio-economic factors:
    a. What socio-economic factors do you consider when evaluating the impact of green infrastructure projects?
    b. How do you deal with these factors during the planning and management of green infrastructure projects?
        i. Can you give an example of successful approaches that have been used to address and leverage these critical factors?

3. Policy factors:
    a. What policy factors do you consider when planning and managing GI projects?
    b. Are there cross-border agreements between the Netherlands and Germany that affect the implementation of green infrastructure initiatives?
    c. How do you deal with the aforementioned policy factors during GI planning and management?

i. Can you give an example of a successful approach that has been used to address and leverage these critical factors?

Theme 3: Cross-border cooperation

1. How did you experience the collaboration with the other partners within the projects in addressing complex challenges?
    a. What methods did you use to enable effective communication between the Dutch and German partners?
    b. How did you deal with the differences in organisational structure and working methods between the Dutch and German partners?
2. What benefits did you derive from the expertise of other partnerships during these projects?
3. What would you do differently next time with regard to the cooperation of cross-border GI projects?

Conclusion

Thank the participant for their participation. Ask if you could email them in case of additional questions.

Information Sheet

INFORMATION SHEET

Title of the study: **Collaborative Strategies for Transboundary Green Infrastructure Management: Insights from Stakeholder Analysis.**

Dear participant,

Thank you for your interest in participating in this research. This letter explains what the research entails and how the research will be conducted. Please take time to read the following information carefully. If any information is not clear kindly ask questions using the contact details of the researchers provided at the end of this letter.

This project aims to provide a clear analysis of the stakeholders involved in *transboundary* GI projects, with the border of the Netherlands and Germany in particular. The data gathered from multiple interviews will used to gain a deeper understanding of the particular stakeholders involved and how the engagement of stakeholders is of crucial importance when implementing GI policy in a particular cross-border region.

During the interview, questions related to your work, stakeholder engagement in GI projects; and important ecological, socioeconomic and policy factors will be asked. This will take around 45 to 60 minutes.

The participation in this interview is voluntary, and you have the freedom to withdraw from the study at any time and for any reason.

The data collected (audio recorded/ notes) will solely be handled by the researcher and will be treated confidentially. Data recordings gathered from interviews will be transcribed by the program Whisper, which will transcribe the data on my computer without the use of the internet. Subsequently, the date will be anonymized, removing all identifiable labels, changing them into codes. The transcribed data will be stored on my password protected personal computer. Later in the progress, the transcribed data will be analysed by the RUG licensed software, Atlas.ti. When the research is finished, all the gathered data will be safely deleted.

The results from the data will be used to answer the research questions from the Master thesis. This can include anonymous quotations from the transcripts, merely referencing to the organisation not the individual in question.

The researcher declares that he will uphold ethical standards during the research, aligning with the University's commitment to compliance with behavioural rules outlined in the Netherlands Code of Conduct for Research Integrity 2018. Enacted on October 1, 2018.

If you would like to participate in the interviewing the researcher would like to ask you to sign the informed consent form. After signing, you are still able to withdraw at any time.

If you have any questions about this study, you can ask them during the interview. If you have any questions after participating, you can contact the researcher. See contact information below:

Contact details researcher

- Huub Visser
    - Email: h.t.n.visser@student.rug.nl
    - Tel: +31619464266

Informed Consent Form

INFORMED CONSENT

Research Title: **Collaborative Strategies for Transboundary Green Infrastructure Management: Insights from Stakeholder Analysis.**

Name participant: _____

Assessment

- I have read the information sheet and was able to ask any additional question to the researcher.
- I understand I may ask questions about the study at any time.
- I understand I have the right to withdraw from the study at any time without giving a reason.
- I understand that at any time I can refuse to answer any question without any consequences.
- I understand that I will not benefit directly from participating in this research.

Confidentiality and Data Use

- I understand that none of my individual information will be disclosed to anyone outside the study team and my name will not be published.
- I understand that the information provided will be used only for this research and publications directly related to this research project.
- I allow the interviewer to audio record the interview.
- I understand that data (consent forms, recordings, interview transcripts) will be deleted after the completion of the thesis.

Future involvement

- I wish to receive a copy of the scientific output of the project.

Having read and understood all the above, I agree to participate in the research study: yes / no

Date

Signature

To be filled in by the researcher

- I declare that I have thoroughly informed the research participant about the research study and answered any remaining questions to the best of my knowledge.
- I agree that this person participates in the research study.

Date

Signature