
Rosa de Jong
iodiversity
in the city
With a symbiotic lens

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“Breath a mending song into these earthy wounds”

Junghun Kim

Junghun Kim’s exposition is an invitation to sharpen our senses in order to navigate anthropocentric wounds (RADIUS, 2023).

I was instructed to lay down underneath the artwork. Listening to the sound of the five natural elements in the narrow space gave me a feeling of protection. I felt underground, like an insect, and hoped that people above me would be nice to me as I felt small.

Key Messages

We are facing a climate problem and new ways of living with nature should be explored to restore a sustainable relationship. In this light, the 'Neighbourhood as a Biotope' project is dedicated to research how residents can use their power to increase biodiversity in their neighbourhood. An increase in biodiversity helps in reducing climate change problems. Contributing to this project, this thesis looks into how we can foster symbiotic human-nature interactions in the Midscheeps, Oud-Mathenesse. Below the key messages from this research are highlighted.

Content, design

Research approach

For a more equal balance between humans and nature, we should find ways to research nature and include her in a design process.

Symbiotic interactions are mutually beneficial interactions between two parties, in this context, humans and nature. By fostering positive contributions to each other, we can create a harmonious coexistence within shared spaces, such as the neighbourhood of the Midscheeps.

Observations showed that limited symbiotic interactions between humans, urban nature and its surroundings happen in Oud-Mathenesse. Consequently, I looked into which opportunities we can take and which tensions to reduce to improve biodiversity, regarding the relations between these actors. It appeared that both people and urban nature of the Midscheeps do not feel heard.

How come these voices aren't heard? What made them stop communicating? Exploring this phenomenon by looking into historical data.

Separation has distanced people from each other and their environment. People didn't feel a sense of ownership over their place and garden. Even further, they do not feel particularly welcome. This is the same for urban nature, the place isn't inviting her, not giving her the space she need. While the place is more and more managed top-down, the feeling of ownership bottom-up decreased. Thus separation of groups is standing in the way of symbiotic interactions.

How should we then continue? How can we integrate this knowledge into the future plans for this neighbourhood?

Future visions depict a sense of community. This is bottom-up responsibility to participate with nature, rather than merely seeing her as a resource. There are several fundings available for community projects like these.

So how can designers contribute to creating a community feeling in which all feel heard, thus supporting symbiotic interactions?

One way is by designing for encounters that increases the awareness of residents; by breaking the silence, showing that something is happening in the garden, evoking interactions in which different species meet again that raises awareness (instead of seperation), and letting them express their opinions which serves as input for community engagement.

An installation in the garden captures the first conversations between groups of people and other species. It makes people think about the possibilities of the garden and their contribution. It is a very small, initial step before taking action. While more-than-human participation is yet very much interpreted by the human, it at least has been reflected on.

In the Midscheeps, human resident's needs and urban nature's needs meet in a garden that provides a welcoming place to find rest and relax. Sharing stories about the garden from non-human perspectives increases the perceived value of the garden. An aspiring activity that some residents would like to do is gardening, children included, which could be linked to the non-human stories.

Acknowledgements

This research has been a journey, marked by an experience of new earth emotions; anxieties for mass extinctions but also a growing feeling of biophillia, the love for nature. I want to thank the people who have guided me through this, either through their inspiration, partnerships, endless knowledge, kind words, helping hand, distractions or good food.

I want to express my deepest gratitude for having three most inspiring and powerful woman guiding me in this process. They are role models I deeply admire, whose knowledge and attitudes have left a lasting impact on me.

First, my hearthfelt thanks to **Bregje van Eekelen**, an exceptionally intelligent woman whose critical engagement and openness to challenging conversations about more-than-human design have been invaluable.

I am also immensely grateful to **Virginia Tassinari** for seamlessly joining halfway through my journey. Your guidance felt like second nature, and I immediately began learning from your insightful input. You have inspired me profoundly, and I look forward to continuing to learn from you.

It seems no coincidence that **Anja Overdiek** and I crossed paths before, only to meet again during this project. I am grateful of the platform you provided me, giving me the chance to speak on events and connecting me. Your intelligence, grounded insights, and human touch have been a constant source of motivation.

An unexpected collaboration with Bioto has made my research so much more meaningful, and for this I have to **René van de Veer.** Your outreach, shared inspiration, project collaborations, and invaluable knowledge about local wildlife made a meaningful difference in my work.

In the uncertain early stages of shaping this project, I am grateful to **Laura Barendregt** for her honesty and humane support. Our conversations—often joined by your then soon-to-arrive baby—introduced me to inspiring researchers and ideas that have been foundational to my journey.

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Summary

In this thesis, the research aimed to explore the expansion of a human-centred design approach to a **more-than-human design approach** with the objective of **enhancing biodiversity in the Oud-Mathenesse neighbourhood**, specifically in the **shared garden** of the Midscheeps.

Central to this inquiry were **symbiotic relationships**, being mutually beneficial for both parties. By concentrating on these beneficial interactions, the study sought to identify strategies for improving coexistence between human residents and urban nature within the constraints of an urban environment.

By recognizing **human residents, urban nature, and the environmental context** as the three primary actors, different research methodologies were employed to achieve a more comprehensive understanding of these actors. A linkage between **more-than-human philosophies** and practical, real-life applications was established through engagement with an **Urban Living Lab**. Studying the context through **different timeframes** enabled me to find the situatedness and temporality of the current human-nature interactions in Oud-Mathenesse. This provided deeper insights into its social and ecological dynamics and interdependencies.

Oud-Mathenesse, historically referred to as the 'forgotten neighbourhood' due to its location on the western periphery of Rotterdam, has been dealing with a **decrease in social cohesion**. This social cohesion is crucial for residents as it enhances their relationships with, and contributions to, the broader community. Additionally, the amount of nature and its **biodiversity is very limited** in the petrified neighbourhood (Figure 1). The nature that is present is **often perceived invisible** by humans, leaving her unnoticed. This limited contact between people and nature decreases even the possibility of symbiotic relations. Consequently, it was concluded that **both human and non-human entities within this environment feel unheard.** To address the issues of social fragmentation and the invisibility of nature, the design opportunity was conceptualised as **'the unheard ones'.**

To be able to get a deeper understanding of the current lack of interactions between human and non-humans in the neighbourhood, the temporality of it was explored. Historical analysis revealed that these connections for people are shaped by individuals' previous experiences with nature, including childhood memories, dependence on nature, and cultural upbringing. This means that **peoples' relationships with nature are widely shaped in their past**. Analysing nature's history showed ecosystems that used to thrive in the area, providing insights into the rich variety of the type of species that liked to root there. Furthermore, the **sense of ownership over the environment** was found to impact the quantity and types of interactions between humans and nature, affecting their relationships. The perception of certain areas as 'no-man's land' (in 1930) facilitated the thriving of various species, whereas newly controlled environments did not encourage spontaneous interactions. **The physical separation between species has resulted in a mutual alienation.**

Looking ahead, envisioned scenarios for symbiotic cities emphasises the reestablishment of a sense of **community**. This vision is linked to an enhanced sense of ownership, wherein both people and nature are once again responsible for contributing to the neighbourhood in their unique ways. While this sense of community provides a compelling direction, it remains an aspirational goal. Initially, it is essential for residents from the Midscheeps to familiarise themselves with each other by **highlighting existing connections** and acknowledging the historical interplay between people and nature. The Midscheeps requires an intervention capable of disrupting the current state, rather than proposing a distant future solution.

The final intervention comprises an installation designed to illustrate parallels (and differences) between human residents and urban nature (Figure 4)**.** Through the process of responding to inquiries regarding their histories and preferences for the shared garden. This exercise facilitates introspection among participants regarding their neighbours and shared attributes. The data points generated in this interactive graphic have the potential to inspire contributions to the local natural environment, thereby fostering symbiotic interactions. This initiative represents an initial endeavour towards acknowledging and nurturing symbiotic relationships between neighbours.

The research overall entailed **three main directions towards a more-than-human design approach;**

1. Prioritising the **centrality of not only humans** but also nature, the environment, and their interrelationships.
2. **Adopting a historical perspective** that extends beyond the present. To learn about how nature has historically flourished and how our past influenced our relationship with nature.
3. **Drawing inspiration from symbiotic future visions**. This provided the space to think out of the box and get inspired by a more inclusive and sustainable world.

These three directions were captured into a card deck which can be shared as a way of inspiration for other designers to implement such strategies (Figures 2 & 3).

While human-centred design has gained a prominent role in the design field, current crises such as climate change demand a shift towards a more-than-human design approach. Incorporating non-human elements into the design process can yield immediate benefits, yet these efforts often remain overshadowed by human-centric interpretations. Therefore, more-than-human inclusion in the design process is still (or again in comparison with some indigenous knowledge) in its infancy and more research and experimentation are needed to find more rigid ways for true inclusivity.

Figure 1, Sight visit in Oud-Mathenesse; where ducks, infrastructure and chewing gum meet.

Figure 2. Insight cards - design for relational problems and opportunities for increasing biodiversity in the city

Figure 3. Insight cards - designs for different times

Figure 4. Installation - In conversation with the tree about the gardens


Wanneer de wind door mijn bladeren blaast, heb ik het gevoel dat ik dans. En in de zomer als het warm is, zoeken de mensen mijn schaduw op. Dit zijn mijn favoriete dagen!
De tuin is voor mij onvervangbaar, het is deel van mijn leven! Waar ik ben opgegroeid. Waar ik mijn meest blije en verdrietige momenten heb beleefd. Er was eens aan mijn rechtertak een schommel gehangen. Dat bracht zoveel pret! Er was gechiechel de hele lentelang.
Genoeg over mij, wat brengt de tuin jou?
Het regenwater dat vanuit hoger gelegen delen hier naartoe stroomt, voedt mij. Ik heb geluk met zoveel water want ik heb ook vrienden met veel dorst. Maar het is veel meer water dan ik opkan. Ik zou willen dat er hier meer vrienden kwamen om mij te helpen met water opnemen.
Hoe tevreden ben jij met de tuin?
bomen
struiken
bloemen
ja, vaak
soms
niet zo vaak
nooit
afkoeling
rust
beweging
sociaal contact
anders
ja

Table of content

Reading guide

This thesis is organized into seven sections, each represented by a colour color corresponding to the respective chapters. The chapters related to time are divided into three segments: past, future & timelines. Each chapter begins with a summary and concludes with key takeaways.

The blocks visualize the Oud-Mathenesse neighbourhood, the scope of this project, with volume corresponding to the level of biodiversity which illustrates its decline up to the present day (Figure 5). The surface represents Oud-Mathenesse along with its residents. Time is depicted on the x-axis, with the left image showing a cross-section of the past, the middle image depicting the present, and the right image envisioning a potential future.

These cross-sections give a glimpse into the underlying structures influencing human-nature relationships in Oud-Mathenesse.

Quick reading tip: Each chapter begins with a summary. The introductions and key conclusions are highlighted in grey boxes for easy reference.

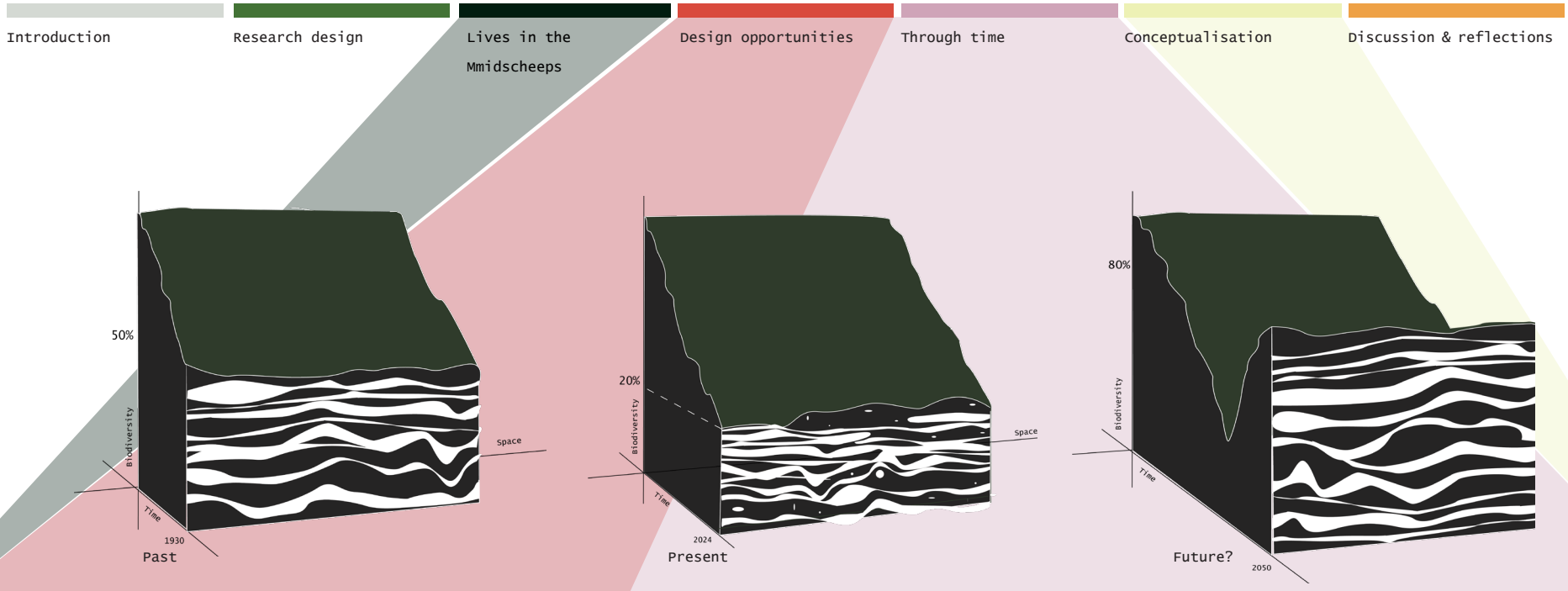


Figure 5. Image depicts the level of biodiversity and underlying structures. Based on the Chronograms of Architecture created by e-flux Architecture (Aureli et al. (2023).

Glossary

Actor - any-thing, whether human or nonhuman, that forms a relationship with other actors that will, in some way, transform the existing situation in which they find themselves (Dakers, 2019).

Anthropocentrism - means human-centred. But in its most relevant philosophical form it is the ethical belief that humans alone possess intrinsic value (Lupinacci et al., 2023).

Biodiversity- Biodiversity is short for biological diversity, which is the variety of all living things (plants, funghi, animals and microorganisms) and their interactions. Levels of biodiversity can be identified as species, genetic and ecosystem diversity which are interrelated (Wikipedia contributors, 2024).

Ecocentrism - the ethical belief that assigns inherent value to both individual living beings and entire ecosystems, considering them as ends in themselves rather than as means to human ends (Goralnik & Nelson, 2012)

Interdependencies - The state of being dependent upon one another (Merriam Webster, n.d.). For example the way plants grow in ecosystems, where they are sustained by complex webs of interdependency with fungi, microbes, animals and other plants.

Nature - The external world in its entirety (Merriam Webster, n.d.). In this report, often the word excludes humans. It includes urban nature, its wilderness and its variety of species it encapsulates, and often reffered to as 'her' in this report. It is an attempt to invite her to the human world and treat her equally. Not to idealise the concept of a 'mother earth' that will come to save humans (Brach, 2022), but rather as a partner with nature (Van Den Born, 2007). It is also a reference to the underlying Actor Network Theory; a theory that acknowledges that humans and non-humans are all part of a network in which they are equally important (Latour, 1996)

More-than-human design - in response to the commonly used human-centred approach in design, the word more-than-human design also focuses on other than humans. This could be other animals, plants, places, etc. The difference with non-human is that more-than-human does includes humans.

Resident - Living organism inhabiting a certain environment. These can be humans or other organisms (animals, plants, micro-organisms).

Symbiosis - a mutual beneficial relationship. In this thesis a focus on symbiotic relationships between humans and nature is researched. In this thesis, such relationships are symbiotic when we notice one another, and being response-able (Haraway, 2017).

Introduction

The human impact on earth has become increasingly evident. Since 2008 we have been living in the Urban Anthropocene, an epoch in which human activity have become the primary force shaping the planet's climate, ecosystems and geology (Elmqvist et al., 2021). This impact is marked by rising CO2 levels, increasing temperatures, higher sea levels, and a steep decline in biodiversity. With a global rise in urbanisation, cities are playing a dual role in the context of climate change: they are significant contributors to it, while also being increasingly vulnerable to its effects (Elmqvist et al., 2021).

This thesis dives into the problem of the decline in biodiversity. Biodiversity losses are so big that researchers have been writing about the possibility of a sixth mass extinction (Pievani, 2013). High biodiversity stabilises and increases the productivity of ecosystems contributing to resilient futures (Diaz et al, 2005). Because ecosystems are crucial for people as they provide resources (food, water, medicines, stress-relieving) and serve regulative functions (like storing CO2) (Pbl, 2023). However, growing urbanisation leaves less space for healthy ecosystems (Pettersen et al., 2018). Therefore new ways should be researched to enable coexistence with nature, especially in urban areas that are rich in biodiversity (Glas, 2022). Positioning the topic of biodiversity in the urban context showed that it is also a social-ecologic problem.

Residents can be key figures in addressing this problem as they own 60% of the land in cities. But biodiverse gardens can be perceived as messy, often because people have a lack of knowledge about biodiversity (Slingerland & Overdiek, 2023). However, in its complexity, it is not a single reason but a multitude of influences, such as the neighbourhood's architecture, that could affect the residents' limited perspective for action. A disconnection from the topic of biodiversity could lead to ignorance of this problem (Turner et al., 2004). Researching residents in an Urban Living Lab will help to gather insights in context, with a specific focus on the shared garden of the Midscheeps, in Oud-Mathenesse Rotterdam.

The relations between human residents and urban nature were central in this research, with a special focus on symbiotic relationships. By equally centralizing nature, I sought to design beyond an anthropocentric approach. There's a need to re-frame design as traditional ways of design contributed to this anthropocentic mindset. That is why both in the research methods as well as in the designs, a more-than-human perspective was explored.

First, this thesis introduces the human residents and urban nature of Oud-Mathenesse. It then provides an in-depth analysis of the opportunities and tensions in human-nature relationships, which must be considered when enhancing urban biodiversity. These dynamics were examined across different temporal scales, beginning with the present. By then investigating the socio-ecological structures of the past, the research offers a deeper understanding into the current relationships. Looking forward by adapting symbiotic future visions provided strategic guidance on the necessary steps to foster co-existence within urban landscapes.

One of these steps was further explored through the design of an installation that facilitates interaction between human and non-human residents, allowing them to express their perspectives and visions for a shared garden.

A glimpse of the shared gardens in the Midscheeps, Oud-Mathenesse, Rotterdam

01 | Research Design

Strategies towards including non-humans more equally in the design process.

This research has been shaped through collaborating with the Neighbourhood as a Biotope project which acknowledged the need to bridge the gap between the human world and nature to build biodiverse cities. Values such as desiging for social justice, nature-inclusive design and actionable futures further inspired the design of this research.

Central to this chapter was the question; w*hich design methods can be used for an inclusive more-than-human approach within the Neighbourhood as a Biotope project?*

Design methods were chosen beyond a human-centred design approach; looking into more-than-human design. Acknowledging the human residents, urban nature and the environmental context as the three prominent actors, alternative research methods should be used to better understand these subjects. A bridge between more-than-human philosophy and a grounded real life context was made by participating with an Urban Living Lab. Situating research findings in different times provided insights into the temporal dynamics and interdependencies of the human-nature interactions in Oud-Mathenesse.

1.1 Introduction

This chapter outlines how this research was shaped by collaboration with the Neighbourhood as a Biotope project, guided by values aimed at creating positive futures for both humans and nature, and by translating more-than-human philosophies into action. This process led to the development of the main research question and sub-questions, which were addressed throughout this report. Additionally, the methods used to gather and substantiate answers to these research questions were discussed.

1.2 Collaborations | Neighbourhood as a Biotope

This thesis has been developed in collaboration with the Hogeschool Rotterdam, working on the project named Neighbourhood as a Biototpe (Wijk als Biotoop) as part of a four-year research program. The aim of this project is to find ways on how to develop, together with residents, a course of action for increasing biodiversity in their neighbourhood.

The Neighbourhood as a Biotope project collaborates with the TU Delft, Municipality of Rotterdam and The Hague, Tech start-ups (among which Bioto), graduate students, and other stakeholders. Research was conducted using Urban Living Labs (ULL), where the first pilot was performed in Oud-Mathenesse, Rotterdam. This pilot should give insights into the question; *what building blocks are needed for engaging with humans, nature, and technology*? These building blocks are guiding the project for the coming three years representing goals, values, preconditions, roles, coordination, activities, and tools. In the Hague, Binkhorst, a second pilot will run in which the scalability of these building blocks are tested.

This thesis is a collaboration with the project, aimed at contributing to and sharing knowledge with. Using the similar context of Oud-Mathenesse, this research added a dynamical perspective to the project by looking into a historical as well as a futures perspective. Giving insights on which steps to take to move towards symbiotic futures. More specifically, the design outcomes of this thesis could serve as building blocks . Insights from this research that were presented as ‘insight cards’ could serve as a research activity looking into relational opportunities and tensions to design for biodiversity in the city. Another outcome of this project, an installation for human-nature encounters, could inspire the project as a possible direction for increasing awareness among residents.

Bioto

Bioto is a key stakeholder in this research, working closely together with the Hogeschool Rotterdam and performing research in the Oud-Mathenesse neighbourhood. This tech start-up produces sensors measuring environmental values which they connect with data about plants. This way, they can measure which plants and animals would thrive in the environment, depicted as an ecosystem with relations between species that could possibly thrive in the area.
Bioto’s goal is to improve biodiversity and resident engagement in the Midscheeps. Because of their prior research they are a key figure in the neighbourhood on this topic. Their expert knowledge was consulted several times throughout the project to discuss ideas, confirm assumptions and collaborate for user tests.

1.3 Critical notes

This research has been influenced by critical thinkers from posthumanism theory on decentering humans and feminist theories that critique science objectivity, the oversimplification of the world. This is especially relevant for complex problems, such as biodiversity loss and social injustice, topics that are interconnected, rooted in the past, and therefore situated in their historical and cultural context. Some of these ideas are reflected in design fields such as systemic design (embracing entanglement) and more-than-human design (taking perspectives and acknowledging subjectivity), both fields are gaining more and more attention. These philosophies and design practices are interwoven in my research, adding a critical layer of reflection.

Us or them?

A loss in biodiversity is destabilising and reducing the productivity of ecosystems (Díaz et al., 2005; Hooper et al., 2005). Ecosystem services show the actions ecosystems perform for humans, such as production services (like wood, water, and food, as resources), regulation services (like cleaning, water storage, and carbon sequestration), and cultural services (recreation, education, and science) (Pbl, 2023). This ecosystem service overview helps policymakers to understand the importance of preserving biodiversity. However, this is all concerning humans. The focus is very much human-centred, as the promotion video of the Biodiversity strategy for 2030 by the EU ends with the slogan; 'let's take better care of nature so that it can take better care of us' (Biodiversity Strategy for 2030, 2023). Even when looking at the grammar of this sentence, humans are referred to as 'us' and nature as 'it'. Apparently, 'us' does not include nature, and nature is reduced to an object and doesn't get the superior status of a human, even though nature includes living beings too. By contrast, in some indigenous cultures there's no distinction between nature and humans. In my thesis, I am playing with the connection between, and attitudes towards different species and how this affects our behaviour.

Inclusive design - how climate change is connected to social injustice

An issue with the way the Anthropocene is conceived in the natural sciences is that earth system change is expressed objectively; increased global temperatures, ozone depletion, ocean acidification, and decreased biodiversity (Palsson et al., 2013). On the other hand, those in the humanities rightly call for a need to situate this phenomenon in historical and cultural contexts (Pálsson et al., 2013).
Climate change is primarily caused by wealthy nations, and disproportionally affects poorer individuals, especially those who rely on the earth for their livelihoods (Carney, 2014). In other words, climate change cannot be addressed independent of social justice.

Oud-Mathenesse has a high proportion of low-income households (2018 | Wijkprofiel Rotterdam, n.d.). Although residents may not feel directly connected to nature, they are vulnerable to climate change effects. The neighbourhood's location near the Maas River, below sea level, and its experience of increasingly hot summers with limited cooling options heighten these challenges.

Interviews highlighted several key concerns. Residents often prioritize immediate needs like food and gas over environmental issues. There is also a sense of being overlooked, with some describing Oud-Mathenesse as a 'forgotten' area, which affects their political engagement. Additionally, the lack of private gardens limits their ability to impact local biodiversity. Lower consumption levels among residents result in less pollution, leading to questions about why they should tackle problems mainly caused by wealthier individuals.

While biodiversity loss and social injustice may seem separate, they are linked by the exclusion of certain voices and entities in decision-making. True inclusivity means integrating all elements of the urban environment—soil, wildlife, immigrants, water, and children.

The Anthropocene concept helps designers address not only physical changes but also global inequalities, power dynamics, and interspecies relationships (Palsson et al., 2013). By exploring these themes, this project aims to bridge biodiversity and social justice, striving for inclusive design that benefits a broader range of residents in the neighbourhood.

1.4 Guiding values

This overview depicts terminology that was used in this research which is clustered in the directions of; Actionable futures, Social justice and Nature-inclusive design. These directions were used as values guiding the research, rather than presenting ultimate goals. These values were derived from the Nature Futures Framework (NFF) which is an approach for creating positive futures for nature and people (Palacios-Abrantes et al., 2022). Symbiosis is central as this could be the way to achieve positive futures for people and nature. Symbiosis is used as a lens through which the human-nature relationships were examined in this research which will be further explained in the following chapter.

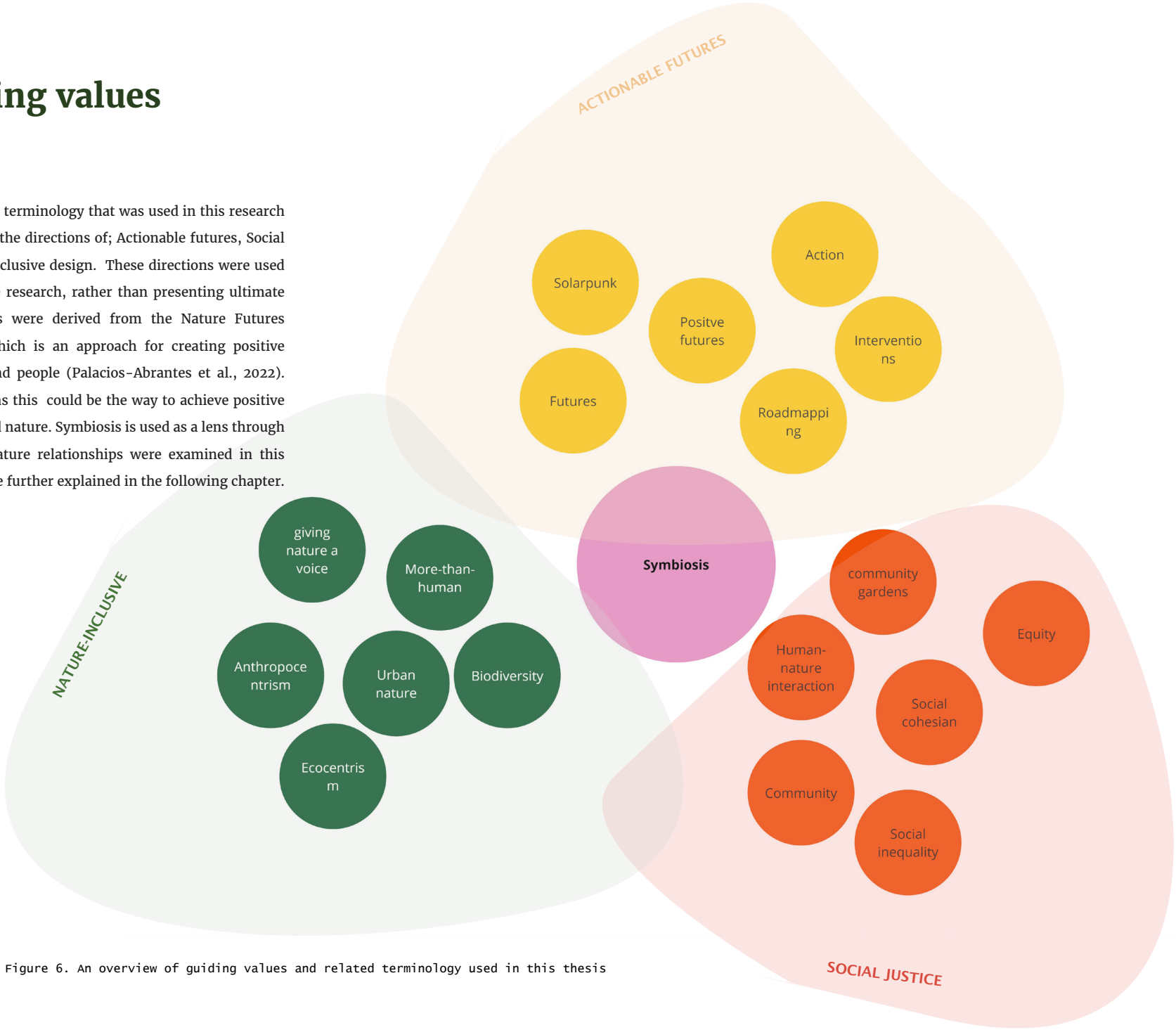


Figure 6. An overview of guiding values and related terminology used in this thesis

1.5 Research questions

Currently, humans use nature as a resource in an unsustainable way causing biodiversity losses. In a sustainable relation, Haraway (2017) stated that humans need to have a more symbiotic relationship with nature.
Symbiotic originates from the Greek symbíōsis, meaning "living together, companionship" (Merriam Webster, n.d.), and is more often used in the search for new partnerships with nature (Tegenlicht (2022), Marian Stuiver (2023), Natuurhistorisch museum). This involves an underlying human behaviour change emphasising interactions where both parties benefit. This shift promotes more equitable and sustainable relationships, encouraging cooperation and mutual gain rather than one-sided advantage.

The main research question is as follows:
How to foster symbiotic relationships between human residents and urban nature in the Midscheeps, Oud-Mathenesse?

The word symbiotic is used as a lens during this research, more than the strict biological definition. Haraway (2017) described symbiotic as a respectful and responsive relationship (Haraway, 2017). To be response-able, one also has to notice one another. However, responding goes further than noticing, it also has an actionable aspect to it. Therefore, symbiosis could be the ultimate relationship towards cohabitation.

The Neighbourhood as a Biotope project identified the knowledge gap of 'including nature as agents in the collaboration', (Slingerland & Overdiek, 2020). They argued for more inclusive collaborations. Therefore, focus was given on including nature during the design process and in the final design.

Human residents are people who reside in a certain place ("Resident," n.d.), they have their own (rental)house, garden/ balcony/window, street, and parks which is part of their daily life. However, these residents aren't the only inhabitants; they share the space with other living beings. Note here that nature's surroundings are not limited by human defined borders, such as the 'Oud Mathenesse neighbourhood'.

Sub-questions were created in order to address the main research question step-by-step. They each encompass a phase derived from the structure used in systemic design (Design Council, 2021). Systemic design is a growing research field in design for complex problems (Battistoni et al., 2019). Its framework builds on existing design frameworks by recognising the interconnected, complex nature of challenges and prioritising the planet as well as its people (Design Council, 2021). Although these sub-questions help in addressing the main research question, there's rarely one 'right' answer to such questions. Rather, a solution is part of a bigger system, which might spark further innovation.

Sub-questions

Methodology- Research design
Sub-question 1. Which design methods can be used for an inclusive more-than-human approach within the Neighbourhood as a Biotope project?

Explore - The Present
Sub-question 2. Which design opportunities arise between human residents, urban nature, the environment of Oud-Mathenesse and its interrelations that could contribute to more biodiversity?

Explore - The Past
Sub-question 3.How did these relations between human residents, urban nature and environmental context change over time? And what can we learn from them?

Reframe - Futures
Sub-question 4. Which 'new' relations between human residents and urban nature could serve as inspiration for symbiotic futures?

Create - Roadmap towards symbiosis
Sub-question 5. Which interactions between human residents and urban nature could serve as inspiration for symbiotic futures?
Sub-question 6. What might be the role of a designer in fostering symbiotic interactions?

Create - Embodiment

Sub-question 7. How does the chosen intervention contribute to symbiotic relationships in the Midscheeps?

Reflect - Academic contribution

Sub-question 8. How does my more-than-human design approach contribute to knowledge for a beyond human-centred design regarding the topic of biodiversity in cities?

1.6 Methodologies

More-than-human design

Most species on Earth—animals, plants, and microorganisms—are non-human. To address the ongoing loss of biodiversity, it is imperative to move beyond a purely human-centered perspective, as that approach has contributed to the current crisis. This challenge necessitates adopting a more-than-human perspective, one that includes non-human entities in the conversation. Consequently, my graduation thesis employs a more-than-human design approach. To achieve a sustainable or even symbiotic relationship, where both urban nature and human residents can thrive, we must listen to and negotiate between species.

Given that the field of more-than-human design is still emerging, there are no established guidelines for applying its methods. Therefore, a detailed reflection on these practices was included at the end of the report.

Urban Living Lab

The research towards increasing biodiversity was performed in an Urban Living Lab context. While it is essential to recognize a diversity of perceptions and understandings of the Anthropocene, it is also important to firmly contextualise them in regional and local realities (Bai et al., 2016). The ULL provided this local reality in the project, which is able to ground findings. It is a source of information and a place to test out ideas to see if they work. It is a check with reality and simultaneously provided a specific context and therefore boundaries. It should be considered that these boundaries can also hold limitations. The research findings were be applicable for its specific context, Oud-Mathenesse neighbourhood, and were not tested in other neighbourhoods reducing its generalizability.

Historical research

The goal of studying history has always been to understand the past in order to understand and deal with the present and the future (Petrosillo et al., 2015). By examining the historical context of Oud-Mathenesse, a deeper understanding was gained regarding the evolution of human-nature interactions. This analysis was particularly relevant in light of increasing urbanization, which has influenced changing perspectives on nature. Additionally, studying the past provided insights into how ecosystems, which were once more thriving, manifested themselves. These historical insights helped clarify the origins of current environmental challenges and offered lessons that could inform present-day solutions.

Futuring

When discussing the Anthropocene epoch, we refer to a period characterized by significant environmental transformations driven by human activities, which are altering the Earth System in ways that are unsustainable. This screams for a window of hope. Bai et al. (2016) argue that the debates on sustainability in the Anthropocene should focus more on opportunities

for realising desirable and plausible futures. By looking into a possible future, outcomes can be imagined and actions can be taken accordingly. These future narratives can give people direction during these complex challenges like climate change.

Humans are often experts on our current habits, however not very reflexive. Futuring could help to break free from routines and see ourselves more as an object that causes change, where we become more reflexive (Brons, 2022). This self-reflection is helpful when situating our human position towards non-humans, and to be able to redefine our relations, and was used in futuring workhsops.

Roadmapping

A roadmap was developed to illustrate how evolving visions of nature, changing landscapes, human-nature interactions, and the underlying socio-ecological structures influenced one another over time. This roadmap was instrumental in structuring the data, providing a clearer overview, and offering a directional framework for action (Simonse, 2018).

Future visions, defined as imaginative depictions of potential futures (Pettit et al., 2023), help raise awareness and define what a "successful" future might entail. To facilitate positive change and anticipate potential tensions, the past and current states were thoroughly examined. It was necessary to add a historical layer to acknowledge that urban areas were once natural wildernesses. Landscapes are inherently dynamic, shaped by the ever-changing interactions between humans and nature (Groenewoudt, 2024). This is often overlooked, as most people lack knowledge of the natural state of areas prior to their earliest memories (Groenewoudt, 2024).

Relevance

Bai et al. (2016) argue that "yet, the futures of the Anthropocene will impact the outcome of today's collective choices, and science has a strong role to play in guiding such choices." It is often criticised that more-than-human philosophies and futures of the Anthropocene (Bai et al., 2016), are mostly staying at a theoretical level. There's a need to translate and collaborate with practice. Bai et al. (2016); "science needs to have closer and different relations with practice, where science is co-designed and co-produced with societal stakeholders, and where science not only informs practice but also learns from practice". Combining theory with practice is what makes the design field at large, and this research project specifically, relevant. The combination of the theoretical more-than-human philosophies, reflexive futuring methods, and grounding ULL, enables the bridge between theory and practice. Within these methods, there's a focus on co-design for and with residents and nature.

1.7 Key conclusions

This research was shaped through collaboration with the Neighbourhood as a Biotope project. Grounding the study within the ULL of Oud-Mathenesse provided a practical setting to test assumptions. In turn, this project contributed to the broader initiative by offering a more-than-human perspective and corresponding design strategies.

Symbiosis served as a lens throughout the research, guiding the exploration of new partnerships with nature. Given the alarming loss of biodiversity, particularly in urban environments, there is a pressing need to adopt perspectives that extend beyond the human realm. This focus led to the central research question of the thesis: *How can symbiotic relationships between human residents and urban nature be fostered in the Midscheeps area of Oud-Mathenesse?*

This research proposed three specific strategies towards including non-humans more equally in the design process.

- By prioritizing the centrality of not only humans but also nature, the environment, and their interrelationships.
- By looking beyond the present. Adopting a historical perspective and drawing inspiration from future visions.
- By actively engaging with the community, immersing oneself in the neighbourhood, and fostering connections.

A glimpse of the shared gardens in the Midscheeps

02 | Introducing the context

Lives in the Midscheeps

This chapter aims to provide context for the research, focusing on the Neighbourhood of Oud-Mathenesse and its residents, both human and non-human. Insights from observations and conversations in the neighbourhood presented an introduction to the lives in the midscheeps as well as the different attitudes towards nature.

Given the broad scope of urban nature, indicator species were identified to represent the needs of local wildlife in this context. The human population of Oud-Mathenesse is diverse in age and nationality. Yet the neighbourhood faces significant challenges, including alcoholism, labour exploitation, and a feeling of unsafety. Despite these issues, small community initiatives offer hope. The chapter highlights the varying perspectives of residents toward nature, ranging from indifference to active engagement, shaped by personal experiences, knowledge, and upbringing. Recognizing this diversity in attitudes is crucial for successful urban nature planning and fostering community involvement.

2.1 Urban nature in Oud-Mathenesse

Urbanisation puts pressure on sharing space between nature and humans. Already in 1995, the Minister of Agriculture, Nature Management and Food Quality shared a discussion paper emphasing the importance of a new relationship between city and nature by advising on ecology-inclusive planning (Visie Stadslandschappen & LNV directie Natuurbeheer, 1995) . This report is relevant to this date.

Nature that is able to survive in an urban environment is referred to as 'urban nature' (Figure 7). Comparisons can be found with similar natural environments like rocky environments in the mountains or grasslands (De Roode, 2021) (Keith et al., 2022). Thinking as small as grass growing between the tiles to foxes and beavers. A video was created to give an impression of urban nature in the neighbourhood Oud-Mathenesse (Figure 8). Every species has its own perception of the world, different scales, experiences of time that should be taken into consideration.

The word biodiversity is complex and encompassess a whole range of diversity and interactions in nature. To keep biodiversity measurable and understandable, a carefully chosen sample of species was used to represent its richness. Within the context of Oud-Mathenesse, species diversity was selected as the most relevant variable due to the challenges associated with measuring genetic diversity and the preference of assessing ecosystem diversity on a rather larger scale. It is crucial to develop an integrated understanding of the response of biodiversity in particular addressing the species-level (and its traits) (Rosa et al., 2017). All species have their own needs and traits. For example, when connecting green in the city to increase the living environment of animals, we need to identify the type of animal. If it is an insect, then can it fly? An urban ecologist said "If you look at green roofs, for example, bees can find them just fine …". But this wouldn't be of any help for a fox. However, within urban nature, there are a lot of different species. It might be really difficult to map all the needs of these species and design for them accordingly. A common strategy is to appoint 'indicator species', which represent certain aspects of nature. For example, hedgehogs root in the ground in search of insects. As they dig, they help aerate the soil. This process can improve soil structure and drainage, which is why hedgehogs are indicators of healthy soils. Rotterdam has appointed 10 species (animals and plants) that represent biodiversity in the city of Rotterdam, each because of its own unique aspects. Care should be given that these species are a simplification of the range of species that actually live in Rotterdam and not to neglect the interdependencies between species (Wang et al., 2019). A selection was made for the six most relevant species in the context of biodiversity in Oud-Mathenesse (Figure 9).

Figure 7, Snapshot of 'urban nature' in Oud-Mathenesse

Figure 8, Impression video of urban nature in Oud-Mathnesse

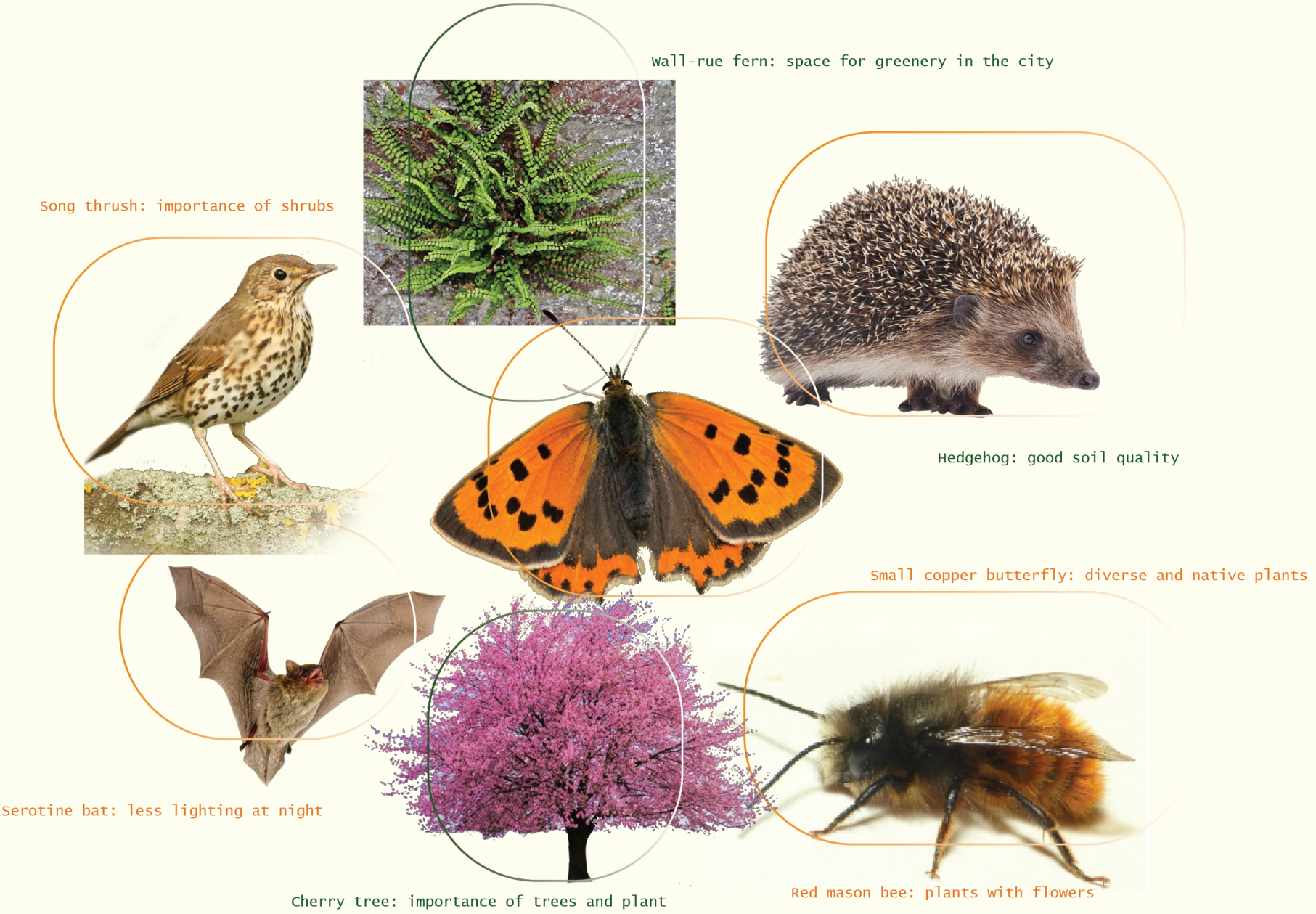


Figure 9, Overview of the selection of indactor species and their indicating elements

2.2 Humans in Oud-Mathenesse

Oud-Mathenesse is located near the harbour adjacent to the dyke near M4H and Schiedam, which used to be named the 'forgotten neighbourhood' (Figure 10). Its demographic composition is notably multicultural, with a diverse population representing at least 93 different nationalities, with a majority identifying as Dutch, Polish, or Bulgarian. Within this locality, there are various societal challenges, including labour exploitation and financial debt, leading to issues such as alcohol dependency, noise pollution, and the accumulation of litter, which leaves a mark on the neighbourhood. The majority of residents do not have gardens; instead, they typically have balconies and communal lawns managed by the homeowners' association. The municipality index presents a general dissatisfaction within the perceived social cohesion and environmental index reflecting the quality of the neighbourhood (Wijkprofiel Rotterdam, n.d.).

Despite a low level of trust in the government and municipality, a sense of communal solidarity persists among residents. Notably, there are active residents in the neighbourhood who start initiatives bottom-up. For instance, 'Mathenesse aan de Maas' aims to connect the new redevelopments for M4H with Oud-Mathenesse and increase social cohesion (Figure 11 & 12). Other examples are initiatives such as the community garden, activating gardeners weekly to gather in the self-made community garden and Wijk Collectie, an initiative that collects and curates stories from the resident's lives and exhibits them in a self-made museum next to the local pub. Learnings from these initiatives, driven by committed residents, were derived and can be found in chapter 3.

Different views on nature

Not all residents share the same beliefs and attitudes towards nature. During the first observations and conversations in neighbourhood, a range of attitudes were identified from 'nature's annoying' to 'following nature's lead'. While the insights from this research was further explained later in the report, this comprehensive overview showed the diverse perspectives hence a generalization that should be avoided when refering to people's attitudes.

Residents can have negative experiences with urban nature "birds pooping on my car". Some do not care much about nature or biodiversity "Ik let gewoon op mijn eigen" "Nature's already everywhere. That is enough". Some notice the presence of nature but have a passive attitude towards her "Greenery is just nice to watch. I have flowers at home". Then there are residents with a more active, perhaps more controlling attitude towards nature "Initially, I was very focused on that I wanted to see results. But now I have a bit more appreciation for it.", "They have restrictions on that it looks tidy". Then there are people following nature's lead, "my garden is my inspiration for my art" "But at the same time, I think, do I really have it all under control? You see that when you remove one bush, others start growing again. It remains dynamic. Meanwhile, my vegetable garden is also less neat."

A diverse set of attitudes, which can change over time and depend on the situation and topic. Perhaps someone hates bird poop, but loves the plants in their garden. These attitudes are influenced by a level of knowledge, contexts or experiences. For example, age and people's experiences with nature in their youth, and whether people grew up in an urban or rural environment (Hughes et al., 2019)(Hinds & Sparks, 2011). Knowledge can change the way people look at for example a biodiverse garden; whether it is perceived as messy weeds or biodiverse fauna. It is important to understand that not everyone shares the same beliefs. Alternatively, Bioto has created an energy map, a map with people who showed interest in actively participating in increasing the biodiversity in the neighbourhood. Active residents are easier to enthuse and could set an example for others.

Figure 10. Welcome sign when entering the neighbourhood

Figure 11. Portrait of a resident living in Oud-Mathenesse (Ubert, 2023)

Figure 12. Portrait of a resident living in Oud-Mathenesse (Ubert, 2023)

2.3 Key conclusions

By focusing on indicator species as indicators of biodiversity aspects, this study navigated the challenges of measuring biodiversity and emphasizes the importance of urban nature in shared spaces between humans and wildlife.

Initial research on the context showed how the urban environment of Oud-Mathenesse presents unique challenges due to its multicultural population and socio-economic issues, yet it also shows resilience through community-led initiatives. These initiatives demonstrate the diverse attitudes residents hold towards nature, ranging from indifference to active engagement. Understanding these perspectives is crucial for fostering greater biodiversity in urban settings. Ultimately, the findings suggest that a nuanced approach, sensitive to both human and ecological needs, is essential for designing sustainable urban environments.

A glimpse of the shared gardens in the Midscheeps

03 | Design Opportunities

Present design opportunities between human, nature and environmental relations

The primary objective is to explore and address the research sub-question 2: **Which design opportunities arise between human residents, urban nature, the environment of Oud-Mathenesse and its interrelations that could contribute to more biodiversity?**

This study employed various qualitative research methods to explore the interactions between human residents, urban nature and their environment. Incorporating methods such as observations, interviews, policy analysis, and guided walks with an urban ecologist captured the diverse interactions from city-wide perspectives to specific local contexts like the Midscheeps shared garden. This approach revealed 21 key insights, categorized into themes that highlight both opportunities and challenges for increasing urban biodiversity. These findings were presented as a deck of insight cards, a tool designed to share these insights with projects like Neighbourhood as a Biotope. The tool helps to design for relational problems or opportunities that could lead to improved biodiversity.

Key themes identified include the effects of urban nature on social cohesion, challenges posed by diverse nationalities, the inclusion of initiatives, and the consequences of environmental factors like pollution and climate change. The research emphasizes the need to balance the demands of human and non-human actors within urban space.

3.1 Introduction

This chapter undertakes a investigation into the interactions between human residents, urban nature, and the environmental context within the Oud-Mathenesse neighbourhood. To achieve this, the study employs a qualitative research approach, drawing on direct observations, coded interviews, policy reports, and site visits to local institutions, each discussed in this chapter.

The collected data are systematically mapped to highlight the relationships among the key actors—human residents, urban nature, and the environmental context (Figure 13) —leading to the identification of insights. These insights are then organized into thematic clusters, providing a deeper understanding of the opportunities and challenges inherent in promoting urban biodiversity.

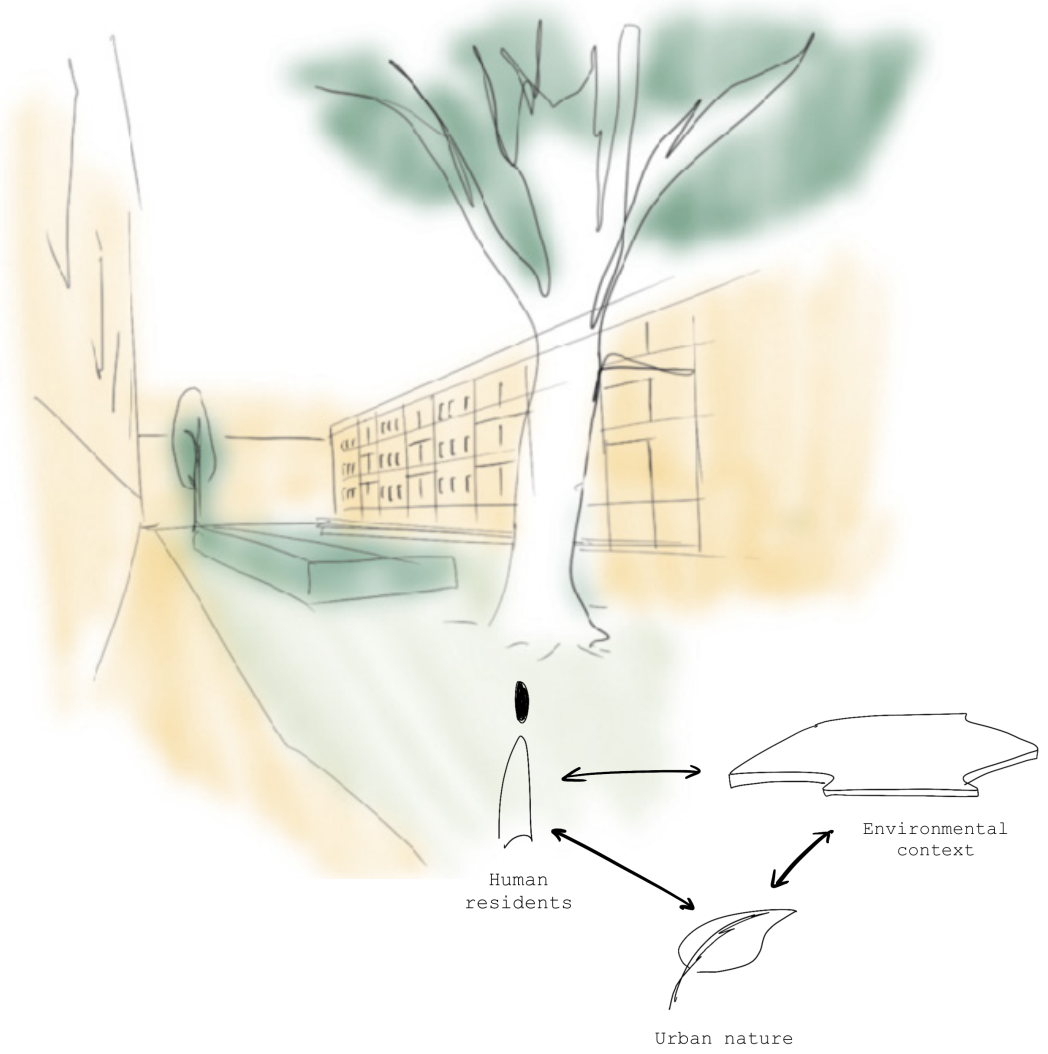


Figure 13. Researching the relations between human residents, urban nature and their environmental context

3.2 Approaches

Various qualitative research approaches were employed to gather data about human residents, urban nature, and the environmental context (Figure 14 & 15) to capture data across different scales and from various actors, thereby providing a broad overview of insights. Relying solely on interviews for example, would be insufficient to understand the non-humans in the neighbourhood. The research began at the scale of Rotterdam and gradually narrowed down to the shared garden in the Midscheeps. This approach allowed me to make informed decisions on how to refine the scope of the research. For example, the city-wide scale was particularly relevant for studying urban nature, as it transcends neighbourhood boundaries.

The different types of research activities were further described in the following subchapter, after which the 21 main insights were shared.

Figure 14. Overview of research activities. Icons depict inclusion of humans, urban nature, and / or environmental context. This categorization ensured that research activities were evenly distributed across these actors.

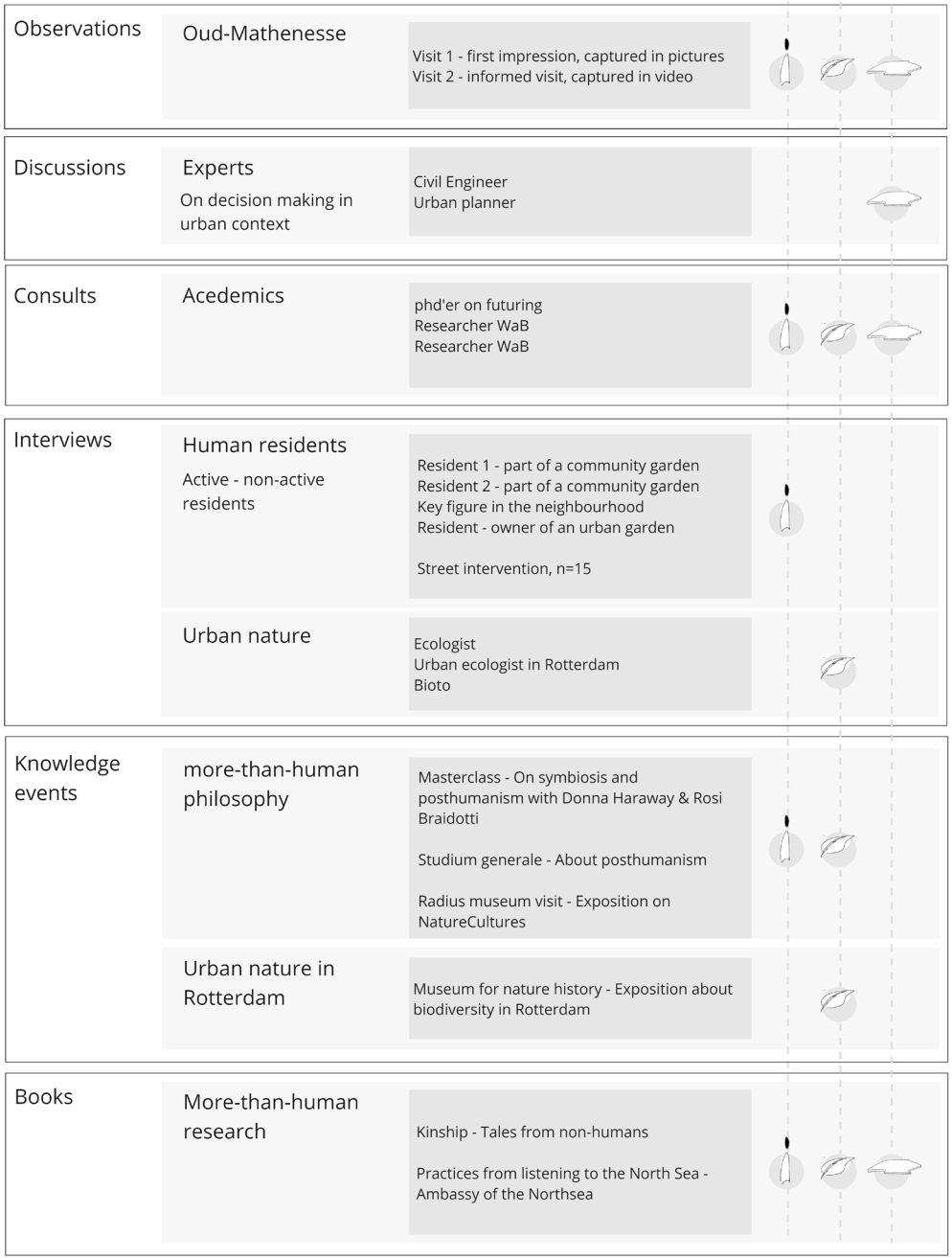


Figure 15. Overview of research methods

Researching human residents

The research on residents included different research methods, reaching a wider range of residents. For the entire neighbourhood, an analysis of all residents was conducted based on neighbourhood profiles by the Municipality of Rotterdam, which indicated both the objective and subjective experiences of the neighbourhood. Additionally, observations were made by walking through the streets, visiting stores, and documenting signs. A short movie was created to depict the biodiversity and typicalities of the neighbourhood, aimed at providing a comprehensive understanding of Oud-Mathenesse from my own perspective as a researcher to later verify these assumptions with residents (Figure 8). Residents were additionally engaged through short street interviews. In-depth interviews were conducted with active residents of the neighbourhood, most of whom were already involved in various initiatives such as the local community garden, and were more willing to share their experiences.

Observations

While desk research presented quantified data about the neighbourhood, only the presence of being in the neighbourhood could give insights into the experience of it. I did two observational walks through the neighbourhood, where the first walk was documented with photographs. This gave insight into the outside living space; amount of gardens/balconies residents, parks, playgrounds and the amount of greenery. To reduce bias, results of the photographs and videos were shared later during interviews with residents and an ecologist to verify my assumptions.

It appeared that little space for nature was provided. Pavements as well as playgrounds were mostly paved (Figure 16) and the green spaces mostly consisted of grass, indicating a lack of biodiversity. However, there were also signs for change. Insecthotels and a bus stop painted with a natural environment presented initiatives for change (Figure 17).
enhancing my ability to identify species and observe their behaviors from a more informed viewpoint—ranging from amphibians to avifauna.

The second observation was conducted following a visit to the museum of nature's history, where the exhibition focused on the biodiversity of Rotterdam. This exhibit detailed the various species inhabiting the city and provided guidance on how to locate them. The experience proved instrumental in altering my perspective of the neighbourhood. Additionally, the exhibition addressed human-animal interactions, highlighting the dual impact of urban waste on wildlife. It illustrated how litter can be harmful, such as through poisoning or entanglement, yet simultaneously serves as a resource for nest-building. During my observation, I noted that birds frequently congregated around trash bins, though I also encountered deceased birds nearby. These findings were systematically documented and later presented to local residents, enabling me to share my insights and validate my observations within the community context.

Figure 16. A petrified street with trees

Figure 17. Suddenly an initiative pops up, rather randomly located in the middle of a square

Street intervention

Given that the observations provided limited opportunities for direct interaction with residents, a street intervention was organized. The intervention was strategically located adjacent to a park and near a supermarket (Figure 21). The primary aim was to gain a deeper understanding of local residents' relationships with nature. Specifically, I sought to explore their daily experiences (Figure 20), current interactions with natural environments, and their needs and preferences concerning neighbourhood greenery. The intervention took place on a Saturday afternoon over a span of four hours. I was joined by another graduate student involved in the Neighbourhood as a Biotope project (Figure 18). We adhered to a consistent methodology for conducting interviews and collaboratively analyzed the data to minimize potential bias.

A semi-structured interview was set up (appendix A), in which the aim was to have a more natural conversation, while still discussing the topics mentioned above. Attention was drawn by having a chalk painting on a board and free cuttings (Figure 18) as an incentive for the interviews. During the interviews, we were invited to have a look at the resident's shared rooftop gardens (Figure 19).

Figure 18. Set-up on the street, having conversations with free cuttings in return

Figure 20. An older lady doing grocery shopping for herself and her plants

Figure 19. A woman gave us a tour around her shared rooftop terrace

Figure 21. The set-up was located at the corner of the Pinassquare, accross the supermarket

In-depth interviews

To acquire more in-depth knowledge, one-hour interviews were conducted, primarily with residents actively involved in green initiatives within the neighbourhood. These individuals were more accessible due to their passion for their activities in nature. The primary objective was to gain a deeper understanding of their motivations for engaging with nature. The interviews were conducted both in person and online, depending on the circumstances. These were recorded, subsequently transcribed, and coded for analysis.

Researching urban nature

The types of methods for researching the topic of urban nature consists of various components, each covering different scales ranging from the urban scale of Rotterdam, to the neighbourhood scale of Oud-Mathenesse and further to the specific context of the Midscheeps. For the city scale: literature research, policy reports regarding the new plans for M4H, and a visit to the Museum of natural history were undertaken that gave insights into current practices (Figure 22) and future plans for nature in the city (FIgure 23). On a neighbourhood scale, these direct observations and a guided walk with an urban ecologist afforded valuable insights. The insights from the walk were documented through recording and transcriptions, akin to the methodology employed for other resident interviews. Knowledge of the specific context of the garden was mostly retained by interviewing Bioto, who performed prior research and observations in this context.

Museum visit

The Museum of Natural History in Rotterdam featured exhibitions closely related to this research: ‘Through the Eyes of... (Perspectives from Different Animals),’ ‘Biodiversity in Rotterdam,’ and ‘National Park Rotterdam.’ These exhibitions provided valuable insights into animal perspectives, the types of species inhabiting Rotterdam, and future prospects for nature in the city. The purpose of this visit was to gather knowledge, observe visitors' reactions to the exhibitions, and use this knowledge to better understand nature in Oud-Mathenesse. Photographs of the exhibitions and future visions were collected, and quotes from visitors as well as videos within the museum were documented.

Policy reports

Several policy reports have been published concerning the proposed transformation of the adjacent Merwevierhaven district from a harbor into a residential area. These reports include research on green-blue infrastructure and indicator species within that region, findings that are likely applicable to the broader neighbourhood context. The relevant insights from these policy documents were synthesized and integrated into the current analysis.

Interview with urban ecologist

To obtain more in-depth knowledge about biodiversity in the Oud-Mathenesse neighbourhood, an elaborate in-depth interview with an urban ecologist was conducted. This interview

Figure 22. A ‘before’ picture of a petrified street

Figure 23. A future vision of how such a street could look like

was scheduled as a walk-through of the neighbourhood, providing contextual relevance. The insights gained from prior research activities on urban nature were evaluated during the interview to assess its objectivity and identify blind spots. The interview followed a semi-structured format and was recorded, subsequently transcribed, and coded for analysis.

Environmental context

Next to human residents and urban nature, Oud-Mathenesse contains various forms of infrastructure; including roads, houses, schools, dykes, etc. These different elements of the neighbourhood are governed by regulations and exert influence on the behaviours of both residents and the natural environment. The environment is shaped by different disciplines and organisations, including urban planners, architects and civil engineers. An interesting development is the arrival of the residential area in M4H and its consequences. While this research set-up is less elaborate than those focusing on residents and urban nature in Oud-Mathenesse, it primarily consists of conversations with people working in these different disciplines and people who are experts of the neighbourhood to get a better understanding of the context, its design choices and the consequences it faces. Another question is the one of ownership, who owns the area, thus leading decisions?

Interview with Bioto

As a partner in the Neighbourhood as a Biotope project, Bioto possesses firsthand experience in the area, having conducted research for two years and collaborated with local schools and gardens. They have in-depth knowledge of the residents' needs, the types of ecosystems and species present, potential areas for biodiverse improvements and knowledge about regulations and who makes decisions. Following the initial semi-structured interview, a more collaborative relationship was established, facilitating the continuous sharing of insights that enriched the understanding of the neighbourhood. While these insights have proven invaluable in defining the research scope, it remains imperative to maintain objectivity and conduct independent research.

Expert conversations

The architectural design of the environment is primarily undertaken by civil engineers and architects, and the possibilities for redesigning the neighbourhood are largely constrained by regulations within these fields. Therefore, acquiring understanding of these regulatory constraints was essential. Ignoring these rules would render the project unfeasible. Consequently, discussions were arranged with a civil engineer from the Water Boards and an urban planner focusing on green-blue infrastructure to comprehend the most critical limitations.

For instance, while dykes initially appear to offer potential for biodiverse vegetation, fifty years of testing have established reliable knowledge about their structural integrity. No similar testing has been conducted for alternative vegetation, making it very difficult to bypass these established regulations. Since adjusting these regulations would be beyond the scope of this project, they serve as boundaries within which the research must operate.

Analysis - from insights to thematic clusters

In total, 122 written insights were gathered and clustered into 21 themes. The most important actors were determined from the insights, including the municipality, youth, Covid and society at large. Accordingly, the insights were mapped onto the actors in terms of relevance and themes were created from clusters.

3.3 Results |

Opportunities & Tensions

Following the data collection, mapping and clustering, an overview of 21 themes emerged, substantiated with quotes. This provided a comprehensive overview of potential opportunity areas and tensions that emerge when increasing biodiversity in the neighbourhood. When designing for biodiversity in the city, the relevant opportunities and tensions could help in providing insights into the relations between the actors that should be taken into consideration. Each theme is further substantiated in this chapter.

01. Effects on social cohesion

Activities in nature can bring a sense of community but it can also cause polarisation. ***“I call them the nature freaks, but it has to be done together”***, resident Oud-Mathenesse. There's a sense of community in the neighbourhood however, a lot of people also live anonymously in the city. “People from the same flats usually do not know each other”. Care should be given to not create aversion towards nature by making this an ‘exclusive’ topic. By working on these topics together, people feel involved which can increase social cohesion which is important for neighbourhoods "The more residents you know the more fun. The more neighbours you know the more you do together. That's good for the neighbourhood and the sense of safety; stronger together", district networker. “ It's really nice to talk about gardening with each other. Such collaboration feels a bit more horizontal”, Rotterdam resident.

02. Diverse nationalities

Oud-Mathenesse is a multicultural neighbourhood with many nationalities. This means it is rich in culture but difficult in terms of communication ***"The languages and cultures differ and it is difficult to bridge this"***, Bioto and new ways should be found to connect “Back in the days we did joint activities, such as Easter egg hunts. But now that people of other nationalities are moving in, we also have to celebrate other parties.”, resident.

03. Making initiatives work

Making initiatives work by inspiring and motivating residents, learning on the job and taking into account demographic limitations. There are new initiatives in the neighbourhood popping up, from which we can learn. The new area of M4H could serve as an example. This upcoming district shows the residents on how a neighbourhood could look like, which could have an active aspect. "Of course, we don't want that to become a wonderfully beautiful neighbourhood any time soon and it's nothing here at all.” "people find it difficult to think for themselves what they would like in their garden.”, resident. “They can criticise already existing designs or say they like or like something. Prioritising what to put in e.g.”, Bioto. People should know what they gain from an activity before they are willing to join something new. Through try and error and giving people space to join with how they 'like' it.***"Like we have one woman that I think is not really into gardening herself. She's always picking up trash and like using a broom around the garden to clean up the sidewalks, which is totally fine."*** Some people are too old for the hard work but enjoy the social part. “We changed the roof terrace because it became too heavy for us". Also, give them space to learn "We're all amateurs. And we have one girl though who knows a lot about plants, and we learned from her because she explains a lot of things."

04. Disruption

COVID changed people’s daily lives, it was an interruption in their routines and environments which made people change their habits. ***"I think it was mostly during the COVID lockdown that I actually got back to my roots***

and discovered that I like plants. I had a lot of time on my hands. So I started getting into like plants. The basil grew like crazy so I started to share cuttings", resident.

05. Happy encounters

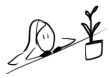
Sometimes nature responds to human actions; planting a tree attracts new birds, and leaves on the ground create a nestling place for a hedgehog which makes most people happy to watch. ***"It is bizarre that you see almost instant results of what happens. Once you give nature space it does come back."***, resident. In Oud-Mathenesse, the Singel is a popular place to contemplate, listen to music, and enjoy nature.

06. Unwanted attractions

In encounters with nature, there are sometimes shared needs that cause conflicts ***"we were smart enough to put a net over the strawberries before the birds got them"***, resident or unwanted consequences "Bushes hold litter that is difficult to clean up, which is why people don't want it", ecologist

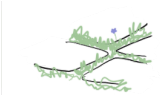
07. Invisible nature

"I never knew we had so many animals in Rotterdam!", visitor of museum for nature history. "I went to a field of grass with a reversed leaf blower. ***At first you might think there's only grass, but I found many animals living in the grass"*** - urban ecologist. Animals hide, show themselves when it is quiet, live underground, or species are too small to see with the human eye. In the Museum of natural history, people were surprised by the diversity of nature that lives in Rotterdam. Still, animals are more recognized than plants (plant blindness) and microorganisms. This is a problem around the topic of biodiversity, as it covers all these different layers of microorganisms, plants, and animals. When explaining, or visualising the layers, people tend to understand better which elements biodiversity involves. "Biodiversity can be captured in layers, you have the soil, micro-organisms, plants, animals. This makes it easier to understand.", Bioto.



08. Perspective taking

"For nature, there is no difference between the city and the surrounding area", ecologist. Humans create artificial borders that work for them however, that doesn't mean they are recognized by all species. A bee doesn't care about the borders of a neighbourhood or garden, a hedgehog might care because of the fences around a garden. It must be recognized that areas are differently defined for every species. When looking at the city instead, we can look at the city from an ecosystem perspective, for example; subterranean freshwater, grasslands, subterranean and terrestrial ecosystems. This can give insights for the preferred environments such as cracks in the walls for bats, that are similar to subterranean areas.



09. Managing space for nature

"Because the trees are given little space, they have not been growing for 30 years", ecologist "A raised path gives nature and especially water more space", Bioto. Nature needs more space to flourish in the city. This 'ecosystem perspective' could help with this.

10. Co-living with trash

Trash can kill animals, however, some animals use trash to build nests or eat from. This can feed them but often sickens them "ah yes, ***there are always dead birds in the neighbourhood"***, resident.

11. The lack of biodiversity

Lack of biodiversity was easily recognized by the urban ecologist ***"I see a lot of grass, but mainly a lack of shrubs"***. The green environments in Oud-Mathenesse are mainly patches of grass and some trees in the streets. Greenery is needed on different levels of height to foster a liveable environment for a diverse set of animals.

12. The loudest ones are heard

"The loudest shouters gets most attention. That's just how it is", local resident. Some people however do not feel in the right position to speak up "But the migrant workers don't dare to speak up.", local resident." And additionally, nature is not able to speak "But you really need to give nature a voice or find a way to weigh it equally", ecologist.

13: Nature shapes its environment, for the good and the bad.

"Thorny bushes are ideal for collecting trash" ecologist, while making it difficult to clean it up for humans. Some trees and bushes also block views causing unsafe situations for bikers or pedestrians who don't have an overview anymore, or people hiding in bushes which decreases safety for residents.

Environmental context

14. There's a fight for space

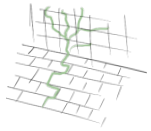
Even underneath the ground "It's a technical story too, because ***the ground is already completely full***. There are a lot of calls for more trees in the city but it's not about space above ground but underground. It's a huge mess there, we have all our facilities hidden away.", policy maker & ecologist. The scarce space must be shared with the different species. "You have to compromise more to live together here than in a forest, there you can leave e.g. rotten trees but in a city, it is not safe". But whose needs are put first?

15. Consequences of climate change

Such as water and heat stress are affecting the city. "This neighbourhood is a well", ***"My basement is flooding these days. And that's going to smell you know."***, resident. Flooding and heat stress are felt by residents. While the ground is slowly lowering, the sewage system has to be replaced to prevent the dirty waters from entering the streets. This is an opportunity for the municipality to make changes to the infrastructure of the streets.

16. Pollution

The canals were polluted last summer, causing animals to die. It was forbidden to touch animals as people could get sick as well. The ***warning signs are still marking the canal***, as a dangerous welcome sign. A report on soil quality of Oud-Mathenesse stated "especially gardens are diffusely contaminated with coal ash. Additionally, in some areas of public green spaces, (sometimes severely) contaminated rubble/coal ash-containing soil has been found. The quality of the topsoil is estimated to be in the industrial quality class. It is expected that the subsoil is less contaminated than the topsoil, thus it is estimated to be in the residential quality class." (Stadsontwikkeling Gemeente Rotterdam, 2022) It indicates a polluted environment.

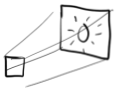


17. Unused spaces

'Unused' is not as straightforward as it might sound. Leftover spaces can be heaven to nature, enabling for biodiverse surroundings. However, currently, streets are all paved, leaving more than enough room to walk or bike but excluding nature. Patches of grass are not in use by people neither enabling a rich biodiversity. These singular patches of green are low in maintenance but also not in use, neither by people nor by biodiverse nature. However, they are good for the overview of the neighbourhood.

18. Public or private space matters

Whether nature is located in a public or private area has an effect on the experience for people in terms of ownership and level of comfort. “At home, you have a bit more control over your space. When you’re outside in a park you get accosted quite often.” ***“My husband has severe PTSD; he doesn’t just go out on the street.”*** However, most residents of Oud-Mathenesse do not own their own gardens.



19. Human’s attitudes towards nature changes

The mindset about how to live with nature is constantly changing. Current future visions reflect a desire for more nature in our cities. “I hope we get a complete ecosystem within the city, a better balance. But then we need less traffic, better connections and a different attitude towards nature”, Forest ranger in Museum of nature history. In professions with nature like forest rangers, we also see the attitude towards nature changed; ***“now we have more ‘nature-responsive management’ instead of nature conservation.”***

20. Shops are disappearing

The number of shops in the main shopping street decreased over the years. ***“It has been reduced to Polish supermarkets, liquor stores, and other supermarkets.”,*** resident “The only neighbourhood shopping street in Oud Mathenesse and Witte Dorp, Franselaan is facing a limited, increasingly one-sided offer, low appeal, a weak merchants association, deferred maintenance in private real estate, and fewer customers from the neighbourhood.”, the municipality of Rotterdam.

21. New residential area

On the other side of the dyke, the M4H will change completely, from harbour to a residential area. The area is focused on living with nature, for which they are planning to connect the green areas with Oud-Mathenesse. For shopping, residents of M4H will need to visit Oud-Mathenesse, which could give an impulse to the stores in Oud-Mathenesse. These plans will be executed between 2024-2030.

3.4 Shareable insights

These insights were illustrated in the shape of a card deck, to better distribute the gathered insights with for example the Neighbourhood as a Biotope project and municipalities (Figure 24). It is a methodology more often used in design to enhance the accessibility of qualitative research findings (Van Raaij, 2020).The cards present the insights as opportunity (green) or tension (pink) (appendix B). A sub-title explains the insight and quotations give further meaning to the topic.

Figure 24. Two examples of ‘insight cards’. The red versions depicts the tensions and the turquoise opportunities

3.5 Key conclusions

This research initially focused on symbiotic relationships between human residents, urban nature and the environmental context. It was found that symbiotic interactions happen, birds warming themselves to the warmth of houses, eating insects and singing songs in return. However, the petrified surroundings provide limited opportunities for urban nature to thrive, presenting very limited biodiversity and thereby limiting possibilities for symbiotic interactions.

Themes were identified presenting opportunities to take and tensions to reduce for increasing biodiversity (Figure 25). Key insights included the impact of biodiversity on social cohesion, the challenges and benefits of a multicultural community, and the importance of engaging residents in initiatives. The findings also highlighted the relationship between humans and urban nature, such as the visible and invisible aspects of biodiversity and the need for managing space to support nature. Additionally, the environmental context, including issues of space competition, climate change, and pollution, was critically examined. These insights were encapsulated in a card deck format to facilitate dissemination and practical application by stakeholders like the Neighbourhood as a Biotope project and municipal bodies. This approach aimed to enhance the accessibility and utility of qualitative research findings, promoting informed decision-making. A wide variety of insights were gathered, however, for the continuation of the project, further focus was needed.

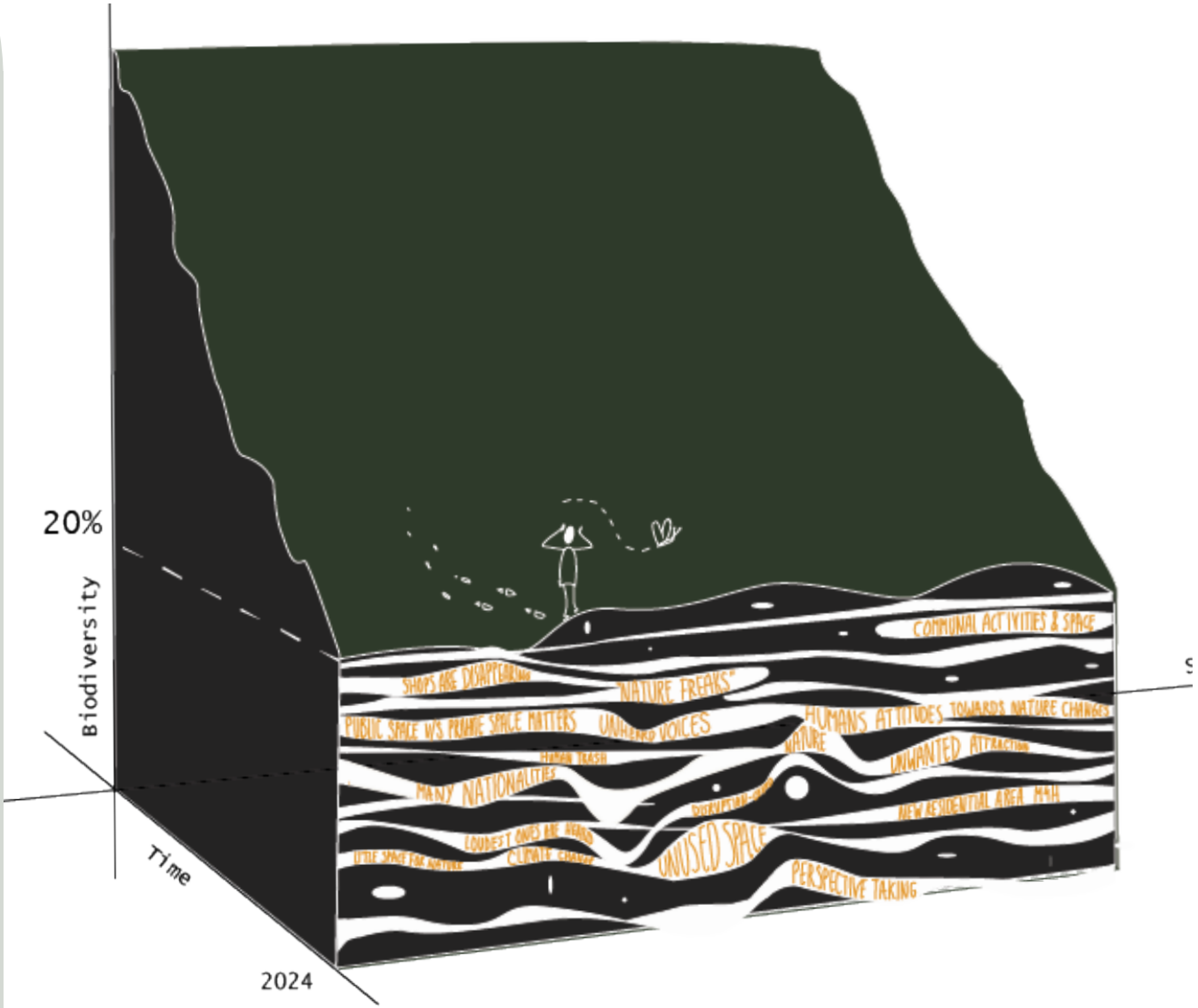


Figure 25. A cross-section depicting current problems and opportunities regarding biodiversity. Only 20% of the original biodiversity has remained.

3.6 Scope |

The loudest ones are heard

While the holistic approach provided a wide range of opportunites and tensions to design for, further focus is needed. For this converging step three types of qualifications helped to determine the focus of the project; specificity (insights that weren't too broad and neither too specific), contextual relevance (relevant to the specific context of the Midscheeps) and future relevance (could be under pressure in the coming years).

The three chosen insights 'Invisible nature', 'Effects on social cohesion' and 'The loudest ones are heard' were related and matched the requirements of the three qualifications mentioned above. These insights were interconnected and influenced each other. A higher degree of social cohesion could positively influence the problems of unseen nature by organising gardening groups where people get to know each other and their neighbourhood better. This also positively influences the 'loudest ones are heard' as residents get along. 'The loudest ones are heard' and 'invisible nature' negatively influence each other, increasing these problems. Thus the final design should increase social cohesion, provide equal opportunities to be heard and make invisible nature appear.

These three themes appeared to be important for the establishment of symbiotic relationships, which consisted of noticing and being response-able. As noticing is a first step, the invisible nature is essential to be highlighted. 'Effects on social cohesion' is more focused on human-human relations and appeared to be important in conveying residents to take action in Oud-Mathenesse. 'The loudest ones are heard' is touching upon both themes, relating to both human and non-human relationships while recognizing a system that doesn't allow all actors to be heard.

"There is an overarching topic of connectedness, being neighbours where we see, hear and act upon each other."

The other 18 insights are not forgotten about but will rather fuel the inspiration during the next design phases. Alternatively they could also help other designers and researchers to recognize important themes within the topic of biodiverse cities.

A glimpse of the shared gardens in the Midscheeps

04 | How did we arrive here?

Alienation between species

The following three chapters are a travel through time. Chapter 04 dives into socialecological structures from the past, chapter 05 explores symbtiotic futures and chapter 06 combines these insights with the role design could play. These chapters helped to identify which designs are desirable at a certain point of time and what their effects could be on human-nature interactions.

Sub-question 3. How did these relations between human residents, urban nature and environmental context change in the past and what can we learn from them?

In light of 'the loudest ones are heard', a better understanding of underlying socialecological structures were explored by analyzing the past through stories from residents and the changing landscape. Historical analysis revealed that human-nature connections are shaped by individuals' previous experiences with nature, including childhood memories, dependency on nature, and cultural upbringing. Furthermore, the sense of ownership over the environment was found to impact the quantity and types of interactions between humans and nature, thereby affecting their relationships. The perception of the landscape as a 'no-man's land' facilitated the thriving of various species, whereas newly controlled environments did not encourage spontaneous interactions. This separation between species has resulted in a mutual alienation. Counterwise, bringing back connections as neighbours requires a space in which all species feel welcome and experience a feeling of belonging. 'Neighbours' is used to address both the human residents as well as urban nature, a word opposite to alienation. This is used as a first step to address the problem of the unheard voices.

4.1 Introduction

By examining the past in the context of Oud-Mathenesse, a better understanding was created of how human-nature interactions have evolved in response to different perspectives on nature and environmental changes (Figure 26). This provided valuable insights for the consideration of critical social and environmental factors, as well as identifying potential opportunities for the final design to leverage and further develop.

Focusing on how alienated relationships between human and non-human species have intensified through history, helped to understand why emphasising multispecies entanglements is crucial and proposes practical steps towards building better human-nonhuman relationships (Büscher, 2021). More specifically, human's views on nature and a constantly changing landscape architecture were examinated as they are are indirect drivers for our connectedness and behavioural changes with nature (Kim et al., 2023)(Riechers et al., 2020) (Büscher, 2021) (Soga & Gaston, 2016).

This was done through a collection of stories from former residents, interviews and analyzing the changing environment with trends and movements present in the urban designs. The integration of historical documentation, expert interviews, and urban planning research provided a better understanding of the area's evolution and the underlying structures guiding its development.

4.2 Approaches

The objective of the historical research was not to chart the entire history of Oud-Mathenesse but rather to offer insights into past lives and identify socio-ecological structures that shaped human-nature relationships.
Frameworks for researching socialecological structures include social, ecogological and economic factors (Petrosillo et al., 2015). Therefore, these three elements were taken into account when collecting data from the history of Oud-Mathenesse, although the research on economic factors were limited. Historical research could go back decades or even hundreds of years, this research starts from the year 1930 for which data was available. A variety of methods was used to research the past, as they provided different perspectives for different actors (Figure 27).

Stories from Oud-Mathenesse

A precious discovery was the book Oud-Mathenesse (De Put) curated by Elly-Visser Smit, a resident of Oud-Mathenesse until 1967. Through this work, she endeavoured to preserve the history of the area by collecting stories and photographs from other residents. The book chronicles the transformation of the neighbourhood from before the construction of Midscheeps to the present day. The book provides not only the objective transformation of the neighbourhood, but also the subjective perspectives of its residents.
An additional interview was conducted to gain a deeper understanding of the writers personal experience having lived in Oud-mathenesse. The transformations and finding were collected and are discussed in the following subchapter.

Changing landscapes

Landscapes can influence social and ecological structures and are often influenced by social, ecological and economical structures. How the changing landscapes have influenced such structures was researched through analyzing the types of buildings from the dominant architecture movements in the post-war era.

Through analyzing photographs, reading related papers and asking experts' opinions, a better understanding of its design choices was created.

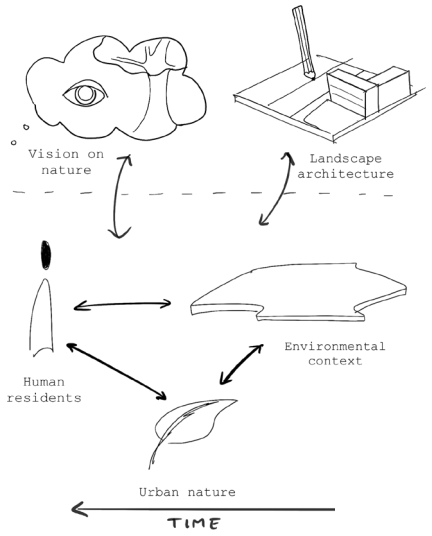


Figure 26. Three actors influenced by dominant visions on nature and architecture design

4.2 A collection of stories

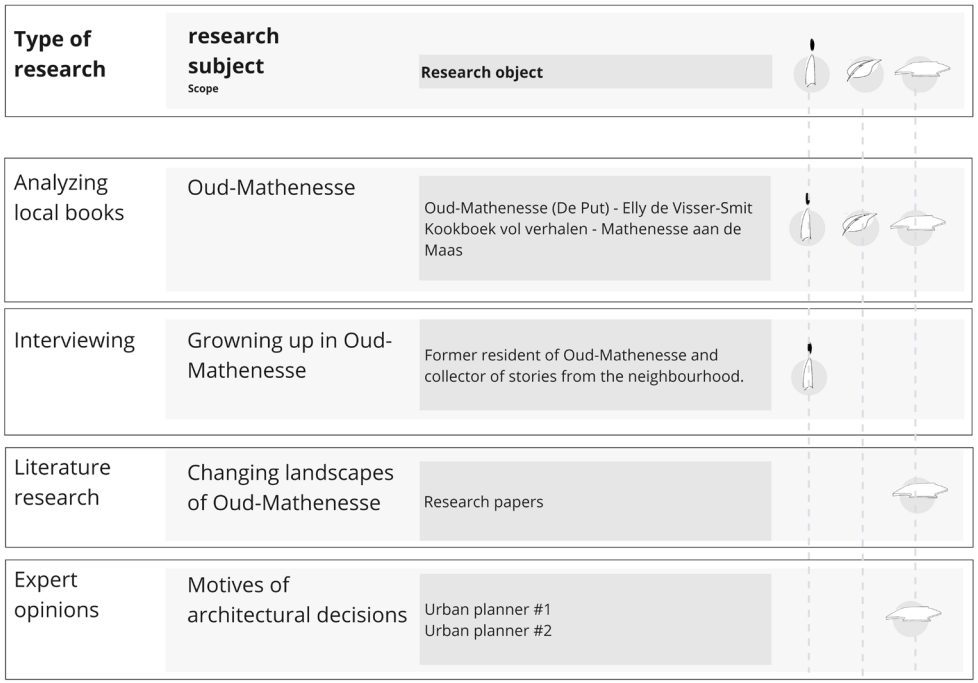


Figure 27. Research activities for historical research about Oud-Mathenesse

A peek into the residents' experiences of the neighbourhood was shared below, divided in three important themes; the development of the area from rural to urban, activities in the community and social seperation.

Origins and Development

The neighbourhoods Witte Dorp - Landenbuurt & Schepenbuurt did not yet exist; this was a rural area. After the baby boom partly due to WWII, and the loss of housing due to the bombing Rotterdam encountered in this war, there was a great need for housing and schools. Many rural areas were converted into residential neighbourhoods to accommodate the growing population after the war such as het Witte dorp ('White village', referring to the colour of houses). In the 1950s and 1960s, nature in the neighbourhood was a place for recreation, such as camping, cycling, and admiring flowers (Smit, 2022) (Figure 28 & 29).

Figure 28. Open spaces provide for reacreation in 1955 (Smit, 2023)

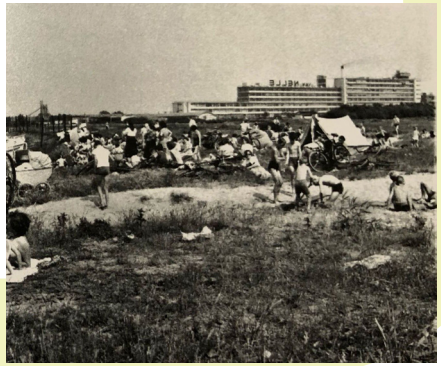


Figure 29. Recreation in nature (Smit, 2023)

Figure 30. Opening petting zoo in 1973 (Smit, 2023)

Figure 31. Tree planting day in 1969 (Smit, 2023)

Changes in Activities and Community

In the 1970s, more activities were organized in the neighbourhood (Figure 30 & 31). Organised clubs and associations emerged, initiated by residents themeselves, where others could join. Also the municipality started a tree planting day in which residents would help. Oud-Mathenesse originally belonged to Schiedam but later became part of Rotterdam. Despite this administrative change, the residents never felt fully recognized by Rotterdam.

Pillarization and Community Spirit

An important theme in the neighbourhood's history was pillarization, which caused a clear division between different groups of residents. There were different schools and children were not allowed play with kids from other churches. A constant factor in the neighbourhood is the 'Witte Dorp' which formed a close community. People would sit in front of their houses and drink cups of tea with their neighbours. These residents were deeply rooted there, and preserving this neighbourhood is essential to them (Figure 32).

Figure 32. Celebrating the 50th anniversity of the 'Witte dorp' in 1974 (Smit, 2023)

Figure 33. The unfinished canal was an ideal place for children to play 1936 (Smit, 2023)

Current Challenges and Future Vision

One of the current challenges is segregation, something that was caused by pillarization in the past and now by the multicultural society. Each new construction project in the past was labelled with the class of the future residents. This led to a clear social separation, ***"Wij komen uit de karbonade buurt en jij uit de speklapjes buurt"***, emphasising the differences between social classes (Figure 33).

Figure 33. Development of Oud-Mathenesse. Houses classified for certain social classess (Smit, 2023)

„De put" zit niet in de put

Oud-Mathenesse: Eén van die wijken waar je practisch nooit doorkomt, als je er niet bepaald te maken hebt. Over de Rotterdamse dijk gieren de volgeladen trams en duizenden passagiers zien de huizen van „de put" minstens tweemaal per dag. En toch, hoe weinigen zijn wel eens in die „put" afgedaald. Want Oud-Mathenesse is als een tussenstation aan de grote spoorlijn, waar slechts zo nu en dan een trein stopt.

Deze vergelijking is niet overdreven, dat ondervinden de putbewoners bijna dagelijks, wanneer ze tijdens de spitsuren op de tram staan te wachten. Zowel lijn 4 als lijn 8 lopen bij het beginpunt al vol en de drie halten tussen Koemarkt en Marconiplein bestaan dan eenvoudig niet voor den trambestuurder. Dit en andere kleine ongemakken brengen met zich, dat het saamhorigheidsgevoel in Oud-Mathenesse sterk is ontwikkeld. Evenals in andere geïsoleerd liggende stadgedeelten, zoals bijv. Katendrecht, legt men zich toe op wijkvorming. Gedurende de oorlog heeft Oud-Mathenesse meer dan eens de angstwekkende nabijheid van het havengebied gevoeld en de wijk kreeg menige luchtaanval te verduren. Het gemeenschappelijk doorstane leed heeft de bewoners van de put echter dicht tot elkaar gebracht en zo ontstond de amusements- en ontwikkelingsvereniging D.B.O. Na de bevrijding kon de propaganda hiervoor openlijk worden bedreven en sedert dien groeit het ledental met de dag. Het bestuur koestert grootse plannen op schier elk gebied: ontwikkelingscursussen, huisvlijt, sport, enfin, teveel om allemaal op te noemen. Ook de kinderen heeft men niet vergeten en er bestaan reeds plannen voor uitzending naar een mooi vacantieoord tijdens de zomermaanden. Indien men over voldoende zaalruimte beschikt, zullen de leden in het komende winterseizoen menig gezellig avondje beleven. Op 25 September krijgen ze tenminste in Odeon al een uitstekend programma voorgezet, waar een keur van artisten aan medewerkt. Ja, de mensen van Oud-Mathenesse zijn putbewoners, inderdaad, maar „in de put zitten".... dat doen ze beslist niet!

21a. *Leuk berichtje uit het Vrije Volk van 11 september 1946*

4.3 Dominant visions in landscape architecture

The landscape of the Midscheeps has been changing (Figure 34). Research about the history of Oud-Mathenesse showed how the landscape transformed from rural area (Wijkprofiel Rotterdam, n.d.) to post-war gallery flats. These flats were inspired by the brutalistic movement, early inspired by Le Corbusier. Later, this movement received a lot of criticism for not providing social space (Richards, 2007). This movement relied on expert knowledge and top-down methods (Miles, 2021) and did not work out as planned. Causing more separation between humans and humans and nature. The then unused garden changed from a public area to more a private space by adding shrubs and fences around the garden to improve the feeling of ownership. The then later future visions of landscapes depict a more dominant role for nature that merges with human property. The inserted plant species are high-maintenance which means that more time and care for greenery in the garden should be expected. The level of ownership seems to change during the years from public to private to commoning. Pictures from the Midscheeps area have been traced to show how the landscape has changed over the years in a consistent way (see figure 34, Appendix C for the original pictures).

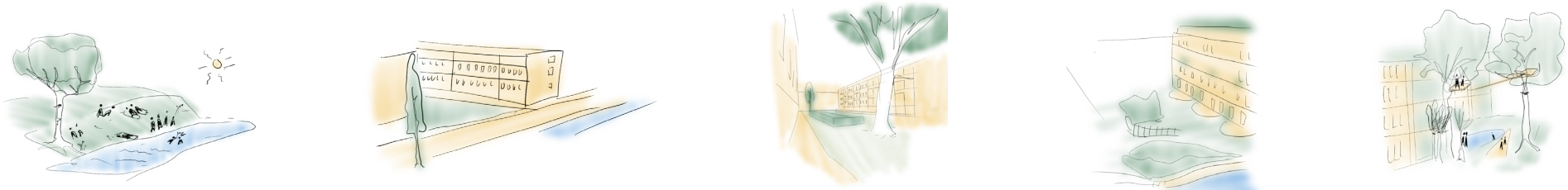


Figure 34. Sketches of traced images showeing the development of the environment

4.4 Key Conclusions

Combining this historical documentation with expert interviews and urban planning research enriches our understanding of Oud-Mathenesse's development. The area's history highlights themes of pillarization and community evolution, emphasising the need from residents to preserve deeply rooted communities like the Witte Dorp. Current and future challenges include addressing segregation and integrating nature with human property in urban planning. While this historical data showed an insight into the changing landscapes and past lives in Oud-Mathenesse, only in light of today's challenges we can understand the impact of its events. Therefore, its implications in today's challenges are becoming more clear in chapter 6.

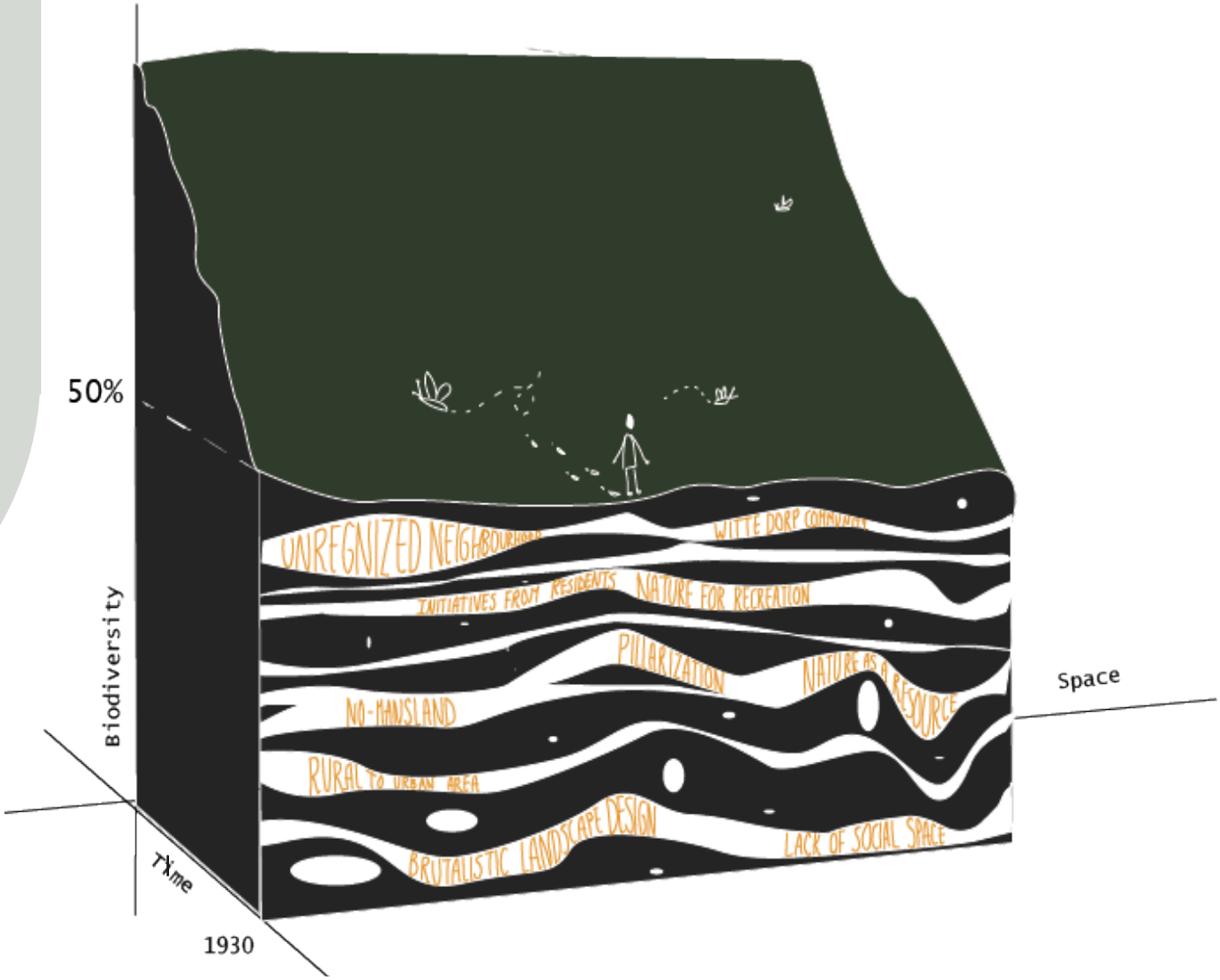


Figure 35. A cross-section depicting problems and opportunities regarding biodiversity in the past

05. Get inspired from envisioned symbiotic futures

Towards a sense of community

Sub-question 4. Which 'new' relations between human residents and urban nature could serve as inspiration for symbiotic futures?

A futuring approach offered valuable insights into potential symbiotic futures. By analyzing various future visions and integrating these into a strategic roadmap tailored specifically for Oud-Mathenesse, it was determined that social fragmentation should be actively avoided. Instead, fostering a sense of community is essential. Bridging the gap between the human and natural worlds—by inviting animals into human spaces and encouraging humans to engage with the natural environment—emerges as a viable strategy to overcome this separation.

Initially, the notion of reconciling human and natural environments may evoke a sense of returning to the past, before the construction of Midscheeps. However, the growing population and evolving technologies challenge the feasibility of simply reverting to past practices. Integrating non-human entities into contemporary contexts necessitates not only reimagining physical spaces but also incorporating them into modern frameworks, such as social media platforms and democratic systems.

5.1 Introduction

Futuring breaks free from everyday practices and provides a place for imagining alternative solutions. It served as a source of inspiration and direction towards possible (more) symbiotic futures.

The analysis of different future visions gave insight into possible future cities and its architecture. Accordingly, for imagining a far future, the Solarpunk movement was used as a source of inspiration from which underlying paradigm shifts were derived. For each paradigm shift an example case was illustrated presenting a more tangible direction towards possible symbiotic futures. Results from a futuring workshop presented insights into tangible solutions for possible future interactions and themes that students evisioned to be important to address for these futures.

5.2 Approach

Exploring future contexts provides an opportunity to investigate alternative possibilities and offers a vision of hope. To achieve this, multiple future scenarios were analyzed and compared. Two futuring workshops, conducted with students, were instrumental in designing alternative symbiotic interactions within the garden (see Figure 36). These workshops facilitated the generation of innovative concepts for integrating human and non-human elements in future environments.

Type of research	**research subject**	**Research object**
Analysis Future Visions	Literature and Visions for nature-inclusive cities in the Netherlands	-A nature-inclusive Netherlands in 2120 - WuR -The symbiotic city - Marian Stuivers, WuR -National parc Rotterdam - WuR -Future of neighbourhoods in Rotterdam - Witteveen + Bos -Future of Oud-Mathenesse - Felix Architects -Future vision Midscheeps - Bioto
Workshops	Future of human-nature interactions in the garden	2 futuring workshops - with 10 students from Industrial Design Engineering
Analyze movements	Solarpunk movement	Solarpunk manifesto Artistic creations Research papers

Figure 36. Main research activities for researching futures

5.2 Future visions

As cities face growing environmental and social challenges, envisioning the future role of nature in urban spaces is crucial. Taking a leap into futures contexts enables us to explore alternatives and offer a window of hope. This analysis explored six future visions of urban nature, ranging from broad national goals to specific local projects, to understand how cities might integrate green spaces and ecological practices.

These speculative visions often reflect optimism and propose actionable solutions for creating healthier, greener cities. A key theme is the alignment with the Solarpunk movement, which combines ecological balance and social justice. This highlights how these visions and Solarpunk principles can inspire and guide current urban planning efforts towards more sustainable and thus biodiverse futures.

Analysis futures visions

Future visions are created to give people a window of hope and perspectives. Six future visions (Figure 37 & 38) about 'nature in cities' were selected, varying from a far future on a national scale to near future at the local scale of the Midscheeps. This selection was analysed to get a more complete view of possible futures and to be able to compare visions, as future visions are always speculative and thus subjective. For each vision, the most important pillars were determined and compared (Appendix D & E). The general conclusions drawn from the analysis are as follows:

Positive and hopeful worldview

Despite the prevalence of dystopian scenarios in science fiction, future visions articulated by architects and researchers often project an optimistic outlook, characterized by healthy and verdant environments.

Timeframe and scope

Shorter-term future visions tend to offer more concrete solutions and have a narrower scope compared to long-term projections.

Integration of humans and nature

There is a recognized need for urban spaces where humans and nature coexist, with an emphasis on increasing the prominence of green areas.

Rise in communal activities

Future scenarios indicate a growing emphasis on communal activities and shared spaces.

Paradigm shift towards ecocentrism

There is a discernible shift towards ecocentric values, prioritizing ecological considerations in urban planning and development.

Omission of friction

Current future visions often overlook the potential conflicts that may arise from expanding natural spaces within urban environments.

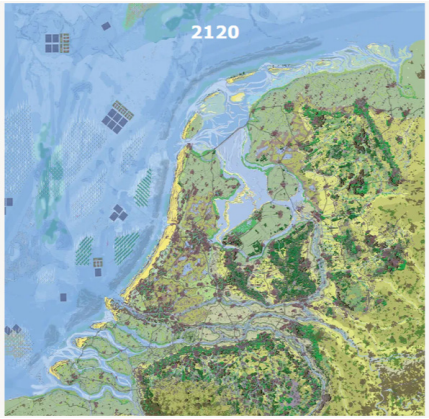


Figure 37. Future vision for 2120 from Wageningen University (Baptist et al., 2019)

Figure 38. Future vision in the Museum of Nature's History Rotterdam (Witteveeen + Bos, 2022)

Emergence of Solarpunk Visions

Extrapolating from the examined future visions, Solarpunk-like scenarios appear as a likely prospect. The Solarpunk movement envisions a just future where social inequality is eradicated, nature flourishes, and renewable energy becomes the norm, resulting in clean, healthy, and ecocentric cities.

Futures visions as a means of inspiration and hope

The analysis of the six future visions showed that there is more high-maintenance and wild green interwoven in the even more densely populated cities (Figure 38). The increase of nature's presence could be a response to the effects of climate change such as heat stress and biodiversity losses. There seems to be a need to collaborate with nature differently. These visions depict clean, healthy cities with nature at the basis, giving an optimistic impression. Extrapolating these future visions, similarities with Solarpunk-like visions emerge. Similar characteristics such as a positive mindset, actionable, green, high tech and communal solutions can be seen. This movement will be analysed further to explore a deeper value on which it is based upon through which we can examine our current relationship with technology, nature and humans.

Solarpunk idealogy, a means of inspiration and reflection

Although the six future visions provided a comprehensive perspective on architectural innovations and energy transitions, they occasionally lacked considerations of more radical and systemic social changes. Solarpunk, as an art movement that imagines possible futures, combining art nouveau-inspired aesthetics with green technology and social justice themes (Figure 39 & 40), advances this one step further. While solarpunk has inspired real-world environmental movements and sustainable design practices (Futurespore, 2023).

"Sustainable futures of Solarpunk genres offer more than just entertainment; they provide a lens through which we can examine our relationship with technology, nature, and each other.", Lavigne (2024).

Dark Matters (a futures design agency) has put Solarpunk thinking in practice by imagining alternative relationships we can have within a neighbourhood (Richard, 2023). Currently, one of the main problems preventing the garden from improving its biodiversity is the current power system. In the context of the shared garden, it is the homeowners association that decides about what is going to happen with the garden. However, current home owners that subrent their houses have little interest in improving their properties *"if it isn't for monetary value, they receive little incentive for caring"*, Bioto. There are underlying, structural, problem preventing the garden from becoming more biodiverse. Bekker et al. (2023) from Dark Matters said "these structural constraints in our economies and societies are now locking us in. We are facing multiple, interconnected crises of the climate, ecosystem, economic inequality, and democracy. These crises are not a crisis of the world, but of our relationship with the world, and how we understand ourselves". Three paradigm shifts show how we could break down these structural problems.

Conceptualising the underlying Paradigm shifts

Towards an entangled system that 1. acknowledges actors (giving agency), 2. dependencies (symbiosis) and 3. deep democracy (eco-social justice).

We need a relational worldview that sees our lives, our cities, our societies, as complex organisms comprising socio-ecological systems and webs of relationships (Engle 2022). We need to redesign our infrastructures so that they centre this complex entanglement and enable all beings — be they humans, future humans, and more-than-humans — to individually and collectively thrive (Dark matters).

From objects to agents finds its foundation in the theory of Bruno Latour, where objects have agents as well as humans. In this thesis already the recognition of nature and the environment were recognized as actors, however, yet not given the same right. This invites non-humans to have agency as well, including nature. The second paradigm shift is towards entanglements, where relations between actors are seen as value exchanges. My

graduation is focused on symbiosis, touching upon positive value exchanges, which can be ecological, material, cultural, emotional value, etc. Thirdly, private/public space is changed towards commoning, inviting for deep democracy. Dark Matters has created three concept ideas that materialise these three paradigm shifts. The first one is *Free the river.* In the free the river project, the river has been given agency and allows communication in different ways. Second *Towards entanglements*, what if we would see value not in terms of money, property, but in the value we gather from relations? Thirdly; *Permissioning the City*, creating a system in which actors constantly communicate their potentials and through micro voting presents available options of use for everyone.

By portraying three paradigm shifts towards agents, entanglements, and commoning Dark Matters managed to visualise how these shifts could affect our current economic system. These three paradigm shifts are explorations on a deeper level on the topic of symbiotic human-nature encounters. Adding these three concepts to the roadmap shows a flag on the horizon, giving inspiration for a systemic change in light of Solarpunk thinking.

Figure 39. Artist impression of a Solarpunk future vision (Perlstein, n.d.)

Figure 40. Depiction of a Solarpunk future vision (Pethokoukis, 2023)

5.3 Futuring workshop

Alternative interactions between humans and nature were explored in two creative sessions with students. These creative sessions used different methods, however, they both went through the phase of problem definition, problem finding and solution finding. This resulted in many many ideas (Figure 41) of which four were chosen and presented for the given context of the Midscheeps.

Methods

The sessions aimed to achieve two primary objectives: first, to explore alternative ways of facilitating interactions between humans and nature within the shared gardens of Midscheeps, and second, to analyze how students, previously unfamiliar with more-than-human design, integrated the inclusion of non-human entities into their design process. Both the design outcomes and the process itself were closely observed.

To facilitate this, two design students participating in a ‘creative facilitation’ course were briefed and tasked with leading a two-hour creative session. The session involved brainstorming solutions for the research question: How can residents and nature engage in symbiotic encounters within the shared garden in the future? A key requirement was the inclusion of non-human stakeholders in the design process.

Results & analysis session one

During the initial brainstorming phase, several themes emerged, including opposites, safety and the feeling of being at home, success metrics, architecture, animal perspectives for comfort, hierarchy, and the concept of giving nature a voice. Among these, “hierarchy” and “giving nature a voice” were identified as central themes, as students believed these directly addressed the core issue of the human-nature disconnect and sparked significant interest. Following an exercise that encouraged students to adopt the perspectives of other species, they generated two key ideas.

The first idea, “Greenstagram,” proposes a social media platform that integrates both human and non-human participants. This platform would translate sensory data from the garden into communicable needs and vibes, thereby fostering greater awareness and interaction. The second idea is an application designed to advise residents on how to “create your own oasis of nature,” aiming to connect and inspire users to engage more deeply with their natural surroundings.

What resonated with me is the way hierarchy was tackled within the group. They thought about how to challenge hierarchy with democracy. Thinking about elements like voting, communication, and representation. This was not fully covered in the two ideas, however, these ideas had to be worked out in less than five minutes. While the range of ideas showed different aspects of a democracy like 'a democratic party representing nature', 'voting', 'language helmet meeting', the presented ideas showed a first step; communicating needs. Greenstagram posts updates and nature's needs in a way that is understandable for humans. Call your nature puts humans as being a part of nature by using the word your, which is a perspective shift. This approach represents a shift in perspective, underscoring how human actions can influence the natural world.

Takeaways

The themes of “hierarchy” and “giving nature a voice” were identified as fundamental to addressing the core issue at hand. These themes led students to adopt democracy as a conceptual framework for exploring potential solutions. Effective communication was recognized as an essential precursor to enabling democratic processes.

The integration of human and non-human worlds was conceptualized through innovative approaches, such as incorporating nature into social media platforms (as exemplified by “Greenstagram”) and embedding humans more deeply within natural environments (as in the “Your Nature” initiative). These ideas reflect an effort to bridge the divide between humans and nature through reciprocal engagement and shared spaces.

Results & analysis session two

In the second session, the problem statement was simplified to ensure clarity; “symbiotic encounters” was translated into the more accessible concept of “win-win exchanges.” The ideas

generated during this session were more utilitarian in nature. Each participant assumed the role of an animal species, and after a walk in the woods, they were asked to bring two items from outside to the session. The dark forest environment, which limited their visual sense, heightened reliance on other senses—more dominant in other animals—thereby enhancing the role-playing experience and fostering greater empathy with their chosen species.

This experience inspired the generation of ideas centered around themes such as providing shelter, a place to relax, and food sources. When the participants resumed their human roles, the ideas naturally began to incorporate social aspects. Two concepts were presented: the "Mush Room" and the "Bee & Bee," both offering shelter for humans and non-humans to coexist and interact.

During the brainstorming phase, an international student remarked on the frequent rain in the Netherlands, highlighting the need for shelter. This insight, along with the diverse perspectives from Dutch and non-Dutch students, shaped the ideas around shelters. The Mush Room was envisioned as a place for social gatherings over coffee, with the added benefit of using coffee grounds to grow mushrooms, thus providing sustenance for both humans and nature. Interestingly, while social gatherings are typically associated with conversation and activity, the students imagined the Mush Room as a silent meeting place. The Bee & Bee hotel was conceived as an inclusive shelter designed to accommodate various species, emphasizing the multipurpose nature of such spaces. However, this raised questions about which animals should be attracted to these shelters and which should not.

Takeaways

Having participants from diverse backgrounds enriches the range of insights generated. Furthermore, it was observed that individuals may seek silence rather than social interaction in their garden or shelter. Additionally, shelters can be designed to accommodate multiple species simultaneously.

Conclusion

Alternative interactions were examined among students through the lens of symbiotic encounters, focusing on two primary themes: 'hierarchy/democracy' and 'shelter.' The theme of democracy was explored in a more philosophical context, addressing issues of hierarchy and inclusion, such as voting, representation, communication, and identifying the needs of various actors. The concept of shelter was centered on creating multipurpose spaces that cater not only to humans but also to animals and plants.

In both themes, the conscious integration of human and non-human worlds was emphasized. This integration was conceptualized through initiatives like the app Greenstagram, which introduces nature into the human domain via social media, as well as mixed-reality approaches like 'Create Your Nature,' and projects like the Mushroom and the Bee & Bee hotel, which bring humans into natural spaces.

To address the question of how citizens and nature could interact in Oud-Mathenesse, it is essential for both humans and nature to engage with each other's worlds. The human world is defined by elements such as gardens, social media, and democratic systems, while nature is envisioned in the external environment, the garden in this case, with its various layers of life.

Inviting humans to the animal world and animal to the humans world

Figure 41. Brainstorming phase of the workshop

5.4 Key Conclusions

There's a visual layer of worlds that are merged, buildings are layered in green and in between green we see (playful) infrastructure for humans. The invisible part is the democratic layer behind it. How are these decisions made? Who made them? How do we better listen to each other? These questions are difficult to answer in merely visual future visions, it is the hidden social layers (Figure 41).

The examination of future visions, coupled with the lens of Solarpunk ideology, offers a hopeful perspective on shaping our cities towards cleaner, greener, and more equitable environments. Through envisioning alternative relationships within neighbourhoods and conceptualising paradigm shifts towards eco-social justice, the study highlights the potential for systemic change. By embracing symbiotic human-nature encounters and advocating for deep democracy, we can navigate towards a future where harmony between technology, nature, and society prevails, inspiring a positive transformation in our urban landscapes.

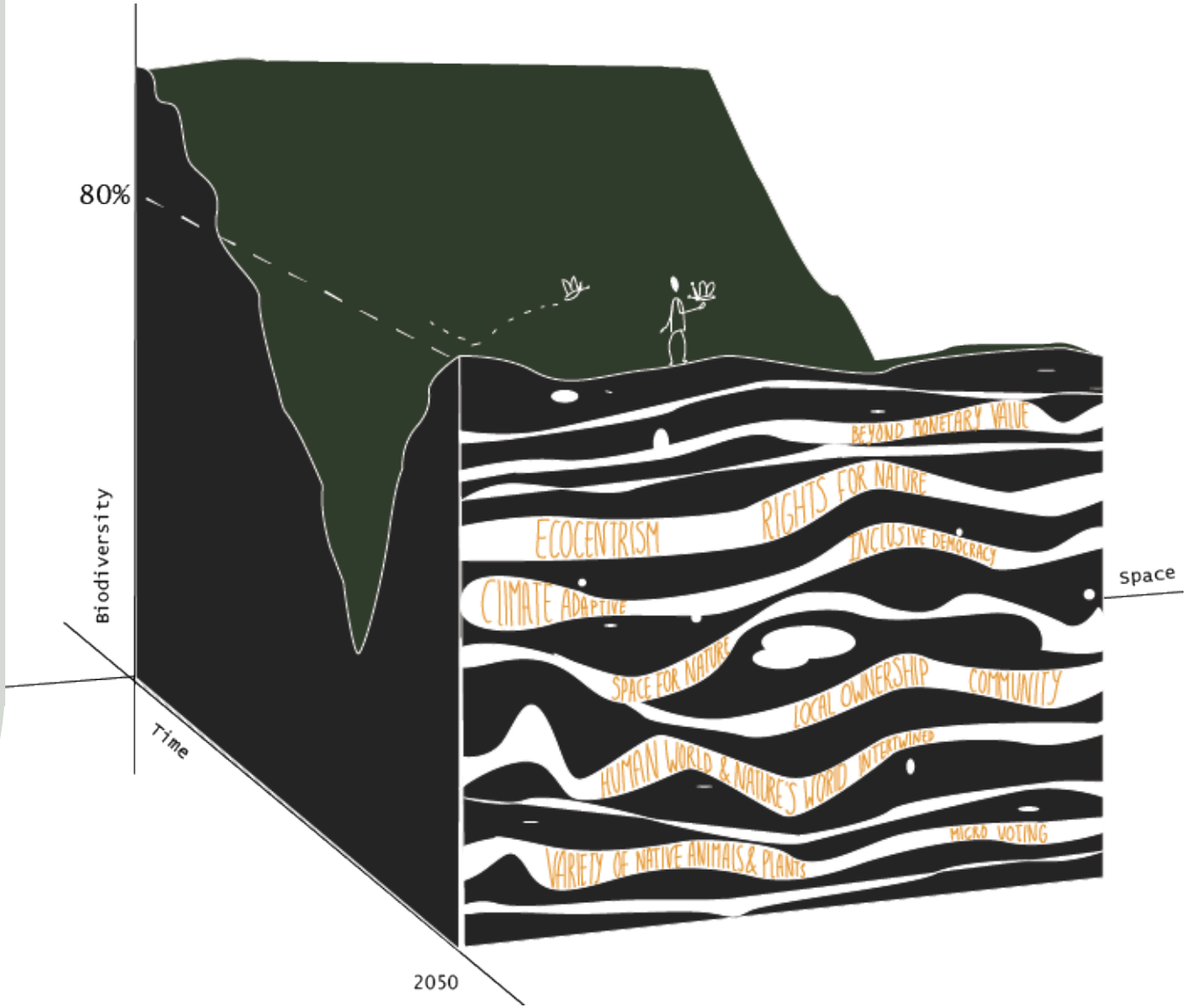


Figure 41. A cross-section depicting problems and opportunities regarding biodiversity for a possible future

06. Designs for different times

Designs for human-nature encounters

The perspective from the past, future and now are all combined in a roadmap. Even so, it combines top-down visions (landscape design, dominant visions on nature and the depiction of the changing landscapes) with bottom-up initiatives (a set of 100+ designed human-nature interventions).

Sub-question 6. What could be the role of a designer in fostering symbiotic interactions?

It was found through this analysis that the role of the government was increased and the role of the community decreased at first. While the whole community helped the municipality to plant trees in 1950, we cannot imagine that happenin now. People seemed to become more separated, almost estranged, from each other and nature. However, tides might turn as the dominant view on nature from ‘nature as a resource’ is moving towards ‘nature as participation’. Many design interventions are directed towards better participation and more equal relationships between humans and humans and nature. Designers have the ability to tap into this problem using their skills for creative ways of communication and translation. These skills could be used for reaching more inclusivity in participation. This participation This participation could happen on different levels; top-down by for example including an extra seat at the meeting table or bottom-up by e.g. designing for encounters between neighbours.

6.1 Introduction

A roadmap is a strategic tool that helps to define which steps to take to reach certain desired futures. Insights from research about the past and future of Oud-Mathenesse described earlier in this chapter were translated and incorporated in the roadmap. This particular roadmap shows how the landscape architecture of the Midscheeps and philosophical visions on nature are situated for its time and how this influenced human and non-human behaviour. Analysing these relations presents opportunities for designers on how symbiotic relationships are and can be fostered.

6.2 Framework

The framework of the roadmap was inspired by traditional roadmapping in strategic design (Simonse, 2018) in which time is depicted towards a future vision and steps in between that should be taken in order to reach such a future. The roadmap is used to understand how the past has shaped the present and how we could move towards an envisioned future. The roadmap includes underlying structures which came from the insights earlier in this research and design practices that could direct us towards symbiotic futures. These practices are applying to different layers, identified by Marianne Stuiver, who worked on imagining symbiotic cities. She used these layers (activities, network and foundation) to classify human-nature interventions (Figure 42). Because to enable sustainable change, we have to address both the foundation (e.g. soil), networks (e.g. vve's) and activities (e.g. gardening). The overall framework combines a more visionary view at the top part, interventions in the middle and underlying structures at the bottom. This way, vertical relations between the top-down visions and bottom-up interventions can be analysed as well as horizontal causal relations.

Dominant visions on our relation with nature

Visions on nature were inspired by Engle and Nowak (2024) who described the most dominant West European view on our relation with nature. Starting from 'terra nullius', to recognizing her as a resource, then as a property, where we see a shift now from participation to the allocation of rights and potentially nature as a self-sovereign agent. In this shift it could be argued that the rights of nature could be a transitional phase toward a more integrated, symbiotic approach. These different visions on nature over time show similarities with the visions in landscape architecture. These visions inherently shape the way we live, design and interact. The roadmap has been iterated upon many times to find the right balance between information and visibility (Appendix F).

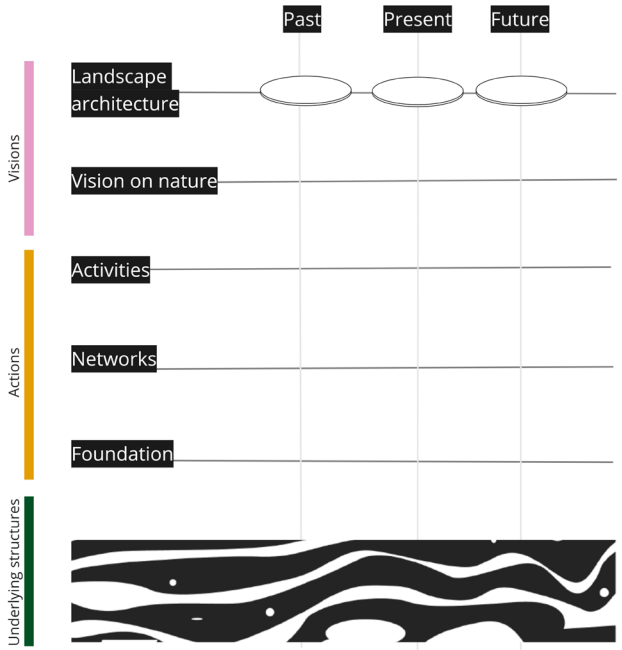


Figure 42. Framework for the roadmap

6.3 Design space

Interventions - on activities, networks & foundational levels

Symbiotic relationships can be found in different levels of our society. To understand these levels in which interactions between humans and nature exist, the following layers inspired by Marian Stuivers (2023) were adopted (Figure 42);

3. Everyday human practices such as constructing houses and roads, verge management, business activities, gardening and being together in the city.
2. Networks: socio-ecological, circular networks and institutional networks. For example homeowners associations, educational institutes, sewage systems that could be connected to the water system, or the municipality that includes the rights of nature in their decision-making. Relations between people, nature, infrastructure and technology in the city.
1. The foundation: layer of living & non-living matter. Including water, air, and soil quality. Fundamental requirements for humans and non-humans to live.

These different layers can reinforce each other; more attention to nature in municipality policies could increase human-nature activities locally as they are stimulated to do so. The quality of the soil influences the health of plants. Therefore, progress must be made on all these different levels, as ignoring one of these elements could interfere with progress on other levels.

Human-nature interventions

A diverse set of 100+ interventions regarding human-nature interactions and initiatives were placed onto the roadmap. This set of interventions was collected from prior research (from interviews, Natuurhistorisch Museum in Rotterdam, Ambassade van de Noordzee, research papers, a history book of Oud-Mathenesse, municipality of Rotterdam, and futuring workshops). These activities were placed on the relevant timeframes and layers (activity, network, foundation). Accordingly, this set of interventions was clustered into themes to create an overview (Figure 43). This presented an overview of, mostly, bottom-up initiatives improving human-nature relationships. This showed potential entry points for designers; examples of directions on what they can do to create an environment, system, product, service or experience that enables symbiotic encounters.

The creation of a roadmap (Figure 44) helped to create an overview on the transition of the landscape, the dominant human perspective on nature, and its relation with interactions between humans and nature. These correlations are described for each timeframe.

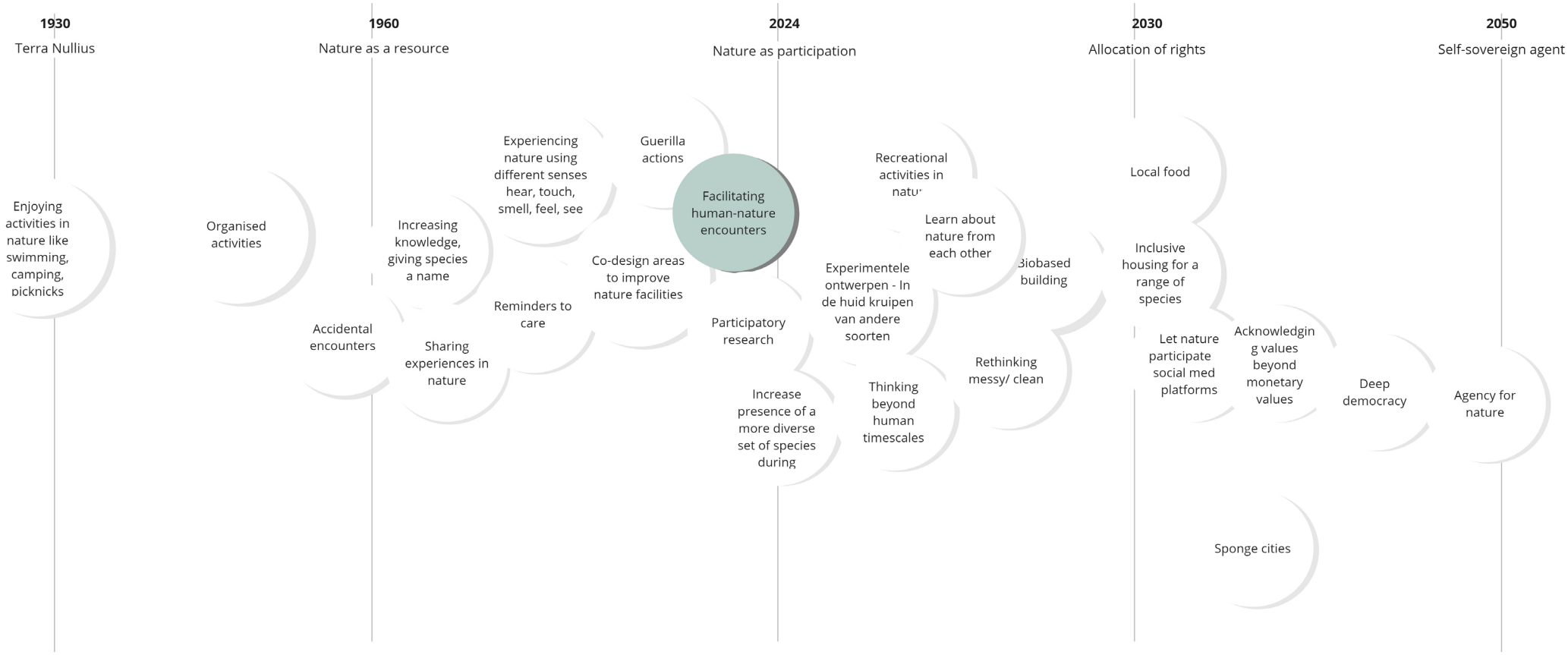


Figure 43. Clusters of actions between humans and nature, in the past-present-future.

6.5 Roadmap

Symbiotic neighbourhood | Roadmap towards biodiverse neighbourhoods

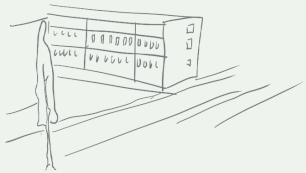
Landscape visions

Actions

Underlying structures

1930

Terra Nullius



1960

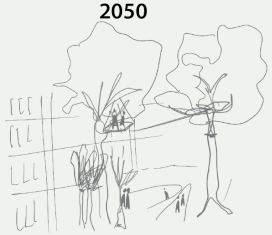
Nature as a resource

2024

Nature as participation

2030

Allocation of rights



2050

Self-sovereign agent

Enjoying activities in nature like swimming, camping and picnics

Organized activities in nature

Increasing knowledge, giving species a name

Accidental encounters

Experiencing nature using different senses; hear, touch, smell, feel, see

Guerilla actions

Sharing experiences in nature

Reminders to care

Co-design ares to improve nature facilities

Facilitating human-nature encounters

Experimental designs - into the skin of other species

Participatory research

Recreational activities in nature

Learn about nature from each other

Biobased building

Thinking beyond human timescales

Rethinking messy / clean

Local food

Inclusive housing - for humans and non-humans

Nature-inclusive social media platforms

Sponge cities

Acknowledging values beyond monetary values

Deep democracy

Agency for nature

UNRECOGNIZED NEIGHBOURHOOD

LACK OF SOCIAL SPACE

PILLARIZATION

RURAL TO URBAN

COMMUNITY IN "WITTE DORP"

BRUTALISTIC LANDSCAPE DESIGN

SHOPS ARE DISAPPEARING

PUBLIC SPACE VIS PRIVATE SPACE

SOCIAL SEPARATION

LOUDEST ONES ARE HEARD

CLIMATE CHANGE

DIVERSE POPULATIONS

LITTLE SPACE FOR NATURE

UNUSED SPACE

"NATURE FREAKS"

HUMANS ATTITUDES TOWARDS NATURE

SHOPS ARE DISAPPEARING

NEW RESIDENTIAL AREA M4H

HUMANS & NATURE'S WORLD INTERTWINED

UNWANTED ATTRACTIONS

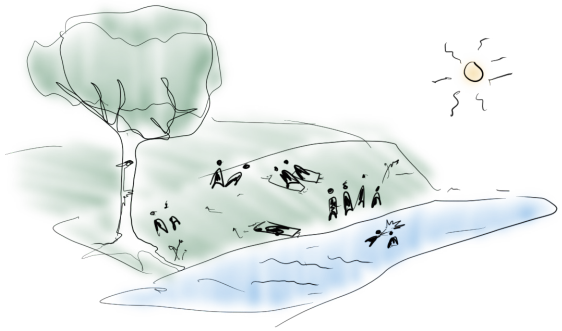
COMMUNITY

LOCAL OWNERSHIP

ECOCENTRISM

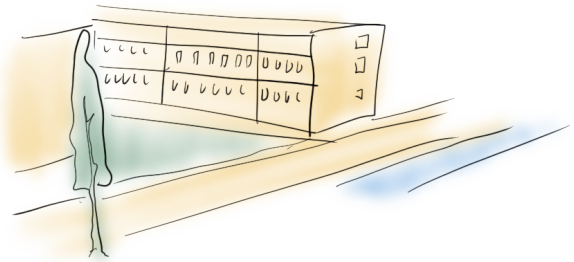
BEYOND MONETARY VALUE

6.4 Characteristics of each time



1930 Terra Nullius

A rural environment marked the landscape of the Midscheeps, where both people and nature freely roamed. This invited activities in nature such as camping, swimming, and sunbathing. It also welcomed a greater diversity of plants, including various types of grasses and flowers.

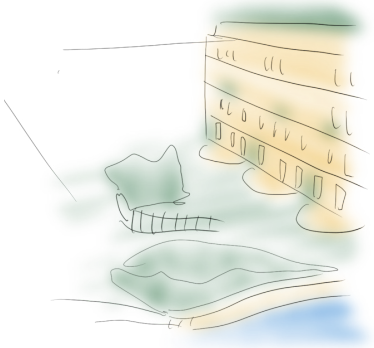


1960 Nature as a Resource

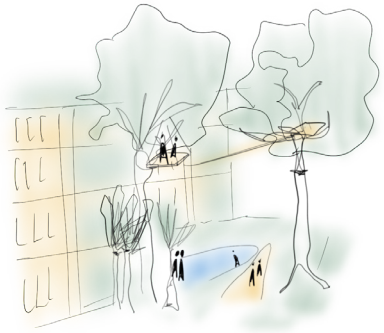
Gallery flats arose and the Schepenbuurt was born. The post-war era prioritised building houses for people. The architectural style separated the ‘living’ area and ‘nature’, limiting interactions between humans and nature. The greenery in the courtyard was public but was hardly used. Connection with nature was facilitated more in a controlled environment; a petting zoo was established, and the municipality organised a tree planting day every year.

2024 Nature as participation

The shared grass fields transitioned from public space to private by enclosing it with a fence and shrubs, however the space was still not optimally utilised, both in terms of biodiversity (it is mostly grass) and socially (few social activities occur). The segregation between humans-humans and humans-nature partly contributed to several problems such as biodiversity losses, reduction of social cohesion, and the need for climate adaptation. Additionally, there is still a housing shortage problem. Solutions to these problems require a holistic approach. There are many examples of projects that tackle these problems. The municipality is actively setting up activities to increase social cohesion. A small group of active residents from the neighbourhood are taking initiative by setting up a neighbourhood garden or secretly planting flowers in the area. All over the world, legal entities are being given to nature, and many design examples aim to restore a connection between humans and nature through art. There is a different mindset among city foresters who shift towards a nature-following



2030 Allocation of Rights



2050 Self-sovereign agent

management rather than nature maintenance management. These signs give hope for more participation with nature and with each other. Although there's still a long way to go before these signs become a new standard.

Currently in the Midscheeps, some residents and urban nature are at a disadvantage; there is a structural problem that prevents them from being heard. Many decisions are made by the homeowners association, a place where tenants and especially nature do not have direct access to.

Transitioning the garden from public to private space should have changed the feeling of ownership. However, the garden is still a shared place in which tenants have little to say, the feeling of ownership is limited. This makes them limited to undertaking action as well. Collective ownership is linked to feeling connected, connected to people in the neighbourhood (social cohesion), and with nature which can lead to symbiotic relationships between humans and nature.

The near-future vision shows a garden with a variety of native plant and animal species. Greenery is intertwined with the residential area. A pont that stores excess water, green roofs, more greenery on balconies, and a varied landscape in the garden all contribute to biodiversity. The proposed design is climate-adaptive, biodiverse, and facilitates social interactions. However, this vision also demands time from the residents. An increase in the feeling of ownership could help to stimulate residents to participate.

Other imagined activities such as gardening local food, biobased building, etc. also see that nature plays a larger role in everyone's daily life; with themes such as inclusive building and local food. Also, experiencing nature goes a step further, how can we truly put ourselves in someone else's shoes? And more knowledge sharing about nature. By recognizing nature more as an essential part of an ecosystem, we systematically need to grant more rights to it.

This is a far-future perspective in which human and non-human life is further intertwined. Nature plays a more dominant role. By combining agency for nature with deep democracy, many more voices are heard, which improves social and ecojustice. Money is no longer the only and most important measured value; other values such as social, environmental, and cultural values are taken into account in decision-making. All residents contribute to the environment in their own way and they feel part of an ecosystem.

6.6 Insight cards +

Designing for human-nature encounters

The roadmap showed how in the bigger picture, humans and nature in the Midscheeps got seperated from each other. While it once was a place to freely roam in nature, they now live in circumstances that aren't inviting to meet again. Recognizing this seperation being reflected in the underlying socialecological structures, we cannot blame current residents about ignorance for their surroundings.

However, the area provides a good opportunity for biodiversity, there is a human need for social interaction among residents, there is a shift in perception on how we see nature and there are examples of activities that are meant to increase the human-nature interactions. These positive factors present a window of opportunity to design something now instead of in a far future.

It is especially the skill of a designer to translate, creating a means of communication to emphasise something or to bridge to parties who do not understand each other. Therefore an opportunity would be to design for a 'first' human-nature encounter. Something that makes residents aware of each others' presence, creating a first step for further collaboration. It should bring up the unheard voices and reconnect neighbours again.

Adding the perspective of temporalities

The timeline showed how current problems did not suddenly emerge, but evolved over time. We can see how changes in the past - for example the brutalistic architecture style that enabled a bigger seperation between humans and nature - affect the present. Additionally, having a vision for the future gives direction towards a desired state.
To provide designers and others with tools for thinking through such layered knowledge, additional insight cards have been developed. These cards have been integrated into the existing set and prompt users to consider alternative timelines through thought-provoking questions (Figure 44), (Appendix G).

Figure 44. Additional 'insight cards', putting insights into perspectives

6.7 Key Conclusions

Over the years, the sense of ownership over the environment has changed. From no man's land, to an unclear division between private and public space, to semi-private space, and in the future vision towards a more shared collective. Before a feeling of ownership is reached, a welcoming feeling, a feeling of belonging should be established. Accordingly, connections can be established with people in the neighbourhood (social cohesion), and with nature (which can lead to symbiotic relationships between humans and nature). A change in the perception of ownership was recognized within the Anthropocentric mindset; humans are no longer central as owners of the earth (and the city) but are part of a natural ecosystem. And within that, we have as much ownership as other natural species. The step towards a feeling of collective ownership was translated into the three different layers of the roadmap;

- Activities: as a first step towards ownership, we need to get to know each other; which (human & non-human) residents are there?
- Networks: Providing space to get to know each other. Is there an extra seat at the table for non-humans?
- Foundation: Existence. Do (potential) residents have the environment that provides a space in which they can exist? And how can humans contribute to create such an environment? This is the minimum requirement to participate in the ecosystem.

There is not one solution needed, but many.

This roadmap offers perspectives and opportunities needed to find answers to the loss of biodiversity and social cohesion in the city. The roadmap provides an overview of possibilities. By taking not one, but various types of actions, we can improve relationships between human resident-urban nature and between human residents. The actions we take now shape the future, a future that is not yet set in stone.

The perspective from the past shows how the neighbourhood continuously changes, but also that history repeats itself. Interventions such as building homes, national priorities such as housing shortages and climate adaptation, urban planning trends, and broad societal issues such as substandard living conditions for migrant workers have implications for biodiversity and social cohesion in the neighbourhood, but can also offer opportunities.

How to rebuild relationships depends on the context, and each neighbourhood has its own starting point. The roadmap is based on research results, publications, books, websites, and movements, mostly focused on the specific location of the Midscheeps. There is much speculation about what possible futures could look like, but it is determined by the actions we take now. Therefore, it is important not to wait too long to apply knowledge; by making room for experimentation, collaborations, learning, scaling up, realising, and supporting (Figure 45).

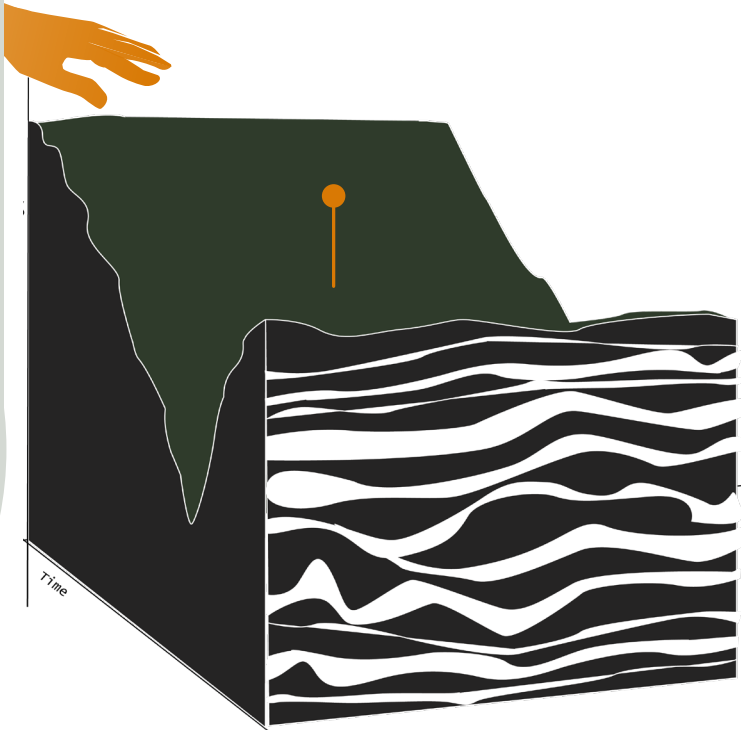
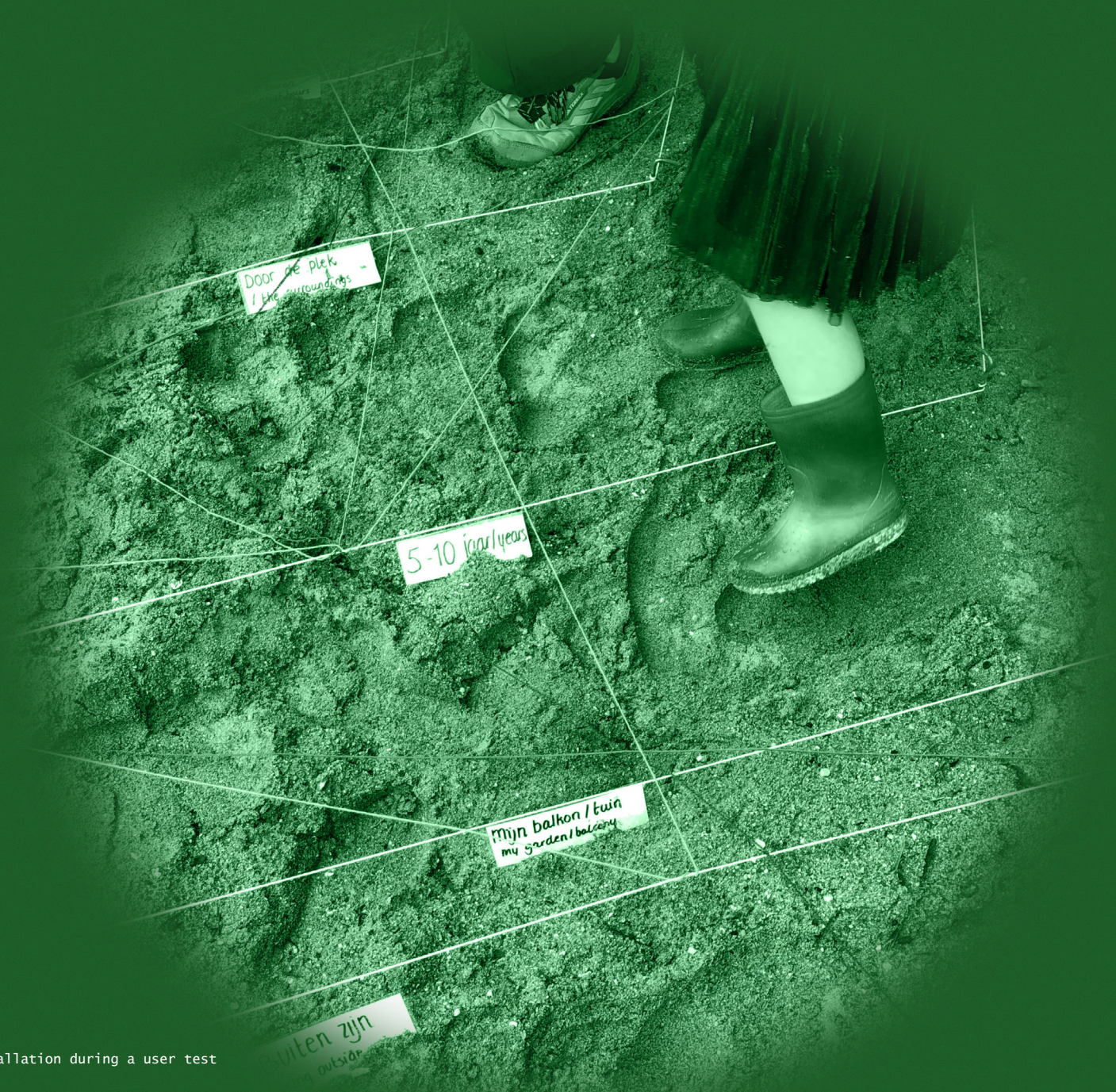


Figure 45. An intervention into the current system



A glimpse of the first installation during a user test

07 | Exploring embodiments

Through interactive installations

The previous chapter presented different areas in which designers can contribute to symbiotic encounters. It was chosen to focus on the 'present', as such a design could be implemented immediately and tested on sight in the Midscheeps. It showed a window of opportunity for design; using their skill of translation to enable a setting in which neighbours could meet again. It was decided to design an installation that would do this bottom-up, as the roadmap showed how this could contribute to a sense of community.

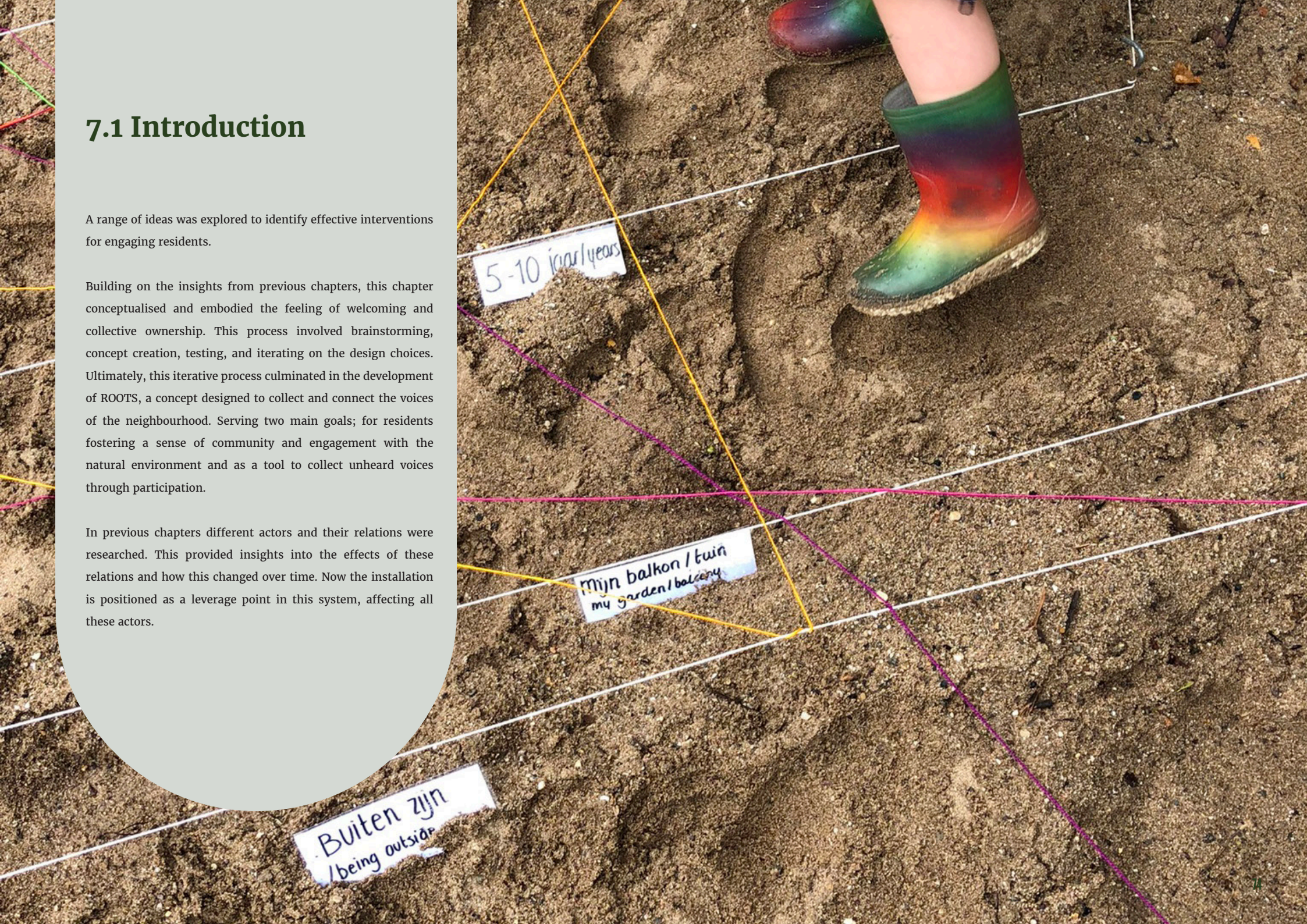
An interactive installation was created to increase awareness of the presence and connections towards human and non-human neighbours and their needs. This should give insights into where neighbours align and could find ways to create a symbiotic relationship. This was tested at the local festival where visitors could interact with the concept, by creating an avatar, answering questions in a web on the ground and reflecting on the answers afterwards. While the installation gained the attention of the visitors, from both residents and urban planners, the embodiment appeared to be messy, providing not enough overview to draw conclusions from given answers. Therefore, several iterations were tested before the final design was determined.

7.1 Introduction

A range of ideas was explored to identify effective interventions for engaging residents.

Building on the insights from previous chapters, this chapter conceptualised and embodied the feeling of welcoming and collective ownership. This process involved brainstorming, concept creation, testing, and iterating on the design choices. Ultimately, this iterative process culminated in the development of ROOTS, a concept designed to collect and connect the voices of the neighbourhood. Serving two main goals; for residents fostering a sense of community and engagement with the natural environment and as a tool to collect unheard voices through participation.

In previous chapters different actors and their relations were researched. This provided insights into the effects of these relations and how this changed over time. Now the installation is positioned as a leverage point in this system, affecting all these actors.



7.2 Explorative co-creation

The goal of the co-creation session was to explore a variety of solutions in several design directions. The co-creation session was held with researchers, entrepreneurs, and a graduate student who are all part of the Neighbourhood as a Biotope project (Figure 46 & 47). The brainstorm session took 45 min, included 6 participants and was recorded. As this session was held at the beginning of the ideation phase, it was useful to sense which direction was interesting for the continuation of the Neighbourhood as a Biotope project.

Methods

As the goal of the session was to quickly generate ideas the method of how to...? questions were introduced. The questions were answered by each teammember, some rounds with extra stimulation such as 'advocate of the devil'. Later, each participant had to pitch one idea telling about the pros and potential risks that the ideas could entail. The conversation ended with a discussion on the best idea. All the results from the workshop can be seen in Appendix H. The questions that were asked and the main takeaways:

How to... Represent urban nature in the home owners association?
This question evoked a lively discussion on how we could include nature in the meetings held with the homeowners association. It appeared an important topic as descisions are made here and yet, sometimes homeowners are not aware of the state of the garden at all, as they own the area but do not live there. VVE010 is an organisation that consults such home owner associations on e.g. sustainability and could be an entrance for advice.
How to... Visualise connections between human-human and human-nature? A concept of a physical message board was created. Having a physical object, the main risk would be demolishion.

How to... Make human feel welcome? Make animals feel welcome?
Questions arose about 'who is welcome?' Are there people we consider weeds? This was mainly around the topic of hang youth that the place struggles with when offering a social space. The garden should be a place for rest, sounds of nature, reflection, conversations. An online environment could be a place for sharing and pride. ***"The relationships about people and nature is also about understanding. Do I understand the human-nature relationships?"***, said one participant.

Results

The 'idea seat at the table during the homeowners association meeting' appeared to be interesting. This is the place where decisions are made regarding the garden. An interesting aspect was a night sensor connected to this seat, which could sense the type of animals that are present. Also the aspect of real-time data could be more convincing. Overall, it appeared that the participants saw vthe importance of giving nature a voice, not only in the garden but also in the decision-making process. Little interest appeared in digital solutions.

Figure 46. Co-creation team

Figure 47. Co-creation team

7.3 Selection of ideas

The human-nature practices outlined in the roadmap, along with those discussed during brainstorming sessions served as foundational sources of inspiration. These sources were subsequently further developed through additional brainstorming activities, which led to an evolution of ideas (appendix I & K). Two expert lectures provided extra inspiration on how to motivate people to engage with non-humans; Elise Talgorn on collective story building with non-humans and Sander Turnhout on the story of the finding of the 'slippery snake' that helped to improve its environment. Combining elements from the range of ideas led to the creation of the idea named 'get to know your neighbours', a collective story writing tool amidst the Midscheeps garden. This section briefly describes the concepts and motivates the rationale of choice.

Rationale for ideas on the activity, network and foundational level

Research in chapter 6 revealed that both humans and non-humans did not feel as welcome in the garden and that collective ownership influences the way people interact with each other and nature. Ideas around these themes were explored and ordered onto the three levels of human-nature interactions for symbiotic city (Stuiver, 2023), similarly as used for the roadmap; the activity, network and foundational level. This helped to see where impact could be made and how this has an effect on different levels.

Activity level

First, neighbours have to meet again. Which (human& non-human) residents are there? Three ideas below covered this thought.

- Providing wayfinding towards the garden

This should invite residents to find their way into the garden and a welcoming feeling. At the moment, the garden is a bit hidden, people might need an extra reminder that spending time in the garden is an option. A welcoming entrance also gives a positive vibe to the experience. This would be a very simple, yet practical solution.

- Providing a place to sit

Yet in the garden, there are no benches or chairs. Seats could invite for conversation and relaxation, taking time to connect. However, residents had negative experiences with youth taking over such utilities and being noisy. Therefore the place should provide a place to relax and connect for residents without the experience of nuisance induced by hang youth.

- A sign that shows which species are living in the garden

Locating this next to the sitting area, people can have a look at this themselves. Bioto can keep track on (possible) species. People could unlock new species if they see them.

Network level

Providing space to get to know each other. Is there an extra seat at the table for non-humans?

- Translation from identified species to action
- Discuss action for biodiversity during homeowners association meetings through tangible examples

Foundational level

Do (potential) residents have an environment that provides a space in which they can live? This is the minimum requirement to participate in the ecosystem.

- Identification of possible species and create an environment for them
- Take action to create such an environment

Including voices of the neighbourhood could be conceptualised on each these three levels, which all are relevent. However, as the 'activity level' seens most rich in ideas and suitable for testing, I will focus first on this direction.

Idea exploration

Three ideas were further explored: Story Creation, Garden Bell, and A Seat at the Table. These concepts are briefly explained here and can be found in Appendix J. Although these ideas were not fully implemented in the project, elements from them were incorporated into the final design.

Story Creation

The concept of Story Creation was heavily inspired by Elise

Talgorn's lecture on storytelling with non-humans, which provides a compelling method for empathizing with nature. The idea involved creating a comfortable space in the garden where residents could create stories from the perspective of animals observed in the garden. These stories could be stored in a box (similar to neighbourhood libraries), allowing others to read and contribute their own stories, potentially generating actions to improve the environment for the characters. The goal of this intervention was to foster empathy with the surrounding nature. However, the concept has limitations: while storytelling could engage people, the process involved several steps that might deter participation. The need to approach the intervention, open the box, read the exercise, and write responses on paper could be cumbersome. Additionally, the static nature of paper and lack of guidance might not be very encouraging. Despite these issues, storytelling from another perspective remains a strong element in bridging the human and non-human worlds.

Garden Bell

Could a garden have its own doorbell? And why not make it inclusive? The Garden Bell is designed to detect a wide variety of species entering the garden, including plants, insects, birds, and other animals. This bell would register the presence of these species and provide transparency to its neighbors by displaying which species have entered the garden both digitally and through the sounds emitted by the installation. This system would allow species to announce their presence, increasing awareness among residents. The installation, akin to a totem pole, would collect data and emit low sounds when a species arrives, serving as an informative piece of art connected to Bioto's sensors. Digitally, species data would be recorded and shared with residents, aiming to increase their awareness of local biodiversity.

While the concept of real-time data on garden species is intriguing, it has limitations. Initially, Bioto's sensors can measure values indicative of species that could inhabit the environment, but this does not confirm their actual presence. Identifying all species accurately is challenging. Additionally, previous research indicated that wildlife cameras are often stolen and may raise privacy concerns. Despite the philosophical appeal of an inclusive doorbell for non-humans, technical challenges and limited scope restrict its feasibility. Questions such as who would listen to the installation and how residents would benefit remain unresolved.

A Seat at the Table

Decisions about garden management are typically made by the homeowners' association. While this is crucial for the environment of local species, nature is often underrepresented in these meetings. Homeowners frequently lack interest or knowledge about the surrounding wildlife. This could be addressed by creating a vivid representation of local nature (e.g., showing footage of wild animals) or by including nature in the decision-making process. Options might include appointing a resident to represent nature, employing an AI to advocate for natural interests, or simply making local nature a discussion point on the agenda.

Translating the needs of non-humans to decision-makers was a key element of this concept. However, the current structure of the Midscheeps homeowners' association presented challenges: four different associations manage the garden, many homeowners do not reside in the properties but sublet them, and meeting attendance was low. Due to these organizational complexities and limited access, this idea was not pursued further.

Combining elements towards the final idea: ROOTS

Several elements from these three concepts were combined towards the final concept; ROOTS (see Appendix L for the collage of elements). The final idea used the element of telling a story throug multiple perspectives, derived from Story Creation, however many changes were made. One of the critique on the Story Creation idea was on the lack of depth. Through adding a historical layer to this concept, using the element of the more provocative statue of the Garden Bell idea and through eliciting voices of all residents from the idea of A Seat at the Table, the final idea ROOTS was born. This early idea was further developed into a concept which is described in the next chapter.

7.4 Concept ROOTS

This chapter introduces the first iteration of the concept ROOTS. The name arose from an interview with a former resident from Oud-Mathenesse. “What should we preserve from the Oud-Mathenesse in 1950?”, I asked.

The interviewee responded; “Het Witte dorp’ should remain; otherwise you are taking away the roots of many people.”

“And what should we not preserve from the historical Oud-Mathenesse?”

“The separation between groups of people.”

When the Midscheeps was born, pillarization was a social construction, a discrimination on beliefs, that was deeply rooted in society and institutions which separated people. Nowadays, there’s a separation in the neighbourhood towards a discrimination based on ethnicity. To counter separation, I focus on connections.

The intervention aims at increasing awareness about the connections between residents in the garden. A garden that has potential for humans and nature to thrive, but yet is not used to its full potential. Instead of putting humans central to solve this solution, a tree was chosen to do start opening up the conversation and wants others to share their stories and preferences regarding the future of the garden, too. as this tree has been standing in the garden, she has been rooted in a past and most likely stays for a little longer. The tree showcases the embodiment of the intersection of time, space and connectedness.

Rooted connections

Not only did people have their roots, but plants (literally) and animals did too (Figure 48). Roots from the past shape us. Not everyone has rooted in the same way or feels equally rooted in the neighbourhood. However, no matter how new or small these roots might be, they are connected through the neighbourhood they share. What brings these roots together is the place, the interdependencies within the ecosystem, the garden. This installation tries to find where roots (could) meet to enable symbiotic interactions.

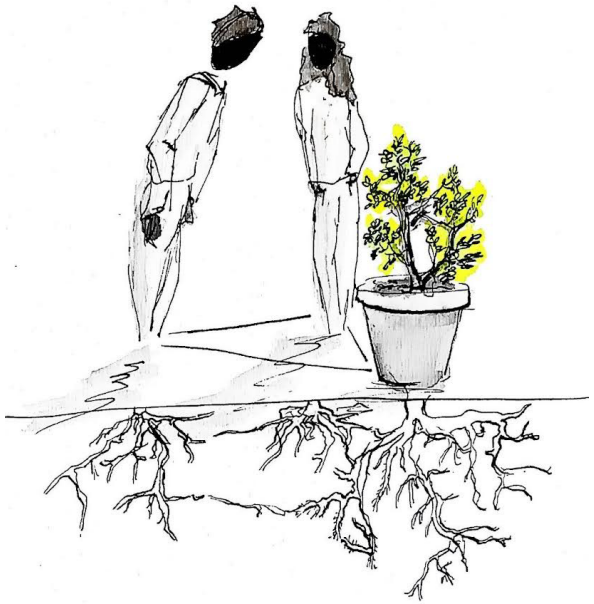


Figure 48. Human can metaphorically root, plants literally root

ROOTS as a living infographic

Roots is designed to elicit voices of the neighbourhood and raise awareness about their interdependencies. Residents are asked to answer questions by weaving their answers around multiple choice options. The physical installation thus serves as a visual data collection tool, allowing participants to express their opinions while patterns evolve.

This living infographic collects data on shared needs within the neighbourhood, which can be utilised by urban planners, municipalities, or homeowners associations to create a community that reflects the residents' needs. Aditionally, it makes participants reflect on their relation with other neighbours and their relation with nature in the neighbourhood. The potential of increasing residential awareness and roots as a participation tool was tested and will be discussed in the next chapter. First, the concept is further explained.

When interacting with the installation, these following steps were initially included;

- Avatar creation. Create an avatar of oneself or another resident in the neighbourhood and position the avatar around the intervention space (Figure 49 & 50).

- Answering questions. Residents answer questions by weaving a threat into the multiple-choice answers provided. (Figure 51 & 52)

- Collective thoughts. Analyse and reflect on the interconnected web of answers to understand common needs and perspectives.

Increasing user awareness

Avatar creation

The first step in interacting with the installation is creating a personal avatar. A template was provided and participants could personalise their avatar's face and write down their nickname. The goal of creating an avatar is to encourage self-reflection by allowing participants to see themselves from a different perspective. Placing these avatars in the outer circle of the installation, alongside those of other neighbours, visually represented their individuals as part of a bigger group, all sharing the same neighbourhood.

Questions

The goal of these questions was to collect and reflect on the answers on what residents needs are from the neighbourhood. Questions were designed to transition from a more superficial level to more deeper ones. As the line was drawn from the persona to the tree in the middle, the questions transitioned from personal inquiries (*What are your hobbies?*) to more reflective ones (*What makes you feel at home somewhere?*).

More-than-human embodiment

Since this research focuses on more-than-human design, such principles needed to be applied in the embodiment of the design as well. Two main strategies were applied to go beyond human-centred-design; decentering humans and looking for similarities between humans & non-humans. Applications of each strategy were described below.

Decentering humans

By situating the intervention at ground level, the design acknowledges that, while human interactions typically occur at eye level for convenience, a ground-level placement aligns more closely with the active environments of gardens, such as those of insects and ground-cover plants.

Personas were developed using name cards typically associated with plant identification. These were placed in the ground to signify the presence of specific species, mirroring how plant species are traditionally marked. This approach extended beyond human personas to include representations of animals and plants, thereby encompassing both human and non-human residents.

Finding Commonalities

In the installation, questions were answered by both humans and local animal and plant species through a woven thread system, which visualized the responses. This approach allowed participants to observe and compare their answers with those of both human and non-human entities, highlighting areas of agreement and shared perspectives.

The sequence of questions began with a focus on the individual and gradually expanded to encompass interactions with others. This progression facilitated a shift in awareness from self-focused to an understanding of one's position in relation to others.

The concept, named ROOTS, serves as a metaphor for the shared or formative past that shapes both human and non-human entities. The installation illustrates how these interconnections have influenced our development. At the intersections of these lines, potential symbiotic solutions can be identified, such as providing shade for humans and a refuge for birds.

Figure 49. First step: avatar creation

Figure 50. The installation was placed in the sand. Avatars were put in the ground around it.

Figure 51. Questions

Figure 52. Non-humans also 'answered' the questions

7.5 Testing at the local festival

With the initial concept developed, it was necessary to test. Preliminary pilot tests were conducted on a small scale prior to the larger trial at the festival (Appendix O). The local Lentefest provided a good opportunity to showcase the installation and gather feedback from neighbourhood residents. A small stand was reserved to allow me to explain the concept to visitors and guide them through the installation (Figure 53). Notably, the presence of Mayor Ahmed Aboutaleb at the festival signaled the renewed focus on the neighbourhood by local governance, which had previously been neglected. The setup and results of the test are discussed below. Overall, the test generated valuable input from both residents and policymakers, informing the redesign of the installation.

Set-up

At the local festival, the installation was set up to facilitate testing with residents from Oud-Mathenesse. Although the festival venue differed from the shared gardens of Midscheeps, it provided a valuable opportunity to test the prototype and validate my assumptions.

The installation required a tree with sufficient space around it, positioned in a visible yet accessible location. Ultimately, the designated area for the installation was the sandpit adjacent to the children's playground. This placement may have influenced visitors' perceptions, leading some to view the installation as a children's game. Due to the site's constraints, a stick was used as a substitute for a tree at the center of the installation. Despite these limitations, the installation remained sufficiently visible, allowing visitors to observe it without immediate interaction with the researcher.

To run this test smoothly, a playbook was created (Appendix M). Due to unforseen bad weather, the festival was not as crowded as expected which caused small changes in the tests. Instead of testing with several people at the same time the installation was now individually visited by curious residents.

Visitors of the installation were guided through the following steps:

1. Listening to the explanation - about the essence of connecting with other residents
2. Avatar creation & shortly introducing yourself 5 min
3. Placing the avatar around the tree & answering the questions 5 min
4. Looking at the results and answers from other residents 2 min
5. Reflection / discussion 5 min

Method

The purpose of the test was to assess the usability of the installation, observe people's reactions to the inclusion of non-human stakeholders, and identify the types of narratives that resonated with and engaged participants. Usability was primarily evaluated through observational methods, while the identification of resonant stories and popular themes emerged during reflection and discussion sessions. In these sessions, residents were asked to indicate which questions resonated with them and to express their preferences or dislikes regarding specific prompts. Additionally, participants were encouraged to share any personal stories that surfaced as a result of their interaction with the installation. Throughout the day, detailed notes and photographs were taken to document the process and insights gained.

Results and analysis

During the test, various types of interactions were established with residents. While some preferred to observe the installation from a distance, eight participants fully engaged with all five steps. The outcomes were analyzed in the following sections. The insights are categorized into general observations, the impact of non-human stakeholders, the narratives that were most effectively triggered, and the usability of the design.

- General insights -

An unexpected insight emerged when urban planning students expressed strong enthusiasm for the concept of gathering live input from residents. This reaction highlighted a compelling connection between utilizing such bottom-up data and its potential application in higher-level neighbourhood planning.

Wording seemed to be important to convey the right message. The word persona, initially used instead of 'avatar' did not cover the right meaning, the word persona seemed to be too human focused. Also the word intervention was too vague. Some people immediately understood this, some did less. More context is needed to understand what you're intervening with. Instead, the word installation was clearer.

Allowing people to first observe the installation independently, rather than explaining it beforehand, proved effective. This approach fostered more meaningful conversations afterward.. These discussions were valuable for gaining deeper insights into the residents' perceptions of the neighbourhood, with the installation effectively serving as a catalyst for dialogue.

- The presence of non-human stakeholders -

Although non-human entities were represented in the installation, they did not actively participate. Their avatars responded to the same questions as human visitors, but these responses were provided by me based on preliminary research into the needs of these species. Consequently, the interpretation of these responses was largely human-centric. **This raises questions about the extent of actual non-human participation in the installation. Instead, the installation primarily functioned as a reflective tool for human participants.**

The avatars of birds and plants (non-human stakeholders) seemed normal to children. Contrary to my expectations, adults did not show surprise at the inclusion of animals and plants answering the same questions as humans, nor did they interact significantly with the non-human avatars. This lack of engagement may be due to several factors;

- The participants were not steered to empathise with the other actors, the coloured threats weren't clearly traceable to the avatars. Therefore, it was not clear if answers showed overlap with human or non-human stakeholders.
- Most participants did not know much about the specific indicator species, lacking a sense of familiarity. Species that were mentioned more by participants were birds, dogs, grass and trees.
- One adult said that they did not know how to garden. This was not a requirement to connect to the non-human stakeholders, however this felt like a threshold for the participant. Another participant said 'ah I saw a song thrush in the neighbourhood next to ours last week!'. She was excited to see this animal in the installation. So the amount of knowledge and recognition about the non-human actors could influence the level of engagement.
- It could be that more reflective questions should be asked to understand the opinion of the residence about the non-human stakeholders.

- The type of stories that were triggered -

Participants enjoyed sharing their personal stories about their connections to a place, which was one of the key questions posed. Some individuals expressed a stronger connection to Rotterdam as a whole rather than specifically to Oud-Mathenesse, indicating variability in their sense of rootedness.

Adults generally appreciated responding to questions about their arrival in the neighborhood and their sense of connection. Some sought greater engagement in the neighbourhood but were unsure how to achieve it. **The thought of aligning their interests with active community groups, such as those focused on gardening or music, appeared to be particularly motivating.**

Conversely, adults showed limited interest in questions about hobbies, whereas children did. For instance, children preferred having "playground" as an option for the question "What is your favorite place outside?" The topic of hobbies could become more relevant if it facilitates ways for residents to contribute to the neighbourhood. **It may be more effective to position this as a concluding question to potentially inspire greater community involvement.**

- Useability of the design -

The installation was designed to function as a "living infographic," displaying graphic information based on residents' responses. However, its effectiveness was compromised by **poor visibility of the data**, particularly due to the wet and disturbed sand background. The clarity of the results improved as the day progressed and more participants contributed.

A notable issue was the lack of distinction between responses provided by humans and those attributed to non-human avatars. Additionally, the installation's shape proved unsuitable for analyzing and reviewing the collected data (see Appendix N for several trials).

The installation also became disorganized, with participants inadvertently stepping on the delicate components or getting entangled in the threads. This led to both reduced data quality and decreased participant comfort.

Measuring participants' reflections on interdependencies and their relationships with non-human entities proved challenging. In future iterations, explicitly asking participants about these aspects could provide more insight.

Starting the workshop with a thought-provoking question might facilitate a more reflective dialogue. The initial focus on avatar creation did not sufficiently engage participants in a reflective mindset.

Conclusions

Testing the first version of ROOTS at the local festival provided useful feedback on a useability level as well as on the content, the way people respond to non-humans and topics that interested the residents.

The concept was yet a first prototype which caught attention of visitors, and entailed an embodiment that was relatively out of the box. This was not a safe choice and this was reflected in the useability outcomes; **the embodiment appeared to be messy, uncomfortable, time-consuming and fragile. While at the same time, the size of the intervention caught attention, looked playful and interactive.** For the next iteration, useability should be improved to counter these problems and make it more accessible for people.

For the communication of the concept, a few adjustments in the wording should be adapted such as changing persona to avatar and intervention to installation. **There was a variety in the level of understanding among the participants.** This was not always a bad thing, as long as everyone can understand the value of finding connectivity in their own way.

Stories that triggered the participants were about the place they lived in and what made them feel connected to it and were open to improve connectivity within the neighbourhood. Some already started brainstorming on how they could contribute with for example music lessons for the neighbours or a fixed time for open soccer games at the square. While this showed a very good start for improving social connectivity, it should be noted that the participants were an untientional preselection of active residents as they already took the initiative of visisting a local festival and socialize with others.

It was observed that adults showed different interests than the way children did. Children liked to talk about their hobbies, that was a thing they could also connect with with others. And above all, **children showed to be important connectors** as they more easily approach others to play with. Parents from these children accordingly connect more easily with other parents.

An important element of the installation was the inclusion of non-human species. However, this element was mainly overlooked by the messy web and lack of interaction with the non-human avatars. For children, the inclusion of non-human species seemed completely normal. While indicator species were introduced in the installation, other species seemed to receive greater attention to the participants. These other species, such as grasses, birds, dogs and trees were more common in their daily lives.

An unexpected insight was the enthusiasm of a group of urban planners that showed interest in the gathered data. They intuitively saw the web of threats as an infographic that could be useful when designing for cities. This showed to be an interesting opportunity which was explored in the following chapter 7.6.

The gathered insights served to improve the installation for the final design. Improvements should be made on useability and interaction with non-human species. Opportunities arose with the selection of bottom-up data and visualisation of such data to communicate residents' needs. Another opportunity

were children, who are naturally open to interact with new experiences and with others (human and non-human). The size of the installation caught attention of visitors and evoked curiosity. In the next phase, the installation should be adjusted to fit the context of a community garden, which as a consequence could entail slightly different needs and goals.

Figure 53 Research stand at the local festival

7.6 Connecting decision makers with voices of the neighbourhood

To affect meaningful change, it is imperative to amplify voices not only among residents but also towards key stakeholders—architects, designers, homeowners associations, policymakers, and researchers. This was also supported by the roadmap in chapter 5 in which different levels - activity, network and foundation- were integrated to show the importance of symbiotic activities accross these different levels. These key stakeholders are part of such a network level that could be fueled through participating with residents on the 'activity level'.

Collaboration between residents (activity level) and the municipality (network level) became a real life case: observing the process of the transformation of the paved square in Oud-Mathenesse conducted by the municipality, I recognized that they were struggling to find the voices and community of the neighbourhood.

Looking back to the beginning of this research, the 'wijkindex' (neighbourhood index) was analysed. This infographic is available on the website of the municipality to get an impression of the neighbourhood (Wijkprofiel Rotterdam, n.d.). It presents the subjective and objective score of the neighbourhood on topics within physical, safety and social domains (Figure 54). With no prior knowledge about the neighbourhood, it cannot be understood why residents' subjective scores were so low as context is missing. While the wheel could be insightful for policy makers, it presents a passive overview of the, in the case of Oud-Mathenesse, overall unhappiness of the neighbourhood.

Linda van der Marel performed research on such data wheels for GGD Hollands Midden (Wijzerindewijk, 2022) from both resident's perspectives and policy makers perspectives. She found that such wheel visualisations were not always understood because of the difficult language used. As a solution she proposed; "An interesting discussion format is to have residents fill in the spider web themselves and then conduct the conversation about Positive Health based on that." This seems to connect with the installation. This could facilitate the engagement of policy makers or other decision makers directly within the neighbourhood, allowing residents to voice their concerns in a transparent manner. Additionally, it served as a tool for connection and action, rather than passive, top-down information.

Conclusions

An interesting feature of the installation ROOTS is that it could bridge residents experience of a neighbourhood with experts working on local governance. There's a need from local governance to find more connection and from locals to be heard and included in shaping the neighbourhood. While this is showed to be an interesting and relevant direction, the goal of increasing residents' connection with their own neighbours (human and non-human) is still the most important element. The feature of creating shareable results could increase the impact of the installation, however, this is yet not the main goal. It would be interesting to continue this endeavour in further research.

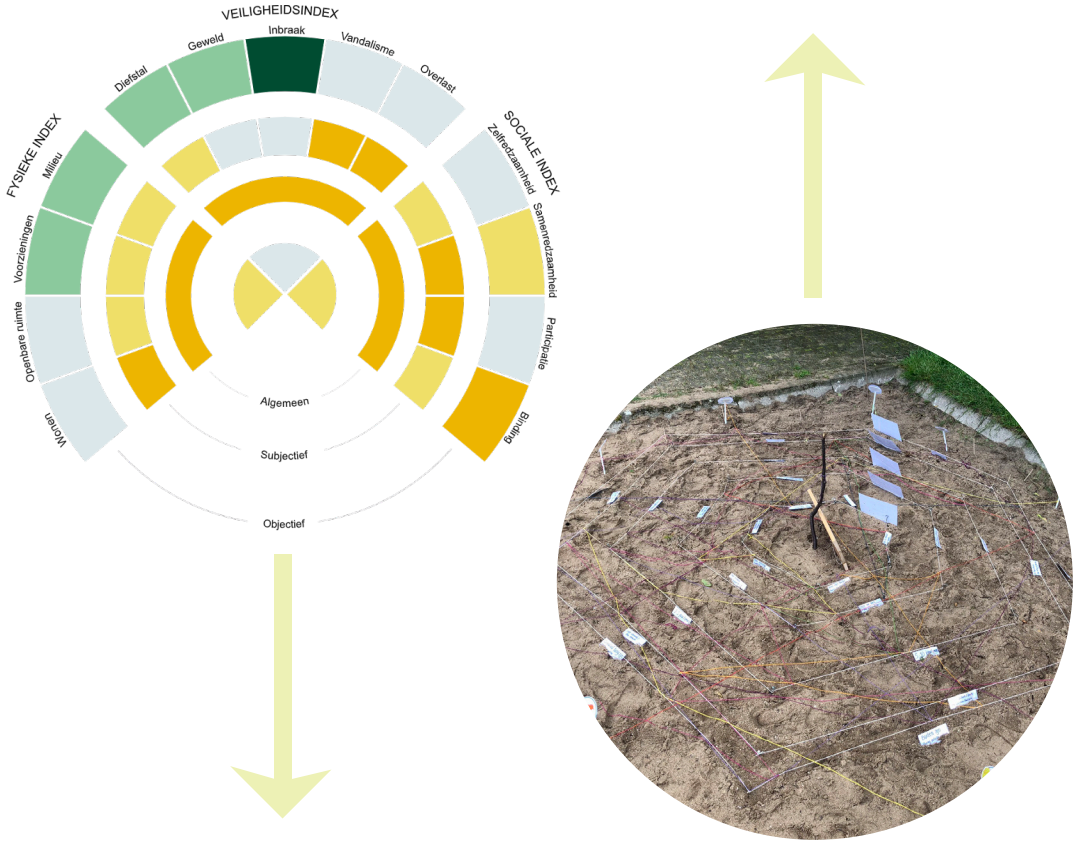


Figure 54. Top-down neighbourhood analysis (digitally) towards bottom-up input (physically)

7.7 Key Conclusions

This chapter examined various forms of embodiment and interaction to address the design challenge of 'designing for human-nature encounters.' Brainstorming sessions with the research team identified promising avenues, such as "a seat at the decision table" for representing non-human entities, and emphasized predominantly low- or non-tech solutions. These discussions culminated in the development of three concept ideas, which collectively informed the initial concept, ROOTS.

The local festival served as a testing ground for the installation, providing valuable insights that will inform improvements for the final design. Key areas for enhancement include usability and interaction with non-human species. Notably, children, who exhibited greater openness to new experiences and interactions with both humans and non-humans, emerged as a significant audience. The installation's size attracted visitor attention and sparked curiosity.

The potential for capturing bottom-up needs and communicating these to top-down experts proved to be a compelling opportunity. However, the primary focus remains on fostering connections and increasing awareness among residents. In the next phase, adjustments will be made to adapt the installation to the context of the shared gardens in Midscheeps.

A glimpse of the final installation in the shared gardens in the Midscheeps

08 | The final design

ROOTS, an installation initiating symbiotic human-nature encounters in the garden

Sub-question 7. How does the chosen intervention contribute to symbiotic relationships in the Midscheeps?

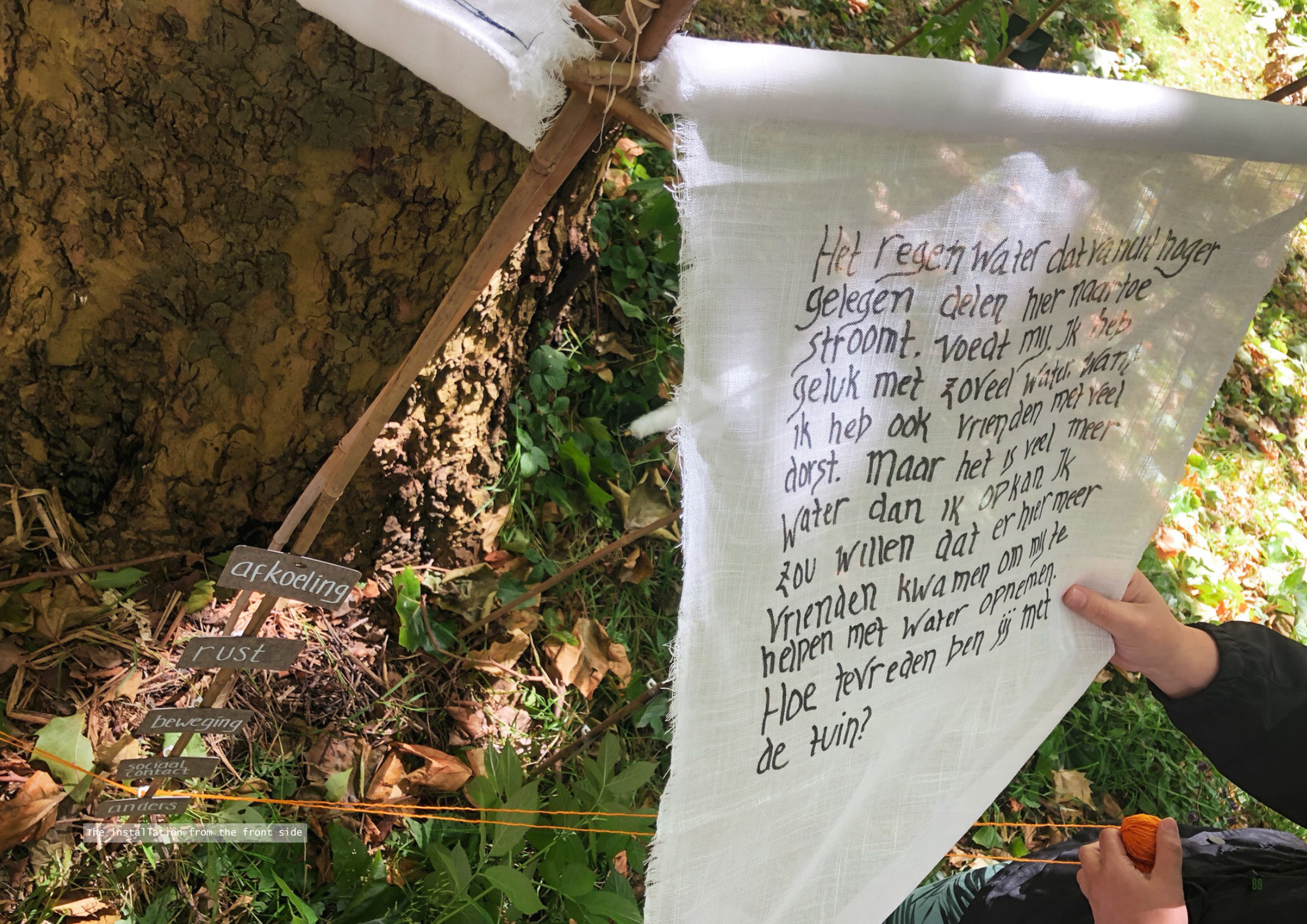
The final intervention comprises an installation designed to let the human residents meet non-human residents in the garden, increasing awareness of its neighbours. It illustrated parallels (and differences) between human residents and urban nature. Through the process of reading an introduction, written from the tree's perspective and responding to inquiries regarding their experiences in nature and preferences regarding the garden, this exercise facilitates introspection among participants regarding their neighbours and shared attributes. The data points generated in this installation, which could be described as an interactive graphic, have the potential to inspire contributions to the local natural environment, thereby fostering symbiotic interactions beneficial to both parties. This initiative represents an initial endeavour towards letting residents participate in the interdependencies of the garden.

8.1 Introduction

An old tree, who is rooted with a past and a future and is connected underground, was used as the center of the installation. Metaphorically, this bridged the human world with the natural world by looking at similarities that enables us to connect with nature.

The tree, located in the garden, invites residents to engage with her narrative; about her history, her experiences and wishes for the future of the shared garden. She also invites humans to share their story too and reflect on each other's answers. These interactions were captured and could be shared to elicit the unheard voices.

The installation serves as an initial step to raise awareness among residents about the potential value of the place for various stakeholders (human and non-human), themselves, and their relationships with others.



The installation from the front side

8.2 The essence

Breaking the silence

The essence of the installation is to break the invisible silence. To give a voice to the tree, which is sometimes overlooked by humans. To allow the human residents to express their opinions. To let people see the perspective of the tree. And to show people the opinions of others. So that, after the conversation, we can collectively take action to create a garden where both people and nature feel welcome.

Making decisions about the garden together

How do you start a communcal activity? Then you consult with your neighbors about their desires and whether they are willing to participate. This is what I did in the Midscheeps, but I also sought to involve nature. Consequently, I gave the oldest resident—the tree in the garden—a voice (Figure 55). This led to the creation of an installation in which the tree narrates its story and ask the opinions of the neighbors. These responses intertwine around the tree, forming a web of perspectives.

This is a small beginning, within a movement towards a potential change. A vision for a livable garden for more-than-human residents is emerging. This dialogue has been captured and will be incorporated into the further development of the garden.

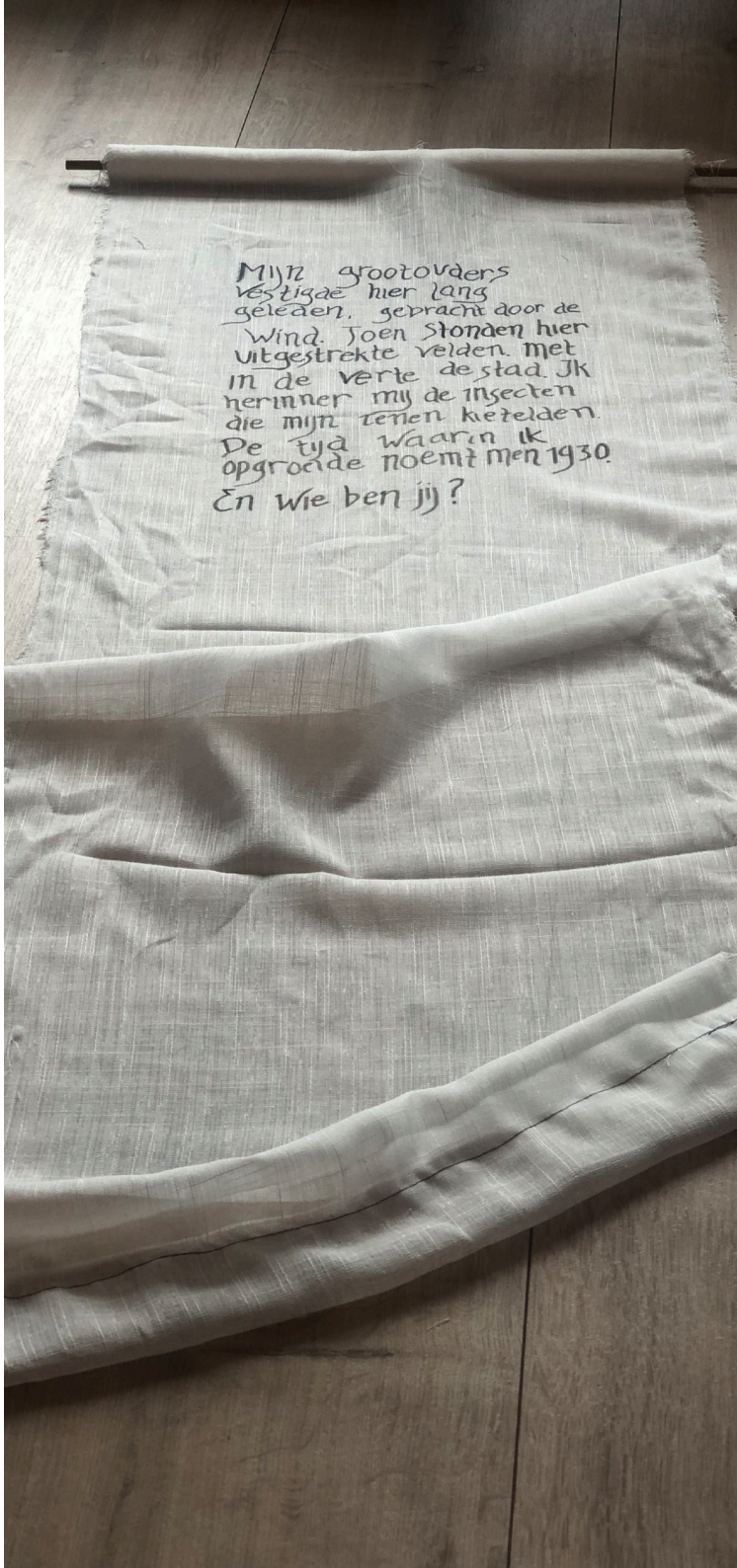
Timing - a first step towards change

One might question why not proceed directly to action. However, my research has revealed the presence of numerous unheard voices within the neighbourhood. The installation is intended to provide a platform for these voices, amplifying them so that a broader group of residents becomes aware of ongoing initiatives. This awareness allows them to engage, express their perspectives, and collaborate.

Communication through online communication is convenient, but it presents two significant drawbacks: it lacks visibility for the entire community, often relying on indirect dissemination, and it excludes non-human species. Although app groups serve as a tool for coordination, they paradoxically fail to foster genuine connection among participants.

The next step is to take action. The installation serves as a reminder of the initial steps and expressed desires. It can be kept as a reference or turned into symbolic markers. It has now become more of a symbol representing the first step.

Figure 55. Writing the story on the fabric



8.3 Elements of the installation

Data Strings

The idea of weaving a threat through multiple choice answers isn't a new idea. "Data Strings experience has been adapted to many places, topics and situations all over the world", (Domestic Data Streamers, n.d.). Data strings are a tool to present data in a visual and publicly engaging way. The visual and engaging aspects of this idea touches upon a feeling of transparency, attention and awareness.

Attention because the installation is distinctive. It's interactive element catches attention, especially when people are engaging with it. Interaction is not required, people who prefer to observe can still pay attention that allows for reflection.

Awareness is raised through the questions that need to be answered and as ones choices are revealed in a bigger picture of collective thoughts.

Transparency because the installation evolves live, depicting real-time information (without the use of any electronics). Compared with, for example a survey, this method shares its answers immediately with the public.

Ownership for the residents

The tree, in the middle of the intervention, is the one asking the questions. This puts nature central, rather than institutions.

The participants - residents- are the one who give input in the data. They can compare their answers with others.

Data collector - is the one who installed the intervention and wants to use the data. However, by collecting the data on location, this data is more meaningful, fostering more connections with residents.

Collective choices

Lines that were woven into the artwork cross each other, are in parallel, or never touch. They show thicker, collective choices or thinner, more exceptional choices. The nods where most lines meet are the most popular choices which could foster decisions for the gardens. The answers were given by humans about themselves but also for other species. This way the needs of other species were visible, using a distinctive colour.

The converstation with the tree

The goal of the story around the tree (Figure 56 & 57) was to shift the perspective to the point of view of the tree; the height from which it could see the surroundings, the food and drinks that it collected underground, its upbringing, the way the tree experienced life in the gardens, its connections with other species and its future wishes for the garden. The story (Appendix P) was based on events from the roadmap, the way the environment had changed, the challenges it faced and the hope for a more biodiverse and social future. While the tree shared its story, it also asked humans to share their preferences (all questions can be found in Appendix Q). The story was divided in eight parts each ending with a question for the residents. This way, the story became more of a conversation.

Symbiosis - where lines meet

The thought of symbiosis was used in two ways, the first was increasing human residents' awareness about other species in the gardens, to notice and emphatize. Further, possibilities for symbiotic actions were visualized by the threats, that were woven for human residents and non-human residents. Answers were also given for three indicator species, the Atalanta butterfly, the hedgehog and the song thrush, although this was a human interpretation of their 'answers'. The answers of the installation were analysed after the test in the garden discussed in the following chapter.

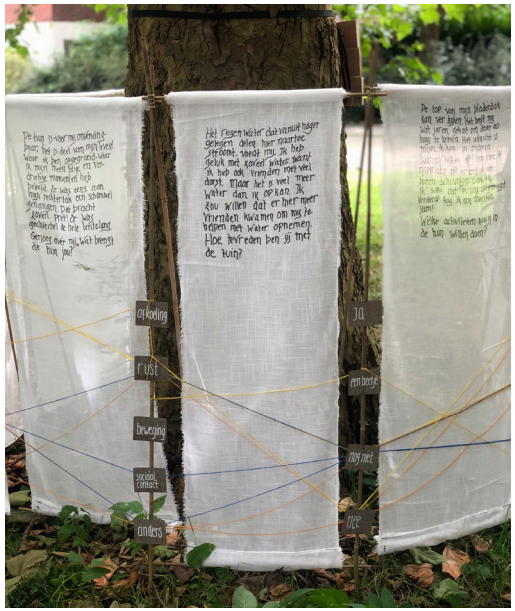


Figure 56. The installation in context

Figure 56. The installation from the front

8.4 Validation

Finally, the intervention was tested in its context; the shared garden of the Midscheeps. The goal was to test the useability of the design, whether people understood the concept, if they got inspired by the installation and whether the gathered answers would be valuable input for the gardens. The installation was connected with the initiative of Bioto who was working together with a few active residents to get a funding for transforming the garden into a more social and biodiverse place. In collaboration with Bioto, the installation could give further insights into the wishes of the residents could be used for the redesign. Additionally, the installation was a sign that something was happening regarding the gardens.

Method

To inform and invite residents to participate with the installation, flyers were send to the 100 neighbours (Appendix P) together with an online message in the local Whatsapp group. The installation was placed in the gardens for 5 days, in which I accompanied the installation for two afternoons to actively invite people who passed by the gardens. 2 responses were gathered inbetween, when I was not present. While it was useful to be present at the installation to see people's reactions and have conversations, the installation was meant to work on its own. A brief explanation about the purpose of the installation was placed next to it.

Results

It was chosen to analyse the results not in terms of graphs rather than analysing the pictures of the results from the installation of the final day of testing. The strings were a bit messy but provdided insights into popular and unpopular answers. Additional conversations with residents that followed were included.

Having an installation outside means it has to be water and windproof and that it is vulnurable for demolishion. Rain was taken into account as the materials were waterproof and the structure was designed to be somewhat windproof. However, a storm on the first day made it impossible to use. The installation was standing underneath a tree that shaked its loose branches making it dangerous to continue the test. The following day the wind got less and the installation could be used again.
The installation stayed for five days without being demolished.

Different levels of engagement

The levels of engagement different per participant, varying from people who read all the text and answered the questions followed by a reflection on the needs of the tree and their own needs. One participant responded; ***"Now I will forever look differently at this tree, as before I hadn't even thought of it"***.

While other people did not read all the text as this was too much. Some had difficulties with the font, for some Dutch was not their native language and had trouble reading it or the use of words was too difficult. However, these participants anticipated on that by only reading the last sentence of every frame as this was the question which had to be answered. This was no problem as they still were able to participate with the installation, able to give their answers. While reflection on the story of the tree missed, they opened up about the possibilities the garden provided; ***"This garden could offer a lot more than I initially thought"*** one participant responded. ***"I'm curious to what is going to happen with the garden"***, said another participant.

Engagement was higher among children, who were curious and less hesitant to try out the intervention. They naturally understood that the animals lived in the garden and also answered these questions. These children saw the installation more like a challenge, reading the text and weaving a thread. I realized it is important to include children in the process, as they liek to contribute and bring enthusiasm. However, their attention span was a bit shorter.

Where lines meet

Most people felt rooted in the Midscheeps, yet not all humans and animals

Asking the question on whether people felt rooted in the gardens, most people answered yes (Figure 57). A few answered ‘a little bit’, of which half of them were non-humans. The indicator species used in this installation were species that were yet not (often) seen in these gardens. Some people lived in the neighhbourhood for a short amount of time and wanted to get to know the neighbours or neighbourhood better, which could be a motivation to join in local communal activities.

Most people and animals do not visit the garden

This was unexpected and a missed opportunity (Figure 58). The garden is not inviting to residents, both human as well as non-human residents. There is no place to comfortably sit and relax. While there was a risk by providing a place to sit, as this could be misused by groups of people who don’t live in these garden which was experienced before. A solution could be to have flexible seatings that can be stored inside when not used. However, this realization of a lost opportunity seemed to make people reflect on change.

Human and animals find rest in gardens

To the inquiry “*What does the garden bring you?*”, most residents responded with rest (Figure 59). While the garden wasn’t visited often, it still brought a sense of rest to them. The large gardens are rather unique in Rotterdam and the Oud-Mathenesse neighbourhood specific, which residents praised themselves lucky with. Some people responded something different as they used the place to walk their dog or playing with their kids. The garden offered limited opportunity to exercise or provide a social space, which is reflected in the answers.

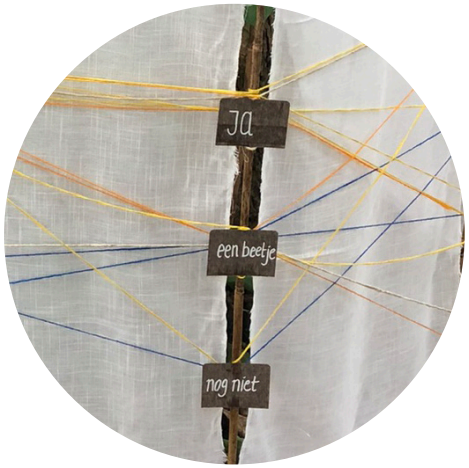


Figure 57. Answers to the question; “Do you feel rooted in the garden?”

Figure 58. Answers to the question; “Do you visit the garden from time to time?”

Figure 59. Answers to the question; “What does the garden bring you?”

Human residents were willing to contribute to the garden by taking up gardening tasks. They also would like to join for social acitvities.

Asking participants which activities they wanted to pursue in the garden, a relatively large amount people indicated that they would like to join in gardening activities (Figure 60). Among these participants were three children who liked to help in these activities. While they said they weren't very keen on organizing these activities, they would like to make their hands dirty. Another group of people showed most interest in the social aspect of the garden, either with meeting their own friends or with neighbours.

Figure 60. Answers to the question; "What do you want to pursue in the garden?"

The installation as a thought provocing exercise

The questions could only be answered through multiple choice answers, limiting the possibilities of answers. The additional conversations with residents provided a better understanding of their answers and motives. It would be interesting to participate with this installation with several residents for which opinions and visions about the garden can be shared. Originally, this installation was planned together with a workshop in which residents could give their input for the garden's design. This originally planned to be a starting activity which made residents reflect on their wishes and those of non-humans before designing, which could increase the impact of the installation.

The story of the tree was engaging and made people empathize with this non-human. However, the 'participation' of the butterfly, bird and hedgehog was not reflected upon by the participants.

Although the answers for non-humans were colourcoded, their choices were limitly recognized. This makes sense as these animals would not be able to answer the questions themselves. The cards that marked their line showed the presence of these animals which were noticed. However, them answering these questions did not make sense to the participants.

Some nature that was noticed were the strawberries that grew on the ground when people had to read the answers near the ground. This was a nice side-effect of having the installation outside.

Conclusions

The useability of the design was very much improved from the previous iteration at the local neighbourhood festival for which the lines were less messy, more readable and took up less time to participate with. Also the location and its purpose; improving the garden of the Midscheeps, seemed to convey a more clear message.

Generally, residents understood the concept although participation took place on different levels of engagement. Overall, the eight parts of the story were a bit too long for which most participants did not read everything while all questions were read and answered. The story could be more comprehensive.

The installation showed to be a nice exercise in viewing the garden from a different perspective. It made people see more possibilities and the added value of the garden. It would be even more valuable to combine this exercise with a co-creation workshop for redesigning the space.

The gathered answers could be shared with Bioto to include some elements in their process of reshaping the garden, such as including children in activities and setting up gardening activities, while also leaving space for rest.

8.5 Contributions

Bioto

The tree opens up to a first encounter where a story is shared, and questions are asked in return. In this encounter, the past becomes part of the present, and wishes are shared that can lead to action. This is primarily a starting point.

Bioto's sensors represent a valuable advancement, enabling real-time data collection on the tree's environment. This technological integration can inform garden development by indicating which plant species are likely to thrive and predicting the presence of various animal species. Furthermore, the sensors can facilitate assessments of the tree's adaptation and satisfaction with the evolving garden conditions.

Bioto's sensors advance the interaction with the garden by showing connections between species within the garden environment. Nevertheless, these sensors primarily support a one directional communication, lacking the capacity for reciprocal engagement. Residents are unable to share their opinions or needs through the sensors, and as long as humans are not integrated into this ecosystem, a balanced or symbiotic relationship remains unattainable.

The personal nature of ROOTS aims to foster connection and understanding between different perspectives on the garden. This approach extends beyond the capabilities of Bioto's sensors, which visualize interspecies connections but do not provide insight into experiences, perspectives, or a framework within which humans can empathetically engage. It would be valuable if Bioto could further experiment with sharing the living experiences of other species with residents, potentially through storytelling, experiences, or queries. With advancements in AI, there is increasing experimentation with creating language models that articulate from non-human perspectives, such as those of the sea or entire ecosystems. Integrating such a language model could facilitate real-time dialogue and enhance mutual understanding.

The installation provided an opportunity to engage with neighbours, introduce them to the perspective of a non-human entity, elicit their opinions, and plant the seeds for future action. The next step involves taking concrete actions while continuing to foster connections. Even a simple addition, such as a small experimental garden (perhaps the sides or balconies), or a rose arch, can signal change. Creating a place to be able to sit, for example foldable chairs, could promote interaction. Transparency is crucial inclusion and minimizing post-action dissatisfaction. Therefore, potential measures could include inviting everyone to a gardening group on WhatsApp, conducting a baseline measurement with the sensor, celebrating progress, and organizing gardening workshops, possibly in collaboration with the local gardening club.

Neighbourhood as a Biotope project

The research conducted by Hogeschool Rotterdam will continue for another three years and will continue next year in a new pilot neighbourhood in The Hague. The central research question remains; "how can we enhance residents' actionable perspectives to increase biodiversity in the neighbourhood?" In the first year, foundational elements needed to be established—a basis for further development. Both the insight cards, methodically, and the ROOTS installation, more practically, could be useful in this process.

The deck of insight cards provide an understanding of the opportunities and tensions regarding biodiversity in a neighbourhood. They can be utilized as a design tool for brainstorming potential solutions. Special cards inside the deck adds perspective by probing into the past or future context and exploring how these factors might affect problems or solutions. The insights focus on the relationships between human residents, urban nature, and their surroundings, thereby encouraging a perspective not only focused on humans.

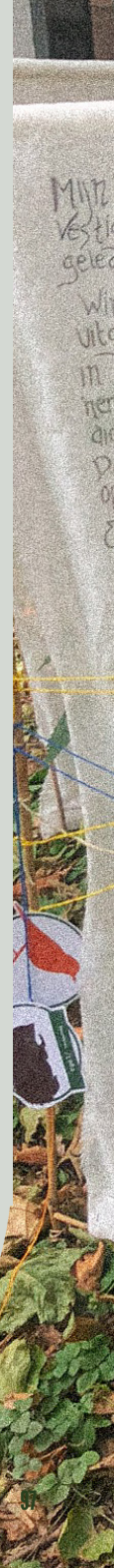
The installation is a practical embodiment of the research and is valuable for the insights it has generated through its experimental approach. Additionally, the visible impact of the installation is a crucial aspect. The physical component of the installation captures the attention of neighbourhood residents, the non-human perspective enhances awareness, and the opportunity for input provides residents with a voice.
Ultimately, the project seeks a scalable solution that the current installation does not fulfill. However, it can serves as inspiration for further research, potentially leading to additional iterations or contributing elements for new designs.

Key conclusions

The intervention implemented in the Midscheeps garden, featuring an installation with a narrative from an old tree, represents a preliminary yet meaningful step towards fostering symbiotic relationships between human and non-human residents. By facilitating a dialogue where the tree spoke and invited residents to reflect on their shared environment, the installation aimed to enhance awareness of the interconnections between humans and urban nature.

This approach successfully engaged residents in considering their relationship with the garden and its non-human inhabitants, though the depth of engagement varied. Some participants showed significant reflection on the tree's narrative, while others engaged more superficially. Nonetheless, the installation effectively stimulated thought about the garden's potential and encouraged community involvement.

The insights gained from this initiative suggest that integrating both human and non-human perspectives is crucial for developing a more inclusive and biodiverse garden. While this intervention provides a valuable starting point, further efforts, including collaborative design workshops and the use of technologies such as Bioto's sensors, are necessary to advance towards a truly symbiotic relationship between residents and urban nature. The findings from this project will inform future research for the Neighbourhood as a Biotope project by sharing the insights learned from this practice and perhaps inspire for future installations.



09 | Conclusions

9.1 Reflection on more-than-human design

Elements of more-than-human design were integrated into both the research methodology and the design outcomes. This subchapter provides a critical reflection on the extent to which these principles were successfully incorporated throughout the research and design process and what I have learned from this approach.

Having an overview of research activities to be able to balance activities among humans and non-humans was helpful.
Having an overview of research activities where balance could be assessed proved valuable. The aim of this research was to adopt a more-than-human design approach, striving to equally incorporate insights from both human and non-human perspectives. I sought to achieve this balance by integrating research focused on nature and the environment alongside traditional human-centered methods. This effort is reflected in the overviews of the research activities on pages [X, Y, Z]. However, my familiarity with conducting interviews with people made these aspects of the research more intuitive, while observing nature required a more deliberate effort. The visual overview of research activities served as a useful reference, helping ensure that the research was balanced across all actors involved.

Interpretation within design is inherently a human-centered process. However, the integration of Bioto's sensors has the potential to supplement this process by providing more precise and objective data.
Ultimately, the design remains centered on human users, with attempts at incorporating more-than-human participation. However, genuine participation from non-human entities was not achieved. Bioto's sensors hold promise for providing deeper insights into the actual needs and behaviors of various species, yet it is crucial to acknowledge that more-than-human participation is often mediated by human interpretation. This means that non-human voices are typically represented by humans rather than expressed directly. True recognition of nature's intrinsic value would require allowing natural systems to exist and evolve without human interference, thus creating a space where nature can assert itself independently (Pereira et al., 2020).

Sensitizing nature on different levels
The interpretation of nature was explored through various approaches in this research. Initially, I began by learning to observe urban nature, something I initially believed to be scarce in a city like Rotterdam. However, through guidance from an urban ecologist, I came to understand that nature is indeed present in urban environments, though it often requires a more discerning eye to notice. This realization was further reinforced by an exhibition on urban nature at the Museum of Nature History, which highlighted the presence of nature even in densely populated areas. A key insight was the influence of timing: while January appeared devoid of nature, by June, the city was teeming with life. This variability underscores the potential pitfalls of drawing conclusions based on a limited temporal perspective.

Further insights into nature came from engaging with experts and literature on iconic species, which deepened my understanding of their ecological needs and altered my perception of the urban environment. Additionally, a futuring workshop with students included a role-play exercise that involved embodying an animal, conducted in darkness which limited our reliance on vision. This sensory deprivation allowed participants to more fully immerse themselves in the experience of another species, leading to a thought-provoking discussion on how such perspectives could influence design. However, the exercise was limited by our lack of detailed knowledge about the animals we were impersonating, raising questions about the accuracy and utility of such experiential methods in design processes.

It is mportant to have non-human participation on a decision level
Recently, the first zoöp has entered the board of the Nieuwe Instituut. Arita Baaijens, an ecologist, has now the position of representing the North Sea. While she is not the sea, she did do an extensive research to this entity. Which is important to represent the right interests. However, what I find very interesting is the level on which this is happening. I recognized a gap, and important opportunity, to represent nature in places where decisions are made.

Balance between useability and inclusions of non-humans

In the installation ROOTS, I put the tree central, as if the tree itself wanted to start the conversation. But the completion of the installation was still very much human focused. Therefore, it was obvious the tree was not giving real input. When trying to bridge a human and nature perspective, we cannot create something that is not useable for humans. In the first iteration of the design, the installation was placed on the ground. It was a deliberate choice to not put the information at eye height. However, this was too much of a struggle for most participants. It did not accross the message. Therefore, careful design choices have to be made in order to include non-humans but also include humans if one wants to include both.

Diverse groups of people are better able to question assumptions

This thesis began by acknowledging that feminist movements have emphasized the importance of examining interrelations and considering the broader context, challenging traditional research paradigms. Prof. Dr. Quadflieg (2021) even goes further with the claim that we first need a we need a post-eurocentric and then a post-anthropocentric understanding of design to be able to design for all interests. To some extent, I agree with this view. This influence was evident during the futuring workshop, where an international student came up with the idea for shelter against the rain. The dutch people were so used to rains in the Netherlands that we did not even think about this relevant aspect. Uunderscoring the importance of diversity in fostering broader, more inclusive thinking.

Complexity makes the topic difficult to grasp

As I delved into the topic of more-than-human design as a newcomer, I sought to identify patterns and approaches within the field. I discovered that this area of study presented challenges, as it fundamentally contradicted the simplified frameworks I was accustomed to. More-than-human design encompasses complexity across multiple dimensions—spanning scales from micro to macro, temporal aspects ranging from historical to future scenarios (I have not even addressed the concept of multiple futures, different pace, etc.), and an emphasis on interconnectedness rather than isolation. This multifaceted perspective complicates the communication of the topic to others. The ongoing tension between simplification and complexity highlights the need for media and methodologies capable of effectively conveying these difficult concepts. To advance in this field, we must develop strategies for navigating and embracing complexity and uncertainty.

Children seemed more connected to animal species than adults

To my surprise, children exhibited the least difficulty in grasping more-than-human approaches. This observation underscores a notable shift: as individuals age, there appears to be a decline in their inherent connection with nature.

Conclusion

Incorporating non-human elements into the design process involved balancing research activities and exploring methods to represent nature through roleplay, storytelling, and examining human-nature intersections. These efforts have facilitated a deeper integration of nature's needs into the design framework.

However, limited knowledge about natural systems has sometimes led to speculative decisions. My background as an industrial design engineer may constrain my perspective, as my education predominantly emphasized human-centered research practices, thus directing focus primarily towards human needs.

Further incorporation of non-human perspectives could be achieved through more experimental approaches, enhanced collaboration with nature experts (could also be indigenous knowledge), more diverse collaboration, and the use of technological measurements. The emphasis on designing for immediate human acceptance has led to a more human-centric approach, while greater focus on non-human elements could involve more speculative and experimental designs.

Despite not achieving a fully nature-inclusive design process, significant strides have been made towards integrating non-human considerations. Continued experimentation and research are necessary to develop methods that better balance human and non-human needs in design. This remains an evolving process.

9.2 Overall conclusions

To foster symbiotic relationships between human residents and urban nature in the Midscheeps, Oud-Mathenesse, it is essential to expand the design approach from a purely human-centred focus to a more-than-human perspective. This acknowledged the significance of urban nature and the environmental context, facilitating a deeper understanding and integration of the needs and impacts of both human and non-human entities. This was done by bridging more-than-human philosophies with a grounded real life context through collaboration with an Urban Living Lab. Situating research findings in different times enabled me to find the temporal dynamics and interdependencies of the human-nature interactions in Oud-Mathenesse.

Through researching the human, nature and environmental interactions, opportunities for designing for more biodiversity in the neighbourhood were identified. Most significantly, the problem of a lack of social cohesion and unnoticed voices in the neighbourhood from both residents and urban nature was recognised. Framing the design solution to; 'exposing connections between neighbours', provided direction for solving these problems. While this focus narrowed the scope for further research, the rich variety of opportunities were translated to 'insight cards'. These could help designers and decision makers to include topics regarding these human, nature and environmental interdependencies from Oud-Mathenesse in their design to eventually design for more symbiotic relationships.

By examining the past, a better understanding was created of how human-nature interactions have evolved in response to societal and environmental changes. It showed how people's previous experience in life shaped their relation with nature. Looking into the influence of landscape transformations and evolving perceptions of nature (from terra nullius to nature as a resource to nature as participation), it was observed that the segregation between humans and nature in the neighbourhood has fostered a sense of estrangement. The concept of ownership is important for the way people and nature settle and interact in the neighbourhood. These insights were used to examine the potential of the final design.

A futuring approach provided inspiration for possible symbiotic futures. Through analysing future visions for societal and environmental changes, it was found that social fragmentation should be avoided and instead striving for a community feeling. Inviting animals to the human world and humans to the natural world could be a way to bridge this separation. Numerous intervention examples seek to facilitate such integration. Hence, there exists a diversity of pathways that collectively contribute towards realising a future that is supportive for both humanity and nature. Yet, the Midscheeps does not experience a sense of community, underscoring the initial necessity for neighbours to cultivate mutual familiarity. The learnings from the past and inspiration of possible futures were translated to insight cards'.

The intervention ROOTS was the embodiment of this goal. This installation presented a live infographic located around a tree. Its design focused primarily on fostering awareness among human residents. This involved visualising connections among human and non-human residents, encouraging their active participation, and providing avenues for them to contribute to the local natural environment in symbiotic ways. Assessing the impact on residents' awareness and improved sense of connection posed challenges. However, connecting the installation with a real-life case, Bioto's participatory redesign for the garden, demonstrated implications for raising awareness about initiatives benefiting both human inhabitants and urban biodiversity. However, real more-than-human participation was yet limited.

In total, three distinct approaches were explored to engage both humans and nature on more equitable terms. In this endeavour, tools were developed that could be utilised by designers or decision-makers (insights cards) to residents (ROOTS installation) during the design process.

This thesis has been directed towards increasing the awareness of desginers and human residents to reflect upon relationships between human and non-humans that benefits both parties.
By first finding symbiotic relationships in the neighbourhood, I hope we can accordingly design for them. While 'awareness' is merely a first step for behaviour change, it might be a starting point for new connections.

9.3 Discussion & limitations

The researchers' subjectivity

While I tried to remain objective in this research, I cannot deny the fact that research has been shaped by my life experiences and beliefs. It is important to understand the researcher's motivation to better understand certain choices that were made. As has been discussed in the thesis, experiences in nature in people's youth do shape one's beliefs. Therefore, my situation is explained below.

I realised that my connection with nature has been an intrinsic part of my identity. From a young age, I felt a connection with the living entities around me—chickens, horses, ladybugs, cats, dogs, etc. At nine, this empathy led me to question the ethics of consuming animals, prompting me to adopt a vegetarian lifestyle, driven by the belief that all lives—whether of mosquitoes, elephants, cows, or humans—held equal value.
However, as I grew older,society taught me that human life is often considered the most precious, with significant disparities in how we value different lives, both human and non-human. I found myself reluctantly conforming to this anthropocentric worldview, yet always feeling a deep-seated resistance. This resistance intensified as I became more aware of the skewed relationships and injustices inherent in our interactions with the natural world. My sense of justice questions our entitlement to position ourselves at the centre of the universe.

Climate change underscores the flaws in our current worldview. It reveals the urgency of adopting a more ecocentric perspective, one that recognizes our survival's dependence on the well-being of our environment. My motivation stems from a fundamental belief in equality and the conviction that we must cultivate a harmonious relationship with nature, not only for ethical reasons but also for our survival. This perspective informs my research and underpins my commitment to exploring sustainable, symbiotic interactions between humans and the natural world.

Vulnerability of 'well intentioned' designs

While the values of equity and social justice were central to my design objectives, the installation, despite its well-intentioned goals, currently reveals vulnerabilities related to equity and the imposition of ideals. The installation, conceived and implemented by a highly educated, European, non-local student, effectively imposes her ideals onto a community by placing this installation on their grounds. This imposition is evident in several ways: the student spoke on behalf of the tree while having limited ecological knowledge, used multiple-choice responses that potentially limited or influenced resident opinions, and restricted translations to Dutch and English despite the neighbourhood's diverse population of at least 93 nationalities. These factors represent forms of steering and exclusion, while full inclusion would be a naive aim.

My intention to elevate the role of nature does not imply a devaluation of human input. The design choices I made do not reflect an intention to exclude. The design is not yet perfect and further iterations are necessary for effective implementation. More ideally, the installation could have been tested within my own neighbourhood or designed in response to a request from local residents. A more genuine dialogue would have been established if I had not spoken for other species or directed the conversation. This situation highlights a sensitive paradox: the desire to do good while inadvertently imposing an ideology.

The following elements could be taken into account to improve this: residents have space to give meaningful input, the design(er) is focused on inclusivity, there is always room for feedback, the designer is not fixated on a single outcome or future scenario, residents are recognized and rewarded for their engagement and the designer commits to a long-term involvement in the project.

It is not a complete overview

This research has used a rather holistic approach to understand the human-nature relationships we have. However, it has never been my aim to research and map all the underlying structures or factors that could influence these relationships. Therefore, this research won't give a complete overview. Additionally, while a narrative was created in this thesis, from a no-mans-land towards a sense of community, no significant evidence was given on how these, and other socialecologic structures, have

influenced each other. Rather, the narrative served as a possible story and as we look into the future, not one but many stories will unfold.

How far should we look into the past?

Historical research has shown to be very important, especially when we talk about nature or the human-nature relationship. However, time is a relative factor. How far should we go back to find a ‘steady’ state between humans and nature? To which date should we go back to find the ‘original state’ of nature? Often, people tend to think in their own timelines. While I have been going back farther then I have ever lived, it still is researched on a very human scale. To deeper understand the original ecology of its place, it would be recommended to look further back. Additionally, further research into past ecologies would benefit the understanding of nature’s needs.

A timeline is chosen that matches human timescales, in a linear way. This is very human focused and a limitation of current practices of roadmaps. It would be super interesting to do more research in how we can visually align timelines in an understandable way, which can convert human timescales to those of plants or other animals.

Futures visions

Futures visions illustrate how a future could look like. It is based on predictions derived from trends and developments. However, these visions are limited as new innovations or unexpected events are very difficult to predict. Therefore, current signs of trends are magnified towards the future. This means that future predictions are magnifications of what is happening now, and therefore future visions also reflect current trends, developments, and underlying wishes and fears. It is difficult to objectively predict the future, as design choices need to be made (design style), the type of scenario (optimistic or pessimistic for which my case about symbiosis pushes towards a positive view). Often future visions are beneficial for the company that created the visions. There is not one future vision everyone agrees upon, and the further away the vision the more speculative it becomes. Therefore one should bear in mind that future visions do not show the ‘one’ truth, but rather are a means of inspiration.

Generalizability

The installation is not universally applicable to every location due to the unique characteristics, inhabitants, and histories of different sites. However, its core value lies in its ability to bridge connections between residents and between residents and nature, thereby fostering collective action. This design encourages dialogue between humans and nature and facilitates the sharing of diverse perspectives.

While the specific narrative of the tree may differ across various trees and locations, many trees will find elements of the story relatable. Additionally, the feedback gathered from participants serves as a preliminary, generalized input for informing subsequent garden development.

Validation of the design cards

The primary focus for future research should be the testing of the insight cards with potential users. Although their potential applications have been briefly discussed with various stakeholders—including the Municipality of Rotterdam for the redesign of Pinasplein in Oud-Mathenesse and the Neighbourhood as a Biotope project—the usability of the insight cards remains unverified. Initially, the cards closely mirrored their original ‘insight cards’ design, which I had experience with with different design projects, among which the social design studio Zeewaardig who often used this approach in their projects with clients. However, as the project progressed, the cards evolved into a distinct format, the usability of which has yet to be tested. Preliminary feedback from the Neighbourhood as a Biotope project indicates a preference for translating the card’s language to Dutch B1 level to facilitate use with local residents.

Improvements roadmap for the use of policies

The roadmap’s format was originally conceived as a tool to identify pathways for transformation. In theory, this thesis could inform future actions and decisions concerning human-nature interactions. The creation of the roadmap involved integrating indirect drivers, such as landscape architecture and prevailing perspectives on nature, to formulate strategies for realizing long-term visions of symbiotic futures. Kim et al. (2023)

developed a similar framework, which bears resemblance to the roadmap structure presented in this thesis. Their framework aims to support the development of Nature Futures within social-ecological systems, such as neighbourhood biodiversity, and is intended for use in policy processes.

Given that the roadmap has proven to be a valuable tool for municipalities engaged in such policy work, it is pertinent to compare these frameworks to identify opportunities for enhancement. Additionally, the usability and visibility of the roadmap need further evaluation to ensure its practical utility.

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Appendices

0 - Project Brief

Name student Rosa de Jong **Student number** 4,645,464

PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT
Complete all fields, keep information clear, specific and concise

Project title Increasing biodiversity in an urban context - symbiotic relationships between citizens and non-humans

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

Introduction

Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)

Context: two neighborhoods in The Hague and Rotterdam are selected as Urban Living Labs for the 'Neighbourhood as a Biotope' project with its goal to increase biodiversity in an urban context. These Urban Living Labs are set up as a pilot by Hogeschool Rotterdam in collaboration with other stakeholders among which are citizens, municipalities, Bioto, TU Delft and more included. Research by Slingerland & Overdiek (2020) highlights the knowledge gap in representing nature as agents in the process of the 'Neighbourhood as a Biotope' project as well as in the design field at large. Therefore I want to collaborate with and contribute to this project by looking into how citizens can interact with non-human entities (focusing on biodiversity and its elements like soil, plants, and animals) that contributes to awareness of citizens (to notice) about what biodiversity is and to be response-able (Haraway, 2017) to increase biodiversity in their neighborhood.

Bioto is a tech start-up that designs sensors for citizens to collect data about microclimate conditions, used in combination with an AI-powered database of complementary species. They are unique in the way they connect knowledge of plants with animals. They are potentially part of my design solution, in which their knowledge could help me show possibilities on how to sense nature's (biodiverse) needs and provide knowledge on their experience in translating these insights to humans. Further limitations could hold in the collaboration with stakeholders (e.g. willingness to participate), the timing of the research project (planned activities, contact moments with stakeholders), and the fact that my findings will be based on one case study.

Main stakeholders & interests are: Hogeschool Rotterdam - project leader & client
citizens - key figures as they affect a large amount of space in cities. They have their own needs that might conflict with nature's needs. (city) Ecologists - knowledgeable about nature and its needs
Municipality - trying to increase biodiversity in the city & keeping citizens happy
Bioto - a company that collects data about the microenvironment through sensors & AI

➔ *space available for images / figures on next page*

Problem Definition

What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice.
(max 200 words)

Worldwide, there is a steep decrease in biodiversity, with losses so big that researchers have been writing about the possibility of a sixth mass extinction (Pievani, 2013). High biodiversity stabilizes and increases the productivity of ecosystems leading towards resilient futures (Diaz et al). People use ecosystems for resources (food, water, medicines) and it serves regulative functions (like storing CO2) (Pbl, 2023). However, growing urbanization leaves less space for healthy ecosystems (Pettersen et al., 2018). Therefore new ways should be researched to enable co-existence with nature in urban areas, especially ones rich in biodiversity (Glas, 2022). Citizens can be key figures in solving this problem, however, they think biodiverse gardens are messy, the topic is boring or they lack of knowledge about biodiversity (Slingerland & Overdiek, 2023). How do we listen, talk, and connect with nature so it becomes part of the process in which it is its main character? Ultimately, these interactions reach a symbiotic state, in which Haraway (2017) describes symbiotic as respectful and responsive. Through research by design, I want to shift beyond an anthropocentric approach. I am adressing the knowledge gap that addresses interaction and translation between nature's & humans' needs (slingerland & Overdiek, 2022). First attention is given to the current, different perspectives on interaction with nature. Then new ways of interaction are explored and conceptualized related to the 'Neighbourhood as a Biotope' project.

RQ: "How can design contribute to building symbiotic relationships between citizens and non-humans in an urban context?"

Assignment

This is the most important part of the project brief because it will give a clear direction of what you are heading for. Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence) As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:

1. Create a roadmap to understand the symbiotic relations between citizens and biodiverse surroundings in Oud-Mathenesse over time and give direction towards an inclusive future vision. 2. Design an intervention/tool to foster such symbiotic interactions between biodiverse surroundings and citizens in Oud-Mathenesse.

Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)

First I'll be gaining a deeper understanding into how currently people interact with nature through literature research and interviewing citizens, city planners, (urban) ecologists and Bioto in which they are experts.
Then I'll be finding alternative ways of collaborating with nature through co-creating futures to reshape human-nature interaction. The future aspect is used to enforced breaking with daily life (Brons., et al, 2022) and discover perspectives beyond the traditional time scales (Hupkes & Hedman, 2022). The goal of the future vision is to have an inclusive image of how co-existence could like like for both human as wel as non-human stakeholders.
The next step is bridging the now and the future vision making through backcasting. The findings from the current situation, future visions and backcasting are collected onto a roadmap.
For each time frame, a direction with recommendations/concept/tool/bouwsteen is created that enables the 'Neighbourhood as a Biotope' project to communicate biodiversity to citizens.
Through reflection on the futuring methods used, this research also contributes to how well futuring methods fit within a design project to find pathways towards new types of interaction bridging non-human needs and therefore contributing to a more inclusive design practice.

Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a ***kick-off meeting***, ***mid-term evaluation meeting***, ***green light meeting*** *and* ***graduation ceremony****. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).*

Make sure to attach the full plan to this project brief.
The four key moment dates must be filled in below

Kick off meeting	30 nov 2023
Mid-term evaluation	27 feb 2024
Green light meeting	6 juni 2024
Graduation ceremony	17 juli 2024

In exceptional cases (part of) the Graduation Project may need to be scheduled part-time. Indicate here if such applies to your project

Part of project scheduled part-time	
For how many project weeks	
Number of project days per week	

Comments:

Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five.
(200 words max)

My personal interests lay in non-human design, looking at things from a non-anthropocentric point of view. Most projects I did at IDE were focused on human centred design, however I'm very interested in having a project in which focus on stakeholders is more diverse, e.g. including nature. Additionally, I am interested in sustainable futures, including biodiversity as an important aspect of it. What I add extra as a double degree student to my design project is that I focus not only on the interaction between citizens and non-humans and design a prototype accordingly, but I focus also on the strategy (giving direction to the project by providing a future vision and steps towards such vision) behind the project. These two approaches create synergy; connecting prototypes to a strategy could give more direction and inspiration to the research.
I feel connected with the company Bioto, that has created plant sensors which are very familiar to my Bachelor End Project results. I have been thinking about the possibilities of these plant sensors and Bioto brought this , similar concept, to a higher level in connecting the sensors to social applications such as children and citizens to create an interaction through the language of plants, which is why I am very interested in finding inspiration from the company.
Competencies that I want to develop is Futuring and work with non-human stakeholders. A personal learning ambition is to organise a Futuring workshop and to both approach this project from a philosophical view (human-nature relationships) as well as a practical view (how to enable a connection). In the end, my biggest ambition for the project is to inspire people to design with and listen to nature more often in a design process.

A - Questions street interviews

Interview vragen

(Introductie wie wij zijn) Hoi, ik ben Rosa/Willemijn en ik ben bezig met mijn afstuderen van de TU Delft/HR over biodiversiteit in de wijk. Het doel van het project is om bewoners meer kansen te bieden om bij te dragen aan biodiversiteit. En daarvoor wil ik u een paar vragen stellen over uw ervaring met natuur in de wijk, we hebben ook een klein plantje als bedankje.

1. Heeft u weleens een vervelende ervaring gehad met natuur in de wijk?

2. En wat is uw leukste?

3. Wanneer komt u natuur tegen? Heeft u bijvoorbeeld huisdieren, planten, een balkon, tuin of gaat u wel eens naar het park?

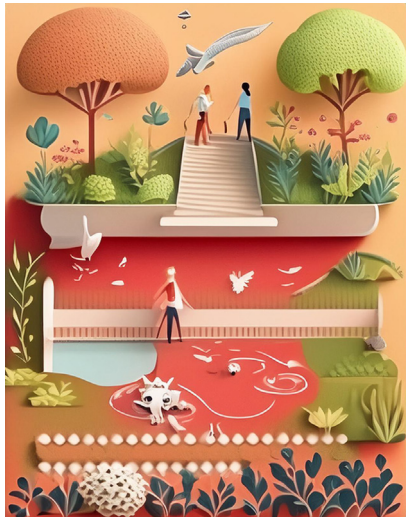
4. Wat brengt zo'n ervaring u? Bijvoorbeeld ontspanning, is het vooral sociaal, als sport of gewoon om naar te kijken?

5. Wat vind u het belangrijkste in een wijk?

6. Als u mocht kiezen, wie zou u het liefst als buurman/vrouw zien? Dat mogen mensen zijn, maar ook een dier, een landschap. En waarom?

Bedanken voor de tijd.

B – Final insight cards



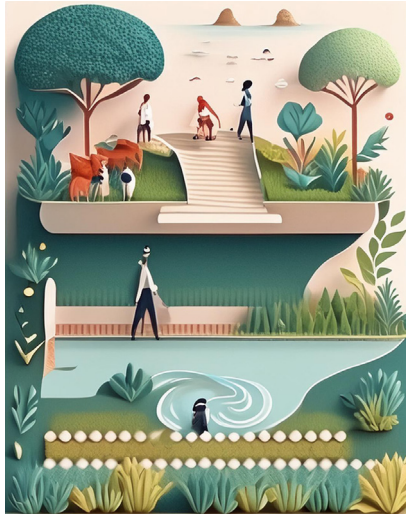
SHOPS ARE DISSAPEARING

There used to be a more diverse variety of shops in the Fransenlaan

"It has been reduced to liquor stores, and ther supermarket's. resident

UNWANTED ATTRACTIONS

In encounters with nature, there are sometimes shared needs (food) or unwanted consequences (like trash in shrubs)



HAPPY ENCOUNTERS

People enjoy when they see nature growing around them

"It is bizarre that you see almost instant results of what happens when you plant something resident

EFFECTS ON SOCIAL COHESIAN

Activities in nature can help people feel like being part of a community, but they can also make people feel excluded. While there's a sense of community, many residents live yet anonymous in the city

"I call them the nature freaks, but it has to be done together - resident

SPECIFYING V/S SIMPLIFYING 'NATURE'

Clarifying terms like 'nature' and 'biodiversity' is essential, for human understanding and as each species has specific needs. However, for overview and understanding it can be easier to highlight for example 'icon species'

NATURE SHAPES ENVIRONMENT AND BEHAVIOUR

Nature affects the environment, which then changes how people behave

"Thorny bushes are ideal for collecting rubbish" - ecologist

MAKING INITIATIVES WORK

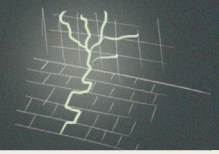
Successful initiatives emerge from a process of trial and error, allowing people to participate in ways they like best

"We have one woman that I think is not really into gardening herself. She's always picking up trash and *brooming the sidesidewalks, which is totally fine." - resident*

DISRUPTION

COVID-19 changed people's behaviour, making some reconnect with nature

"I think it was mostly during the COVID lockdown that I actually got back to my roots and discovered that I like plants." - resident



UNUSED SPACES

There are spaces in Oud-Mathenesse that could be used more efficiently, for example for nature

Leftover spaces can be heaven to nature, enabling for biodiverse surroundings

DEVELOPEMNTS OF M4H

The new residential area in M4H could affect Oud-Mathenesse as inspiration for green spaces and an increase in people who will use local services.

"Of course, we don't want that area to become a beautiful neighbourhood while it's completely neglected here" - resident

MANAGING SPACE FOR NATURE

Nature is resilient and will find its way in the city if given the right conditions

"Because the trees are given little space they have not been growing for 30 years" - ecologist

PUBLIC V/S PRIVATE

Nature offers different experiences depending on who owns the space and how comfortable people feel there

"At home, you have a bit more control over your space. When you're outside in a park you get accosted quite often". - resident

INVISIBLE NATURE

Humans don't see the invisible nature like insects, microorganisms, underground life

"I never knew we had so many animals in Rotterdam!" - visitor of the natural history museum

HUMAN'S TRASH

Trash can be used by animals to build nests, but it can also harm them

"Ah yes, there are always dead birds in the neighbourhood" - resident

LACK OF BIODIVERSITY

There's a limited amount of species that thrive in the neighbourhood

"I see a lot of grass, but mainly a lack of shrubs - ecologist

CONSEQUENCES OF CLIMATE CHANGE

Climate change causes problems like water and heat stress

"This neighbourhood is a well"
"My basement is flooding these days.
And that's going to smell you know" - resident

THE LOUDEST ONES ARE HEARD

Not all people and nature are listened to

"The loudest shouters get the most attention, that's just how it is. But the migrant workers don't dare to speak up". - resident

"But you really need to give nature a voice or find a way to weigh it equally ecologist

MANY NATIONALITIES

It's difficult to bridge languages and cultures, however, the variety can also be a ontribution to the neighbourhood

"Back in the days we did joint activities, such as Easter egg hunts. But now that people of other nationalities are moving in, we also have to celebrate other parties". - resident

A CITY HAS MANY FUNCTIONS

The city has many uses, and there's a fight for space where people's, nature's, and environmental needs meet

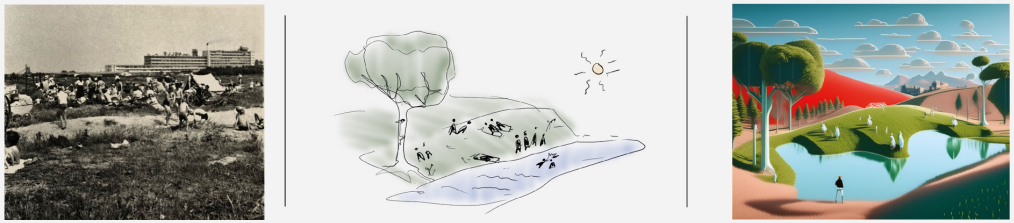
There are a lot of calls for more trees in the city, but it's not about space above ground but underground.
It's a huge mess there" - policy maker & ecologist.

POLLUTED ENVIRONMENT

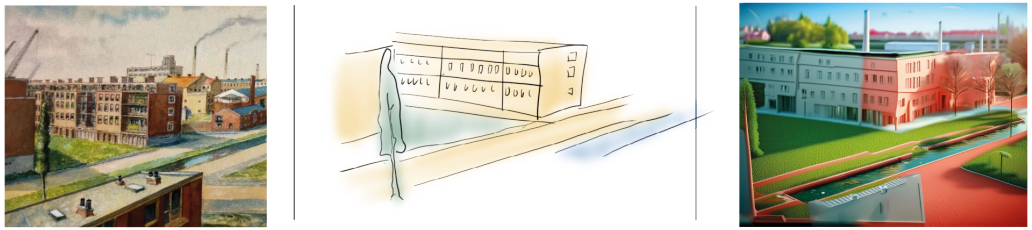
The neighbourhood suffers from pollution in various ways; soil quality that does not allow for agriculture, human trash and water channels are prone to diseases

C - Picturing the environment; from photo to drawing to AI generated images

A: images from different resources, **B:** Traced image from A,
C: AI generated image with image B as a reference

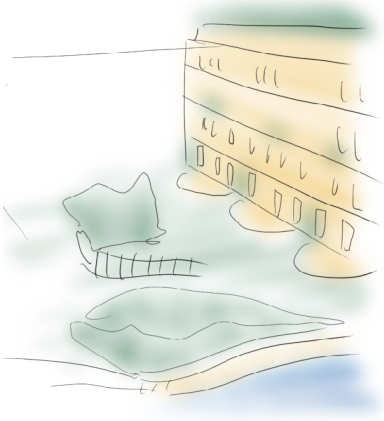


1930 A: Photograph of the area before it was called the Midscheeps



1950, A: Drawing of the newly build Midscheeps

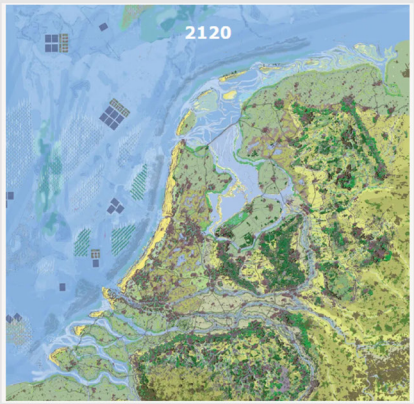
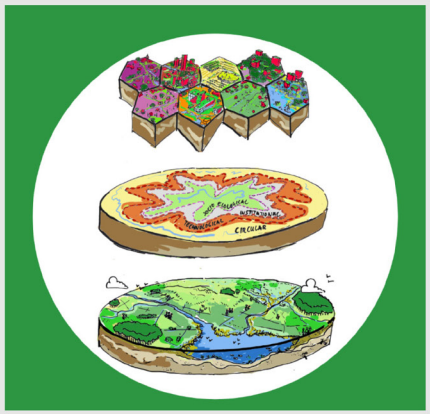
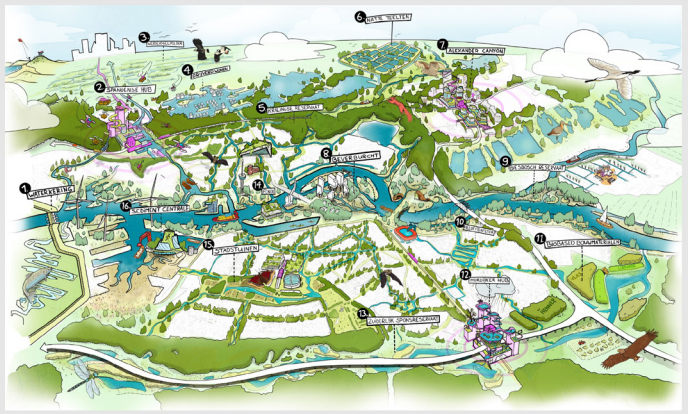
2024, A: Photograph of the Midscheeps



2030, A: Redesign created by Bioto

2050, A: Future vision by Natuurhistorisch museum Rotterdam in collaboration with Bureau Stadsnatuur and Witteveen & Bos

D – analysis future visions

focus theme	Aan de hand van dit kaartbeeld schetsen wij hoe Nederland er in 2120 uit kan zien indien Nederland kiest voor een natuur-inclusieve toekomst.	Symbiotic city	Rotterdam als Nationaal park
Author	WuR	WuR	WuR
Image			
Year & scale	2120	2050	+=2030
most important pillars	1.Natuurlijk systeem aan de basis 2. optimaal benutten van water 3. Natuur-inclusieve samenleving 4. Circulaire economie 5. Meebewegende (adaptieve) ruimtelijke inrichting	eco-centrism symbiosis equity values of nature	Reservaten, groene aders en ankerpunten (5,9,14,8) Biodiversiteit (3) Inrichting van de stad (prioriteiten in de ruimte) (7,2,6,1,10,13) kringloop (4,16,11)

Toekomst van random wijk in Rotterdam

Toekomst van Oud-Mathenesse en het Witte Dorp

Toekomstschets van Bioto voor de Schepenbuurt

Witteveen+Bos, inspired by Heijmans en Bureau Stadsnatuur

2050

Felix architects

+-2030

Bioto

2027

growable and liveable city

commute healthy

Less tiles! more green

no cars

klimaatadaptieve wijk

meer contact buren en buurtbewoners tegen eenzaamheid

overgangszones tussen gebouwen en openbare ruimtes

versterkte biodiversiteit

geprogrammeerde openbare ruimte die aansluit bij gebruikers

meer groen, minder verharding en parkeren

verdichtingsstrategieën versterken de relatie tussen gebouw, plintprogramma en buitenruimte

de voetganger en de fietser krijgen meer ruimte binnen de wijk

prettige wandelroutes

gezond lokaal voedsel

sociaal maatschappelijke waarden

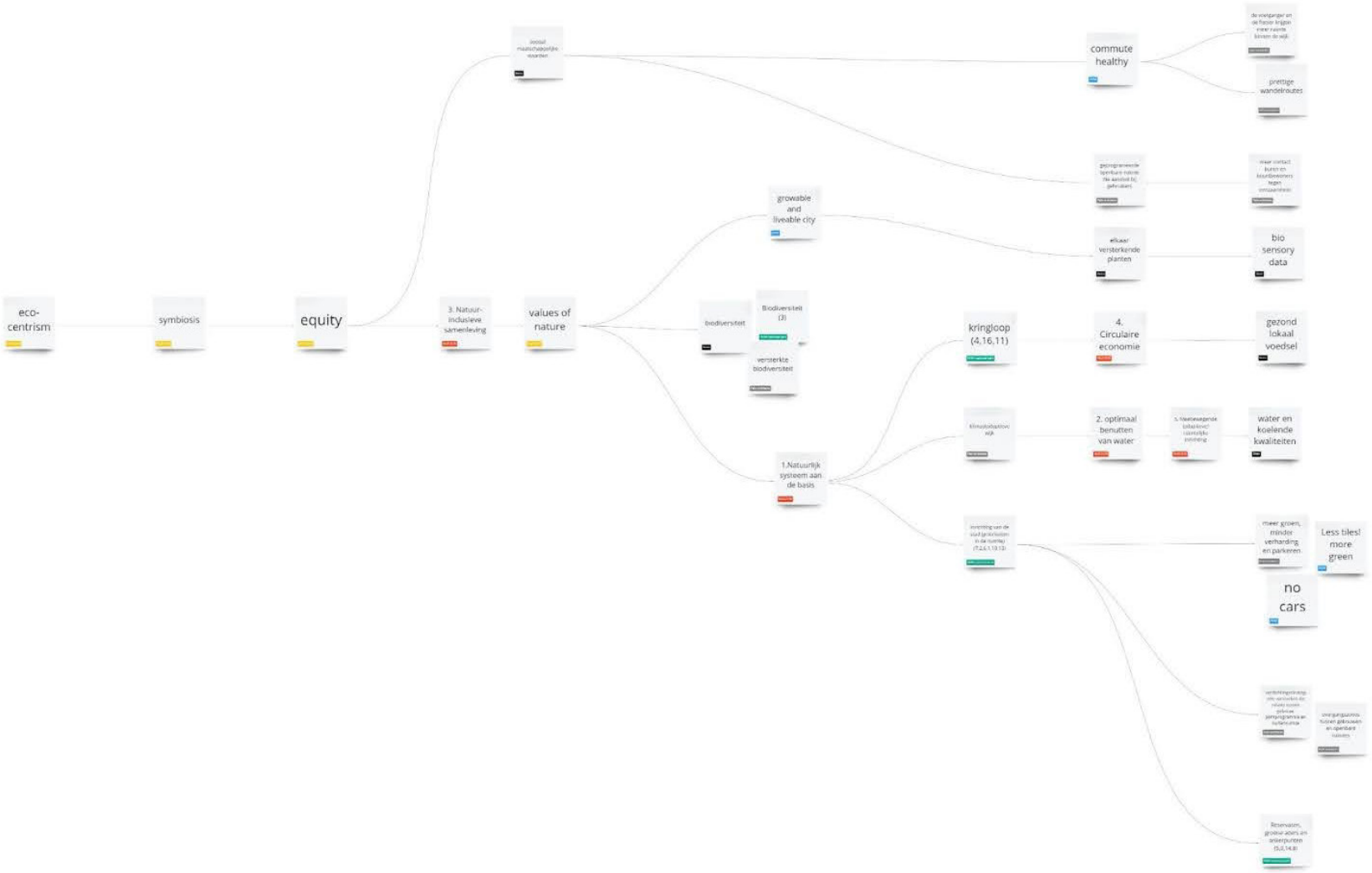
biodiversiteit

elkaar versterkende planten

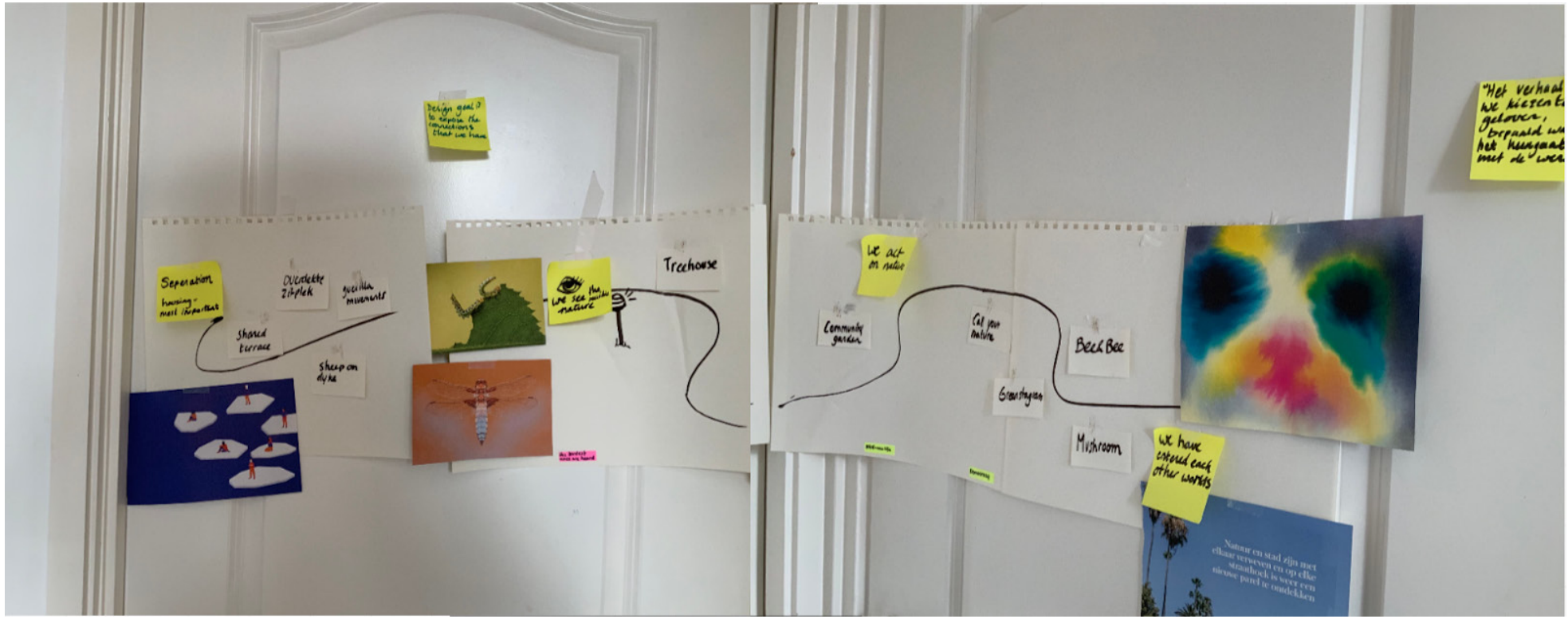
water en koelende kwaliteiten

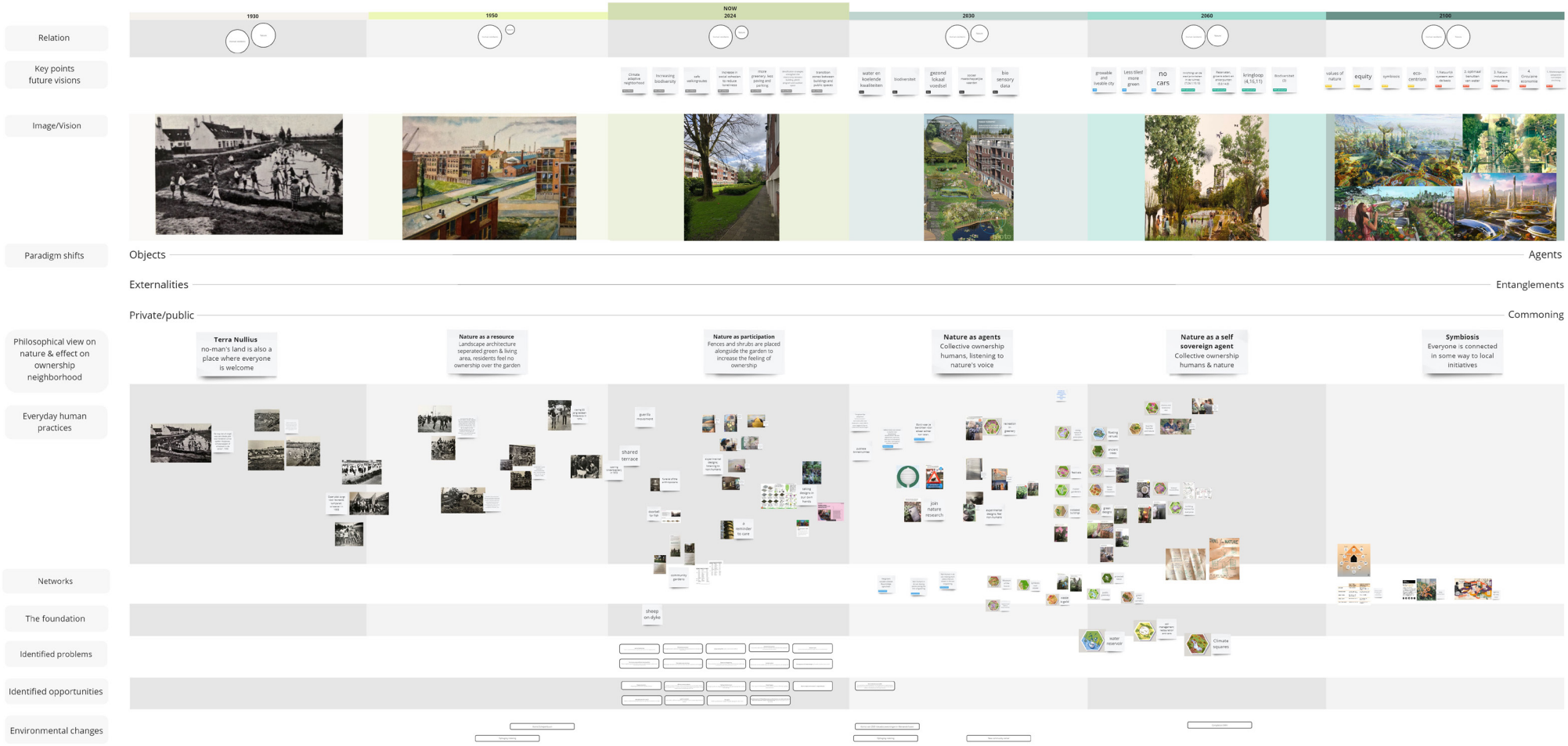
bio sensory data

E - Features from future visions, from motivation towards implementation

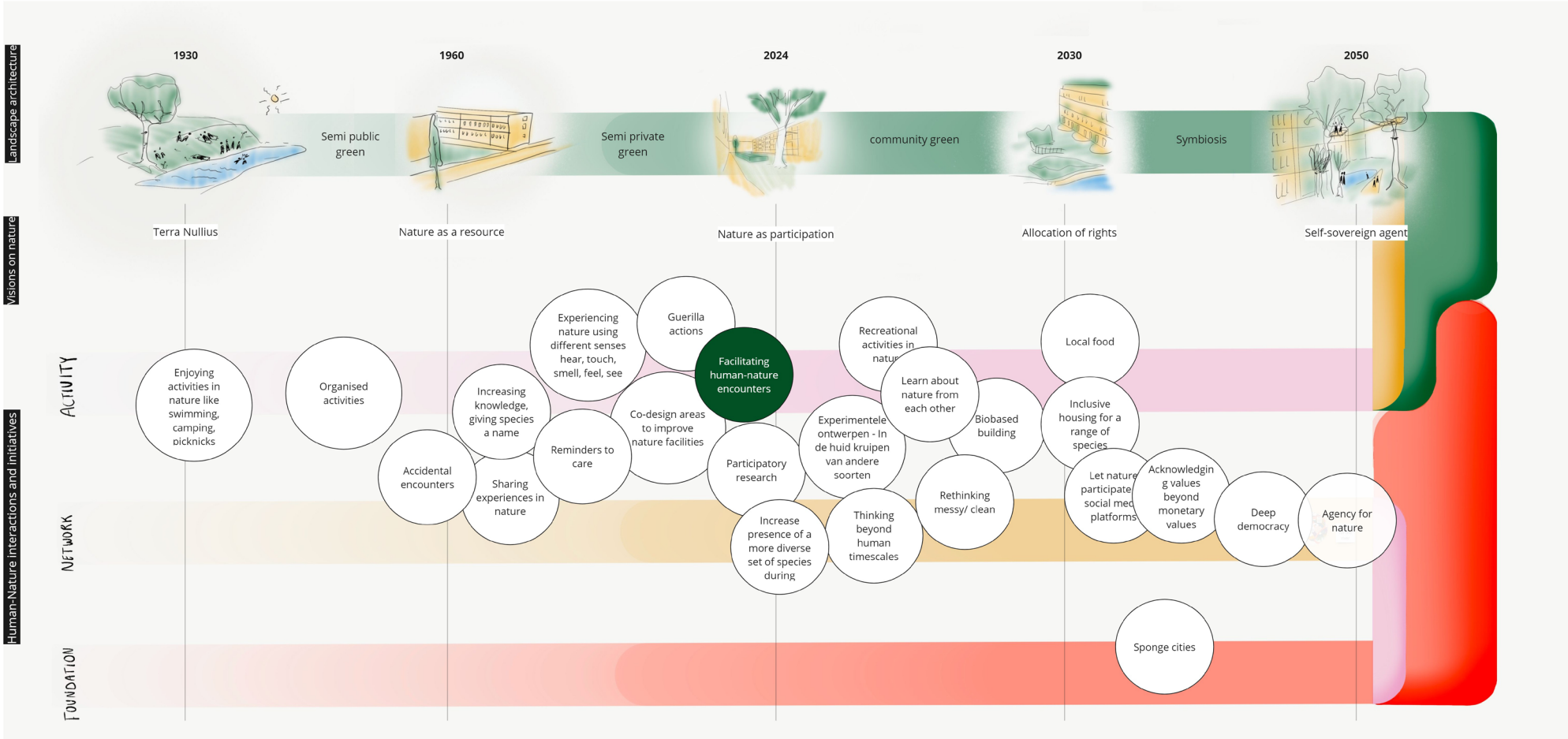


F - Roadmap iterations



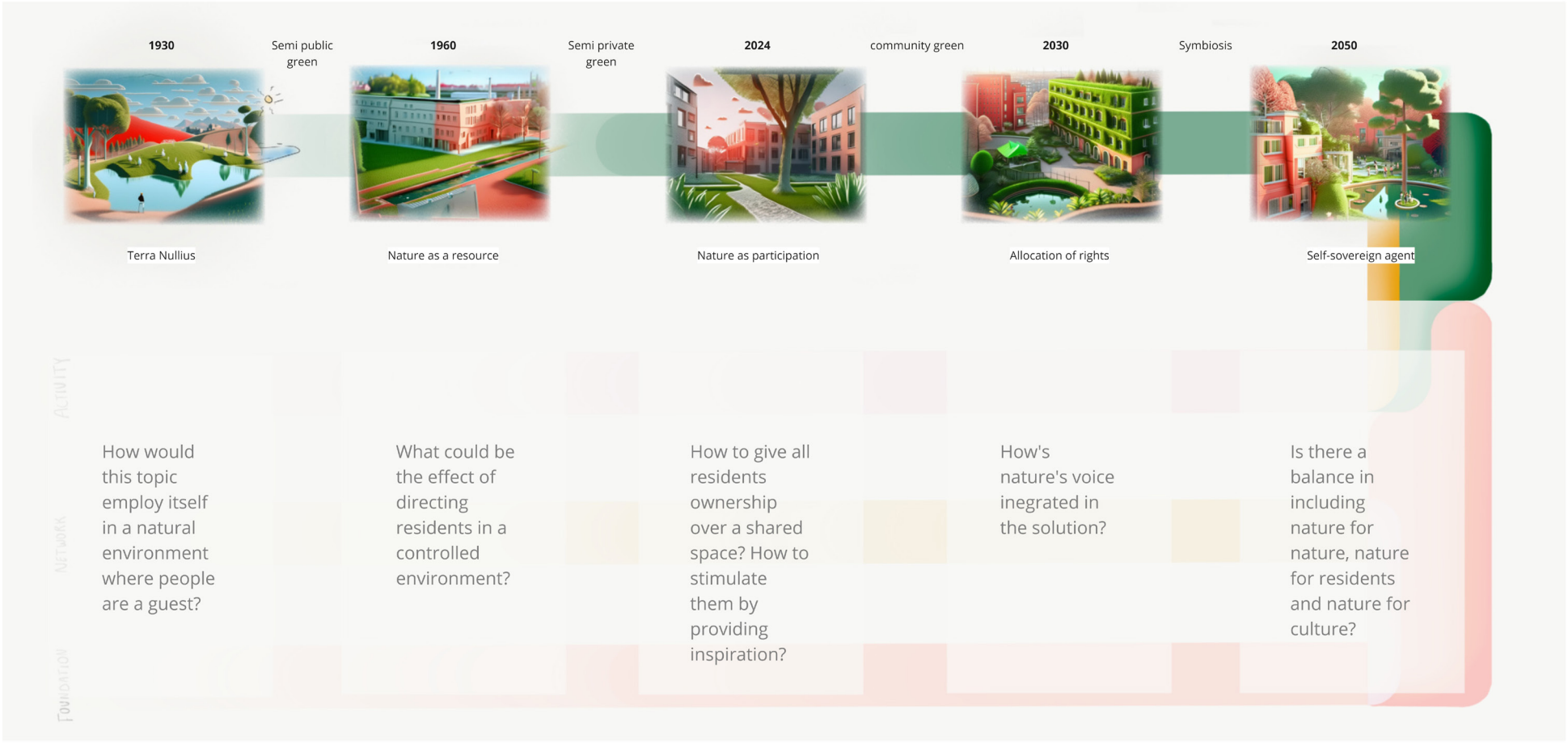

1930
1950
NOW
2024
2030
2060
2100
Relation
Key points future visions
Image/Vision
Paradigm shifts
Objects
Agents
Externalities
Entanglements
Private/public
Commoning
Philosophical view on nature & effect on ownership neighborhood
Terra Nullius
no-man's land is also a place where everyone is welcome
Nature as a resource
Landscape architecture seperated green & living area, residents feel no ownership over the garden
Nature as participation
Fences and shrubs are placed alongside the garden to increase the feeling of ownership
Nature as agents
Collective ownership humans, listening to nature's voice
Nature as a self sovereign agent
Collective ownership humans & nature
Symbiosis
Everyone is connected in some way to local initiatives
Everyday human practices
Networks
The foundation
Identified problems
Identified opportunities
Environmental changes

Symbiotic neighborhood | Roadmap for biodiverse neighborhoods



G – Final insight cards Times, based on the roadmap insights

Symbiotic neighborhood | Roadmap for biodiverse neighborhoods



It is the year 2030
Nature has been given more rights

How would you design for this opportunity or tension if nature had its own rights?

How could this tension have been prevented? Or how would the opportunity be used in 2030? How can you apply this knowledge now?

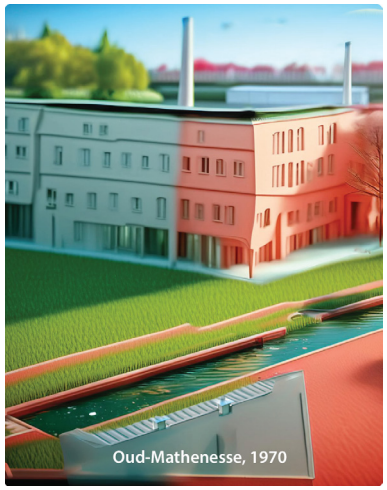
Put this cards on top of an insight card

It is the year 1970
Nature is primarily seen as a resource

How would you design for this opportunity or tension if nature was only a resource?

How could this tension have been prevented? Or how would the opportunity be used in 1970? How can you apply this knowledge now?

Put this cards on top of an insight card



It is the year 1970
Nature is primarily seen as a resource

How would you design for this opportunity or tension if nature was only a resource?

How could this tension have been prevented? Or how would the opportunity be used in 1970? How can you apply this knowledge now?

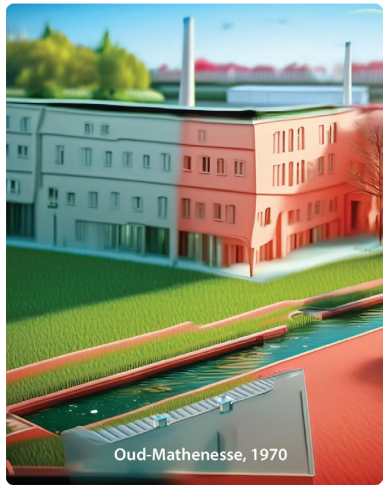
Put this cards on top of an insight card

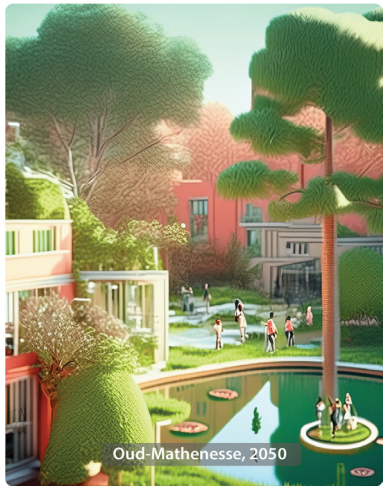
It is the year 2050
Nature is an independent agent

How would you design for this opportunity or tension if nature could make decisions by themselves, without the permission of humans?

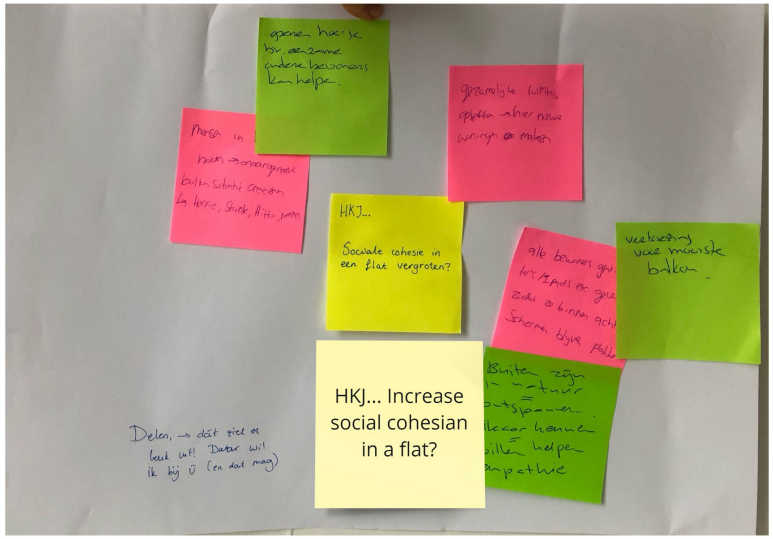
How could this tension have been prevented? Or how would the opportunity be used in 2050? How can you apply this knowledge now?

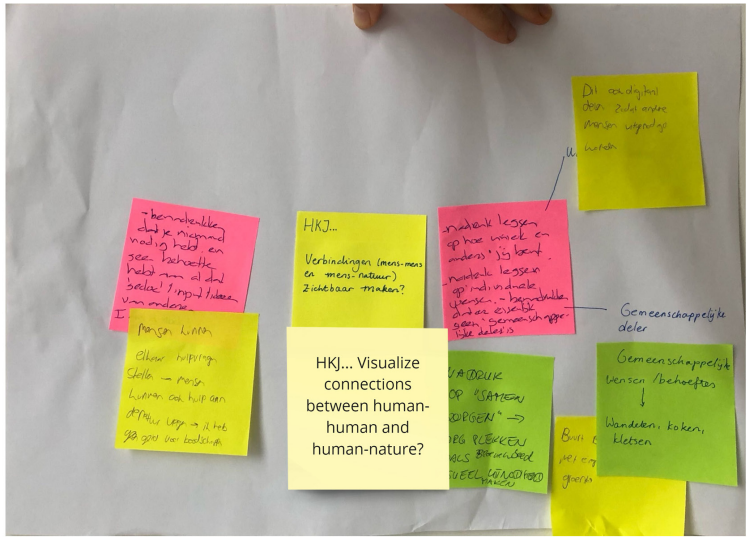
Put this cards on top of an insight card

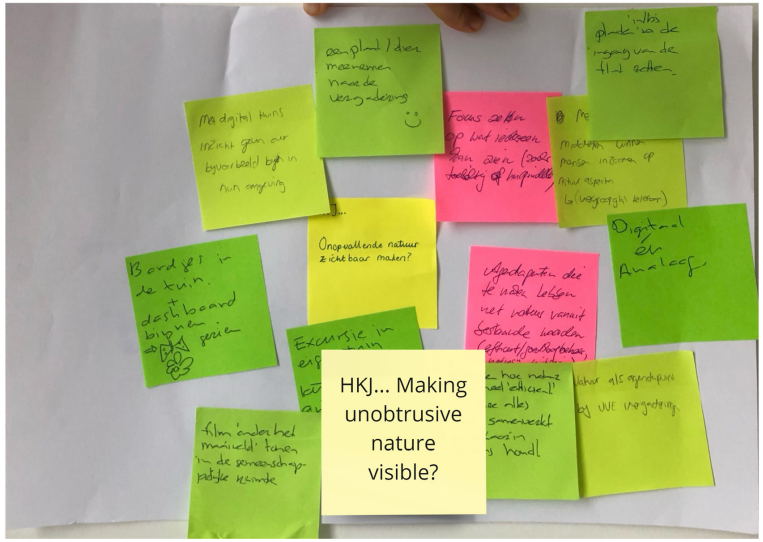


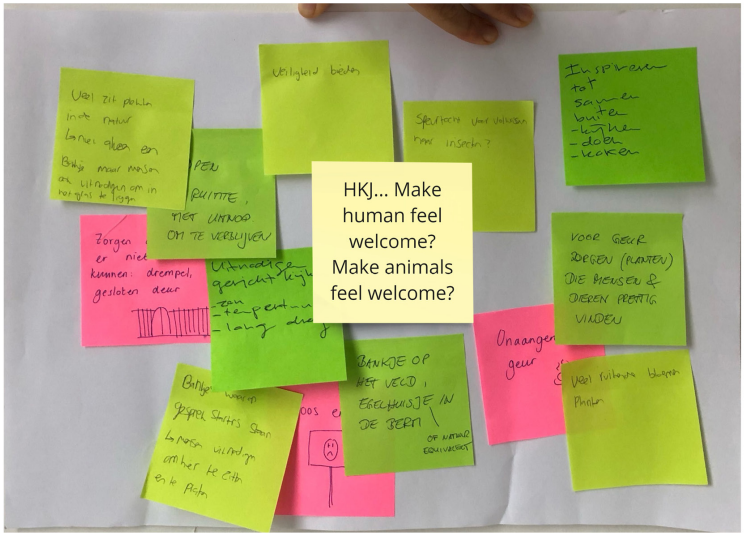


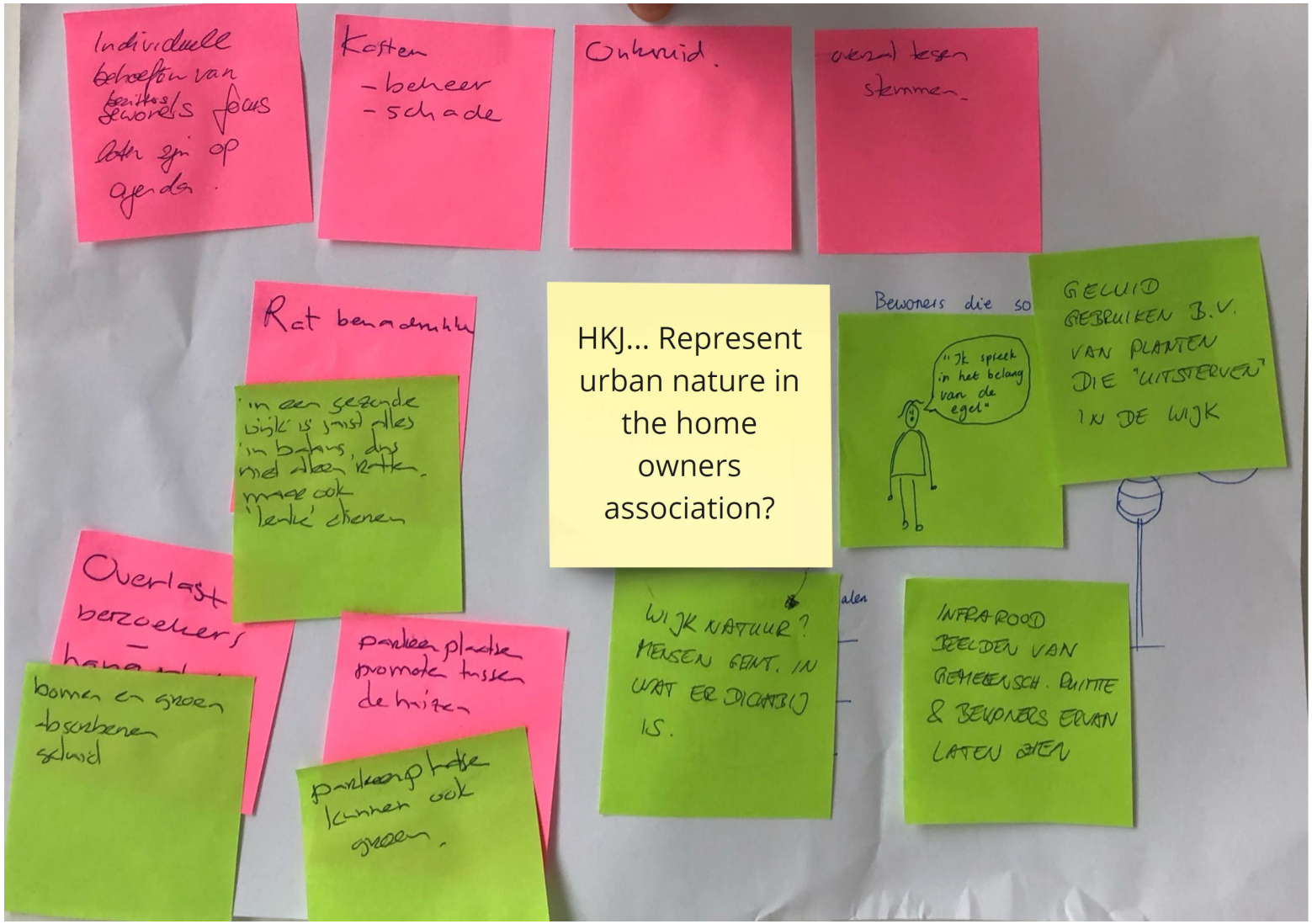
H - Co-creation, brainstorming on how to..? questions

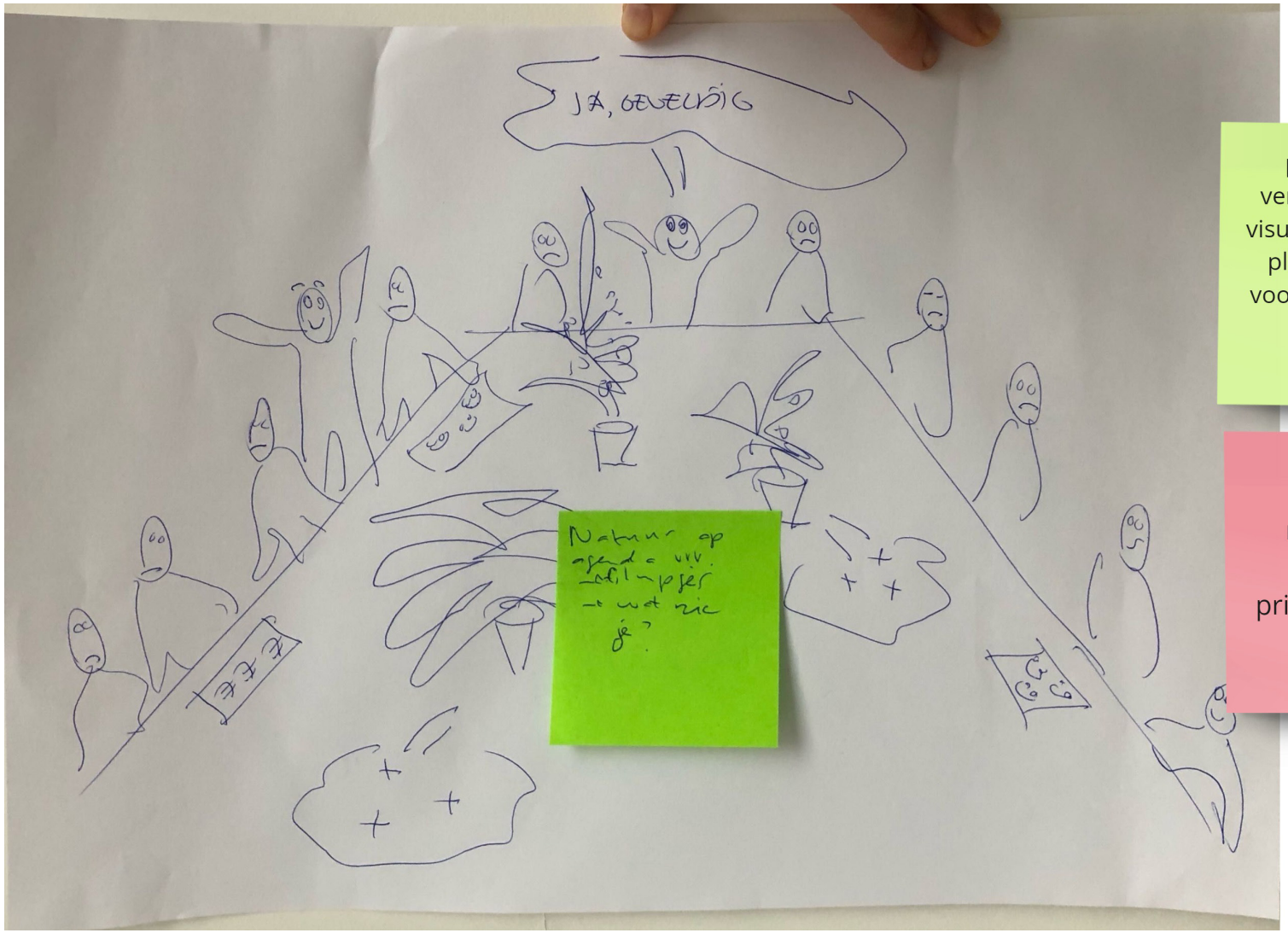









Individuele behoeften van bewoners focus later ook op agenda.
Kosten
- beheer
- schade
Onkruid.
overal tegen stemmen.
Rat
'in een gezonde wijk' is juist alles in balans, dus niet alleen ratten, maar ook 'leuke' dieren
HKJ... Represent urban nature in the home owners association?
Bewoners die so
"Ik spreek in het belang van de egel"
GELUID GEBRUIKEN B.V. VAN PLANTEN DIE "UITSTERVEN" IN DE WIJK
Overlast bezoekers
bomen en groen absorberen schuld
parkeerplaatsen promoten tussen de huizen
parkeerplaatsen kunnen ook groen.
WIJK NATUUR? MENSEN GENT. IN WAT ER DICHTBIJ IS.
INFRAROOD BEELDEN VAN GEMEENSCH. RUIMTE & BEWONERS ERVAN LATEN ZIEN



planten in de vergadering, voor visueel aspect en de planten laten de voordelen zien, wat zij kunnen toevoegen

Er zijn altijd mensen met andere prioriteiten, zoals auto's, geld

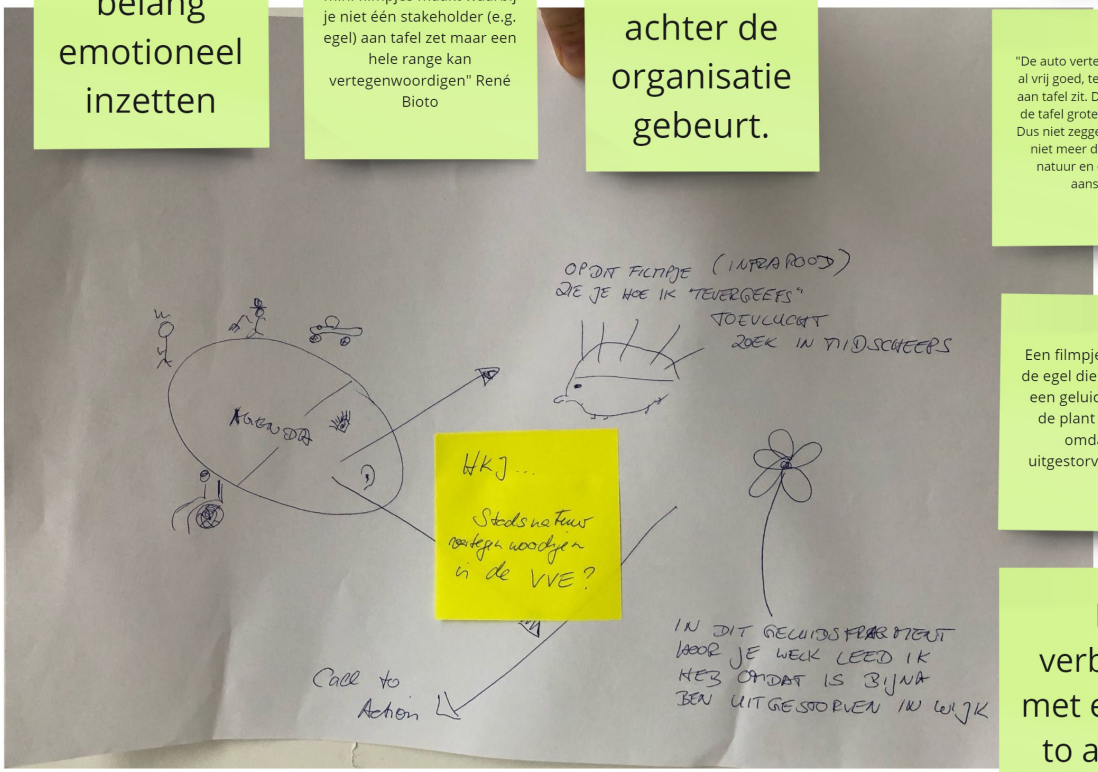
Ik zou het belang emotioneel inzetten

"Hoe gaaf zou het zijn als je mini filmpjes maakt waarbij je niet één stakeholder (e.g. egel) aan tafel zet maar een hele range kan vertegenwoordigen" René Bioto

Zien wat er achter de organisatie gebeurt.

Dat je door kleine verhaaltjes dingen meeneemt. d.m.v. storytelling

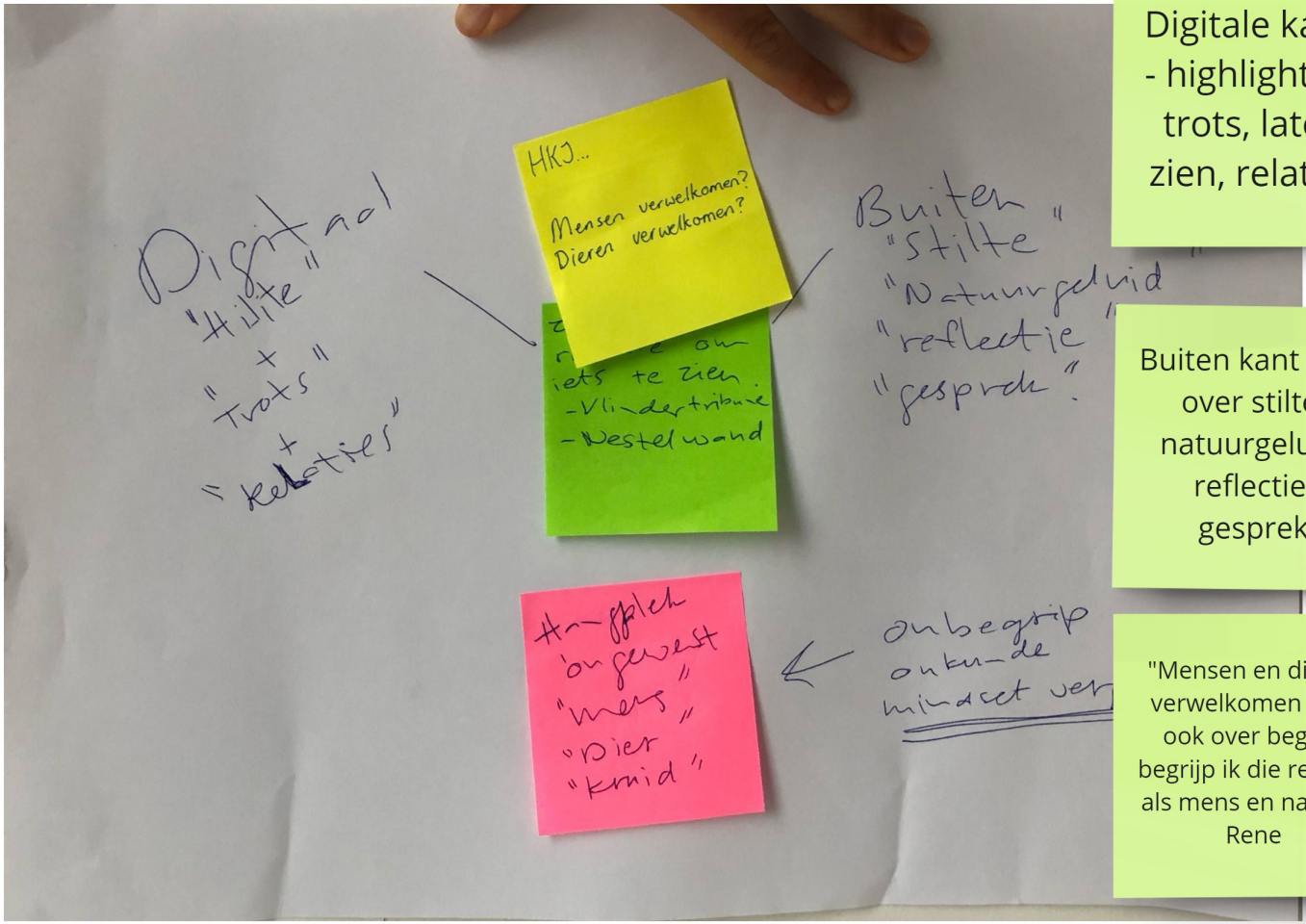
Anja: het is ook schaalbaar voor andere vve's



"De auto vertegenwoordigen wij al vrij goed, terwijl die daar niet aan tafel zit. Dus ik denk dat we de tafel groter moeten maken. Dus niet zeggen 'we kunnen dat niet meer doen' maar door natuur en dieren te laten aanschuiven.

Een filmpje infrarood over de egel die er rondloopt en een geluidsfragment van de plant die leed heeft omdat ze bijna uitgestorven is in de wijk.

Dit verbinden met een 'call to action'.

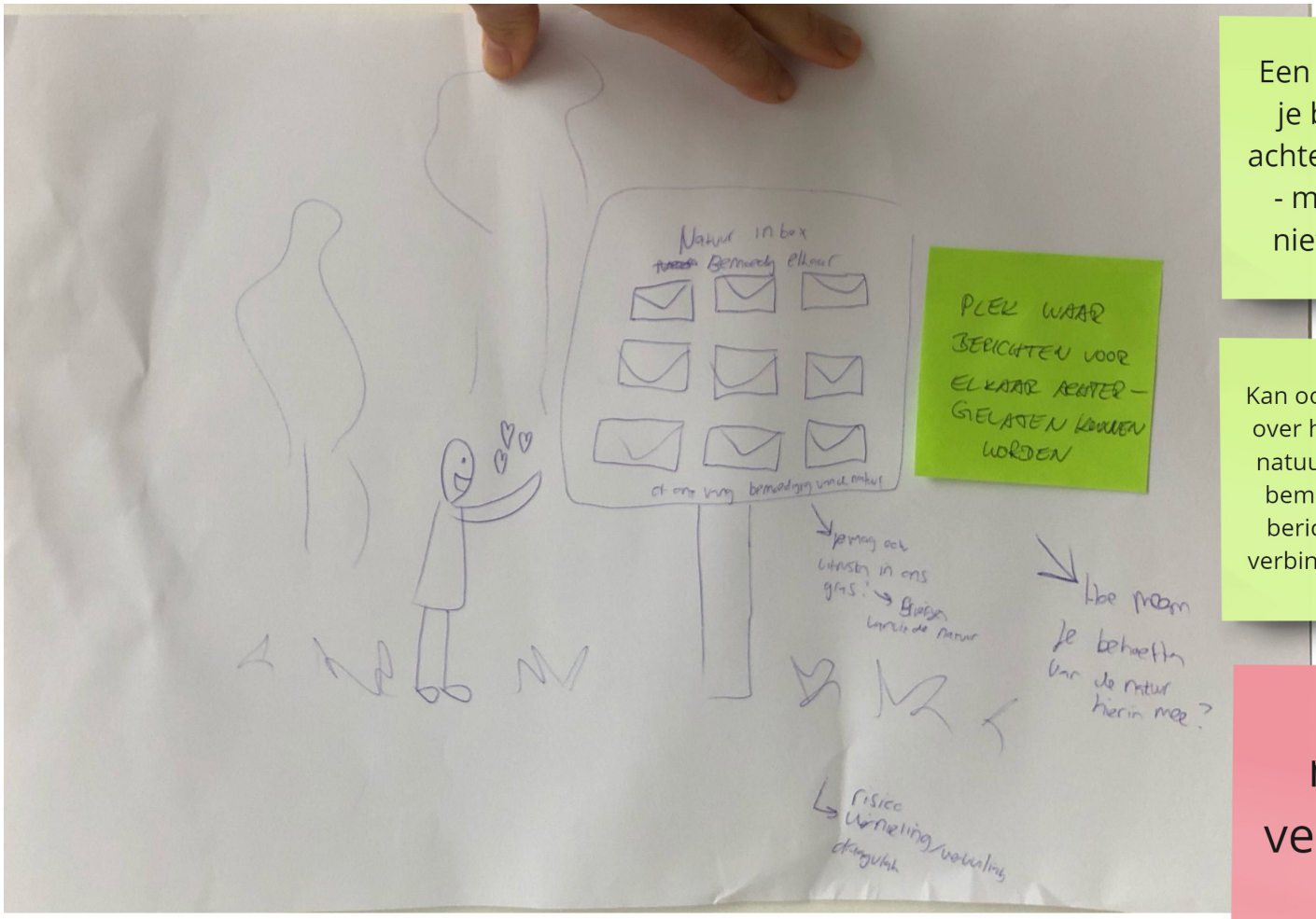


Digitale kant - highlighten, trots, laten zien, relaties

Hangplek
Ongewenst, mens, dier, kruid. Maar gaat ook over onkunde en over hoe kan je die mindset vergroten?

Buiten kant gaat over stilte, natuurgeluid, reflectie, gesprek

"Mensen en dieren verwelkomen gaat ook over begrip, begrijp ik die relaties als mens en natuur"
Rene

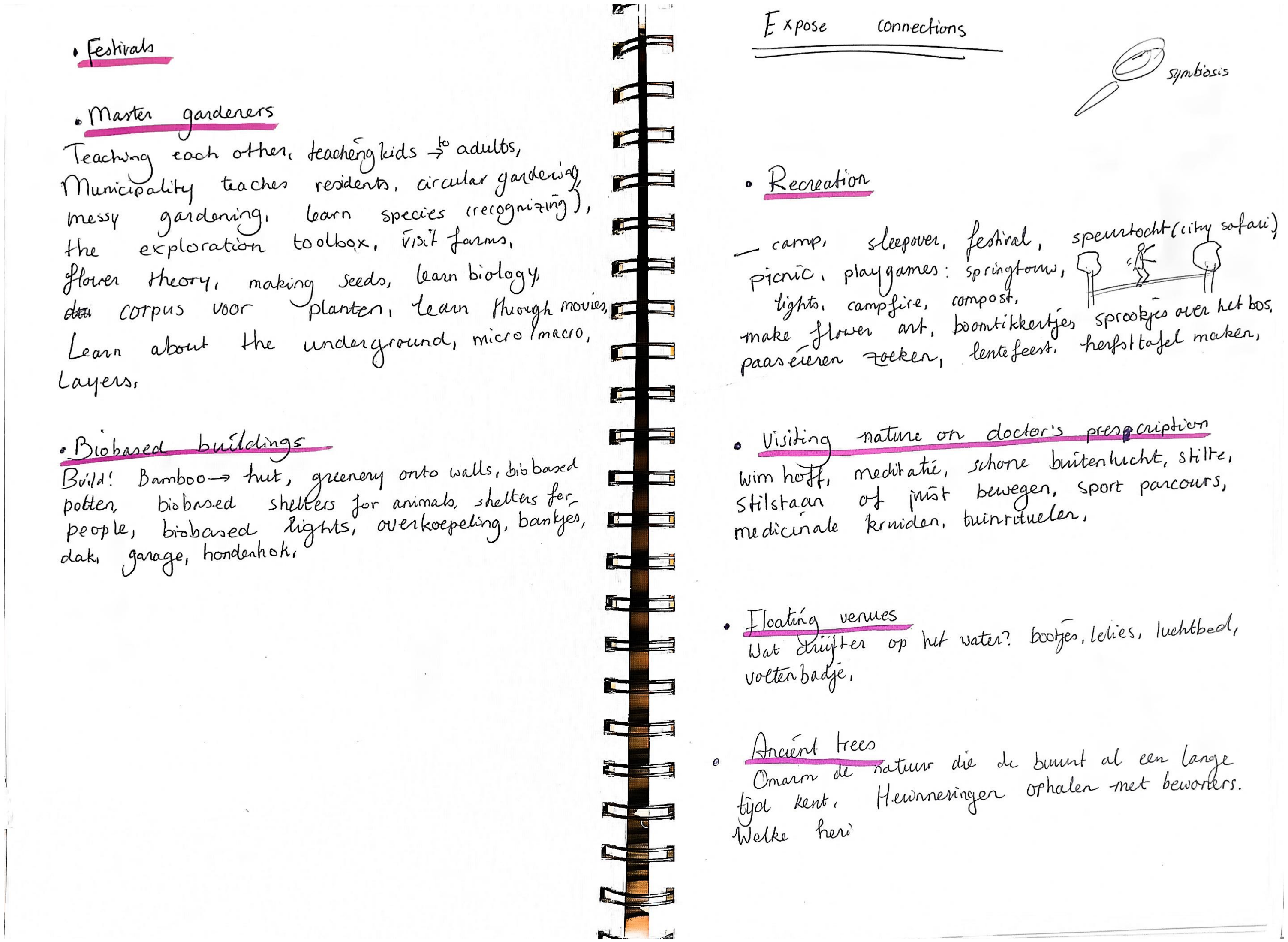


Een bord waar je berichten achter kan laten - mensen en niet-mensen

Kan ook opdrachtjes over hoe je naar de natuur kijkt, elkaar bemoedigen met berichten wat de verbinding versterkt

risico: vernieling

I - Braindump ideation



- Festivals
- Master gardeners

Teaching each other, teaching kids → to adults, Municipality teaches residents, circular gardening, messy gardening, learn species (recognizing), the exploration toolbox, visit farms, flower theory, making seeds, learn biology, corpus voor planten, learn through movies, Learn about the underground, micro/macro, Layers,

- Biobased buildings

Build! Bamboo → hut, greenery onto walls, biobased potten, biobased shelters for animals, shelters for people, biobased lights, overkoepeling, bankjes, dak, garage, hondenhok,

Expose connections

symbiosis

- Recreation

— camp, sleepover, festival, speurtocht (city safari)
picnic, playgames: springtouw, lights, campfire, compost, make flower art, boomtikkertjes, sprookjes over het bos, paaseieren zoeken, lentefeest, herfsttafel maken,

- Visiting nature on doctor's prescription

wim hoff, meditatie, schone buitenlucht, stilte, stilstaan of juist bewegen, sport parcours, medicinale kruiden, tuinrituelen,

- Floating venues

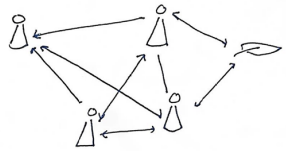
Wat drijft er op het water? bootjes, lelies, luchtbed, voetenbadje,

- Ancient trees

Omarm de natuur die de buurt al een lange tijd kent. Herinneringen ophalen met bewoners. Welke heri

Entanglement:

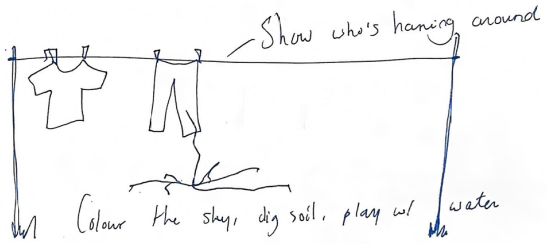
Show a web of residents & show the effects.

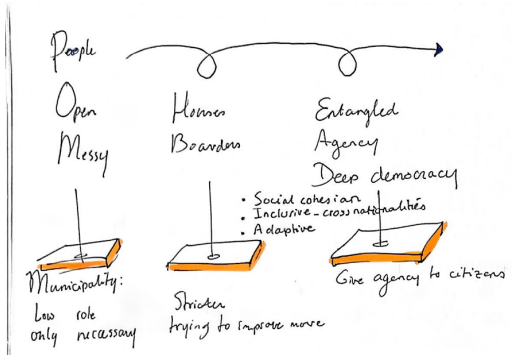


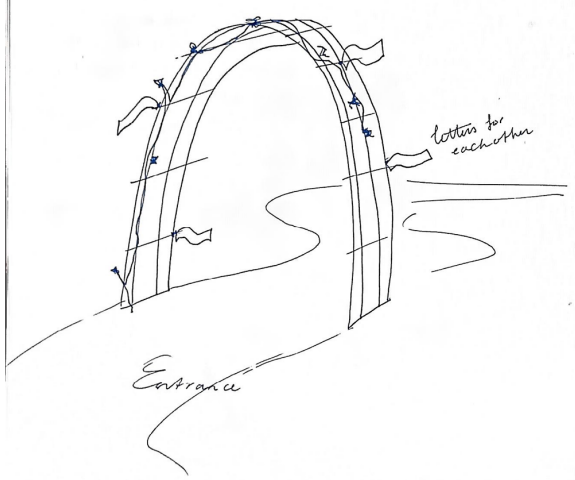
Shikkers met watje voor een ander hebt gedaan.

Faciliteren van zo'n plek: A coming together (party, bench, etc.) And show who's joining. The sky, water, soil

- When you start sitting on the bench, it shows you're part of the system. there's a light / vibration. Let's grow together.







Design for agency

Talk to/communicate with nature, other residents, the weather, soil, water, insects underground

Empathy towards environment

Design an inclusive social media

An entrance, dirty place, integrate in VVE networks.

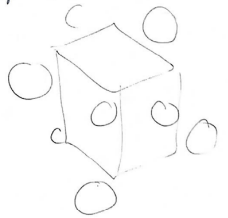
voila in municipality, people who get responsibility for certain voices, ~~value for other things than money~~

Entanglement

Show value in the agent-to-agent relationships

Free House: a house build on diff. value flows. Show not only the species, but also what value they bring to each other. Show the value, because this is often untangible. E.g. giving water: space, birth of new plants, help with seeds.

Commoning

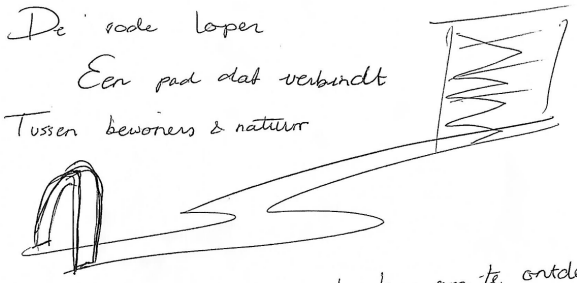


De rode draad

De rode loper

Een pad dat verbindt

Tussen bewoners & natuur



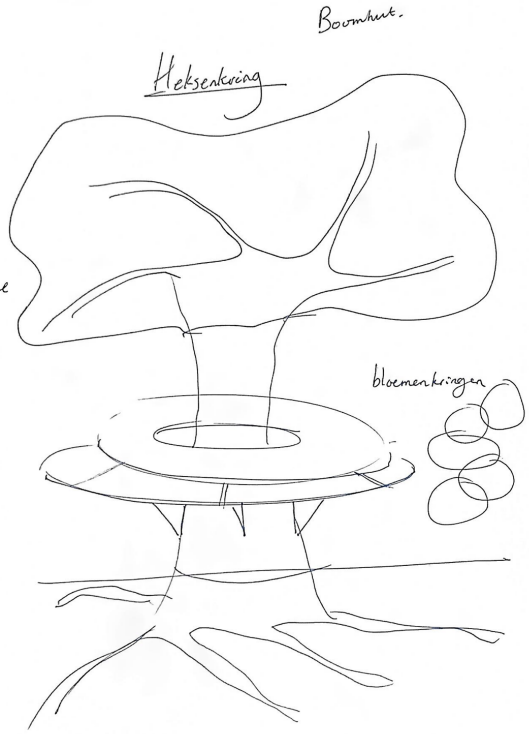
Een paadje waar je doorheen kan om te ontdekken

Het loopt door, door de flat heen.

De rode loper heeft verschillende wegen voor verschillende soorten.

Het is een uitnodiging, introductie van de voorstelling van de natuur.

Wat we nodig hebben is verbinding

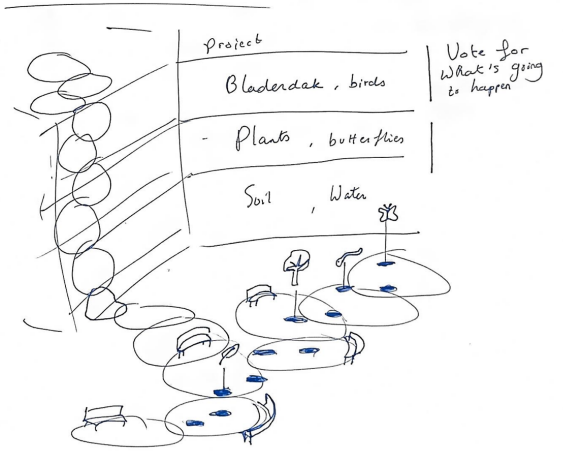


Een plek voor ontmoeting, waar je kan blijven hangen, alleen terug kan komen & die in verbinding staat met de natuur.

practical — Heksenring, circulair eten verbouwen, overdekt, modderpoel,

Network — Residents, what's their incentive? Show Value exchange

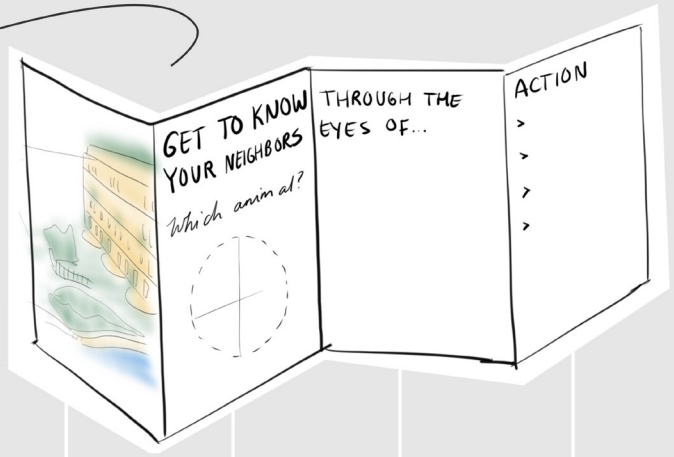
Soil / water — Contribution, look through

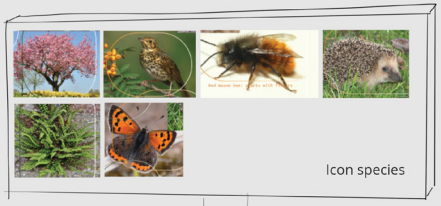


J - Concept creation

Get to know your neighbours

Through the eyes of ..





Vision of a biodiverse garden

empathize with an **animal** who lives in the garden

Fill in the **story**

Translate to **action**

Voedsel

Veiligheid

Menselijk afval

In de binnenplaats van de Midscheeps, te midden van de stedelijke _____ (soort geluiden dat je op de binnenplaats hoort), _____ (manier van voortbewegen) een eenzame _____ (dier) genaamd _____(naam) met vastberadenheid. Haar maag knorde van de honger, waardoor ze elke hoek en kier verkende op zoek naar voedsel.

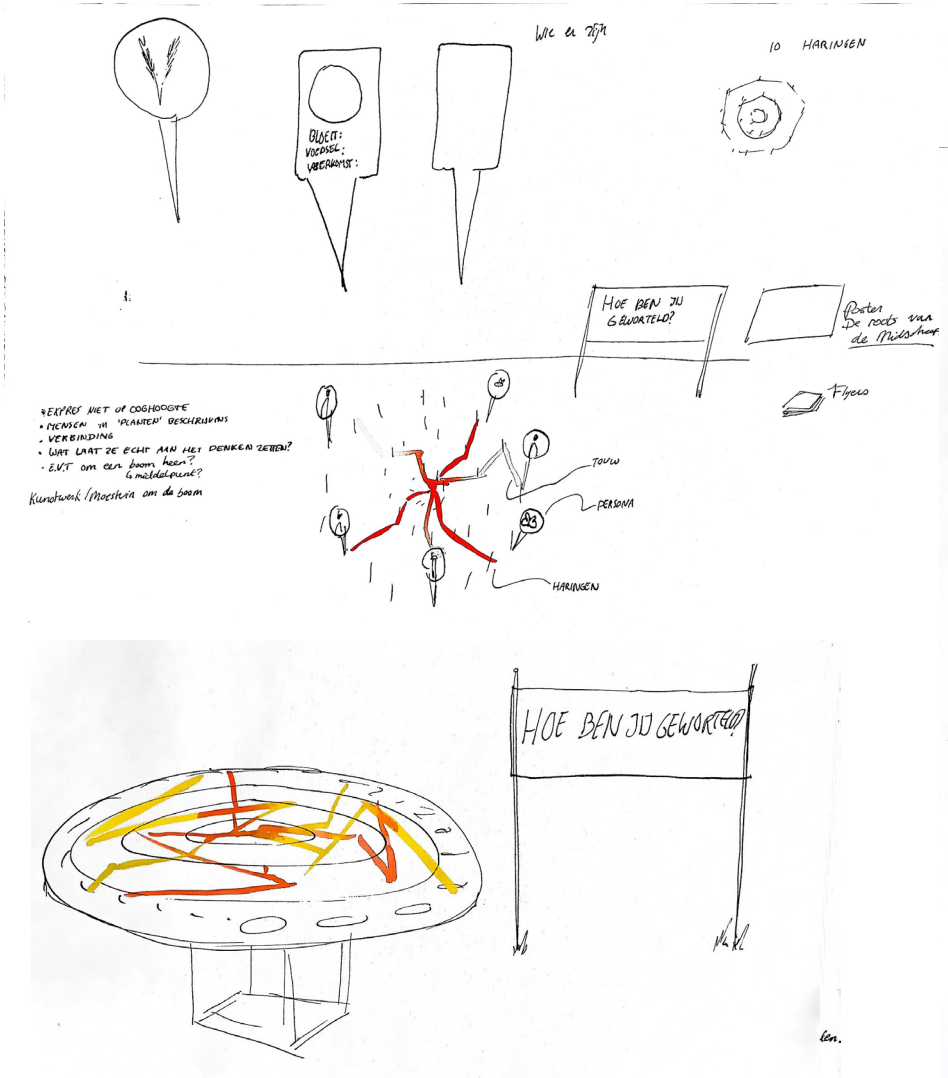
Terwijl ze de drukte om haar heen negeerde, schoot _____ (naam) tussen bloempotten door en op de reling van het balkon, haar scherpe _____ (meest gebruikte zintuig van dit dier) speurend naar enig teken van een maaltijd. Meestal waren er kleine insecten te vinden onder de bloempotten, maar vandaag waren de _____(insecten) er niet. En de kruimels van gisteren waren al lang verdwenen, waardoor ze met lege maag achterbleef en verlangend naar een hapje om haar buik te vullen.

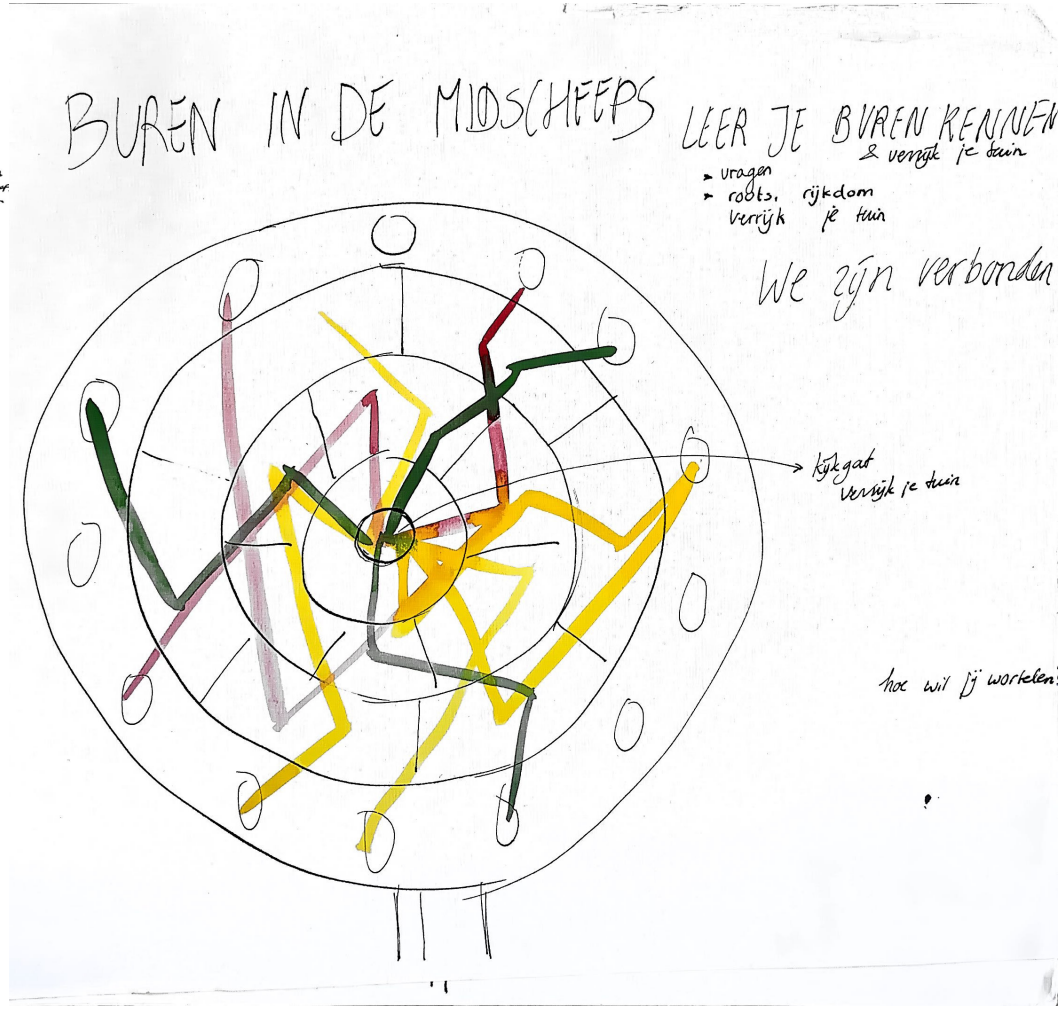
Ongestoord ging _____ (naam) op zoek naar toevlucht in _____ (schuilplaats voor dit dier). Vanaf haar uitkijkpost ontdekte ze een sprankje hoop: een _____ (afval van menselijk eten + merknaam) achtergelaten op een balkon.

Met een triomfantelijke _____ (geluid dat dit dier maakt) ging _____ (naam) naar beneden, haar _____ (waarmee ze eet) proefde de _____ (smaak van dit eten). Dat smaakte naar meer, maar haar feestmaal was van korte duur, toen een ondeugende windvlaag de _____ (verpakking van afval) buiten haar bereik deed tuimelen, waardoor ze opnieuw in de greep van de honger bleef.

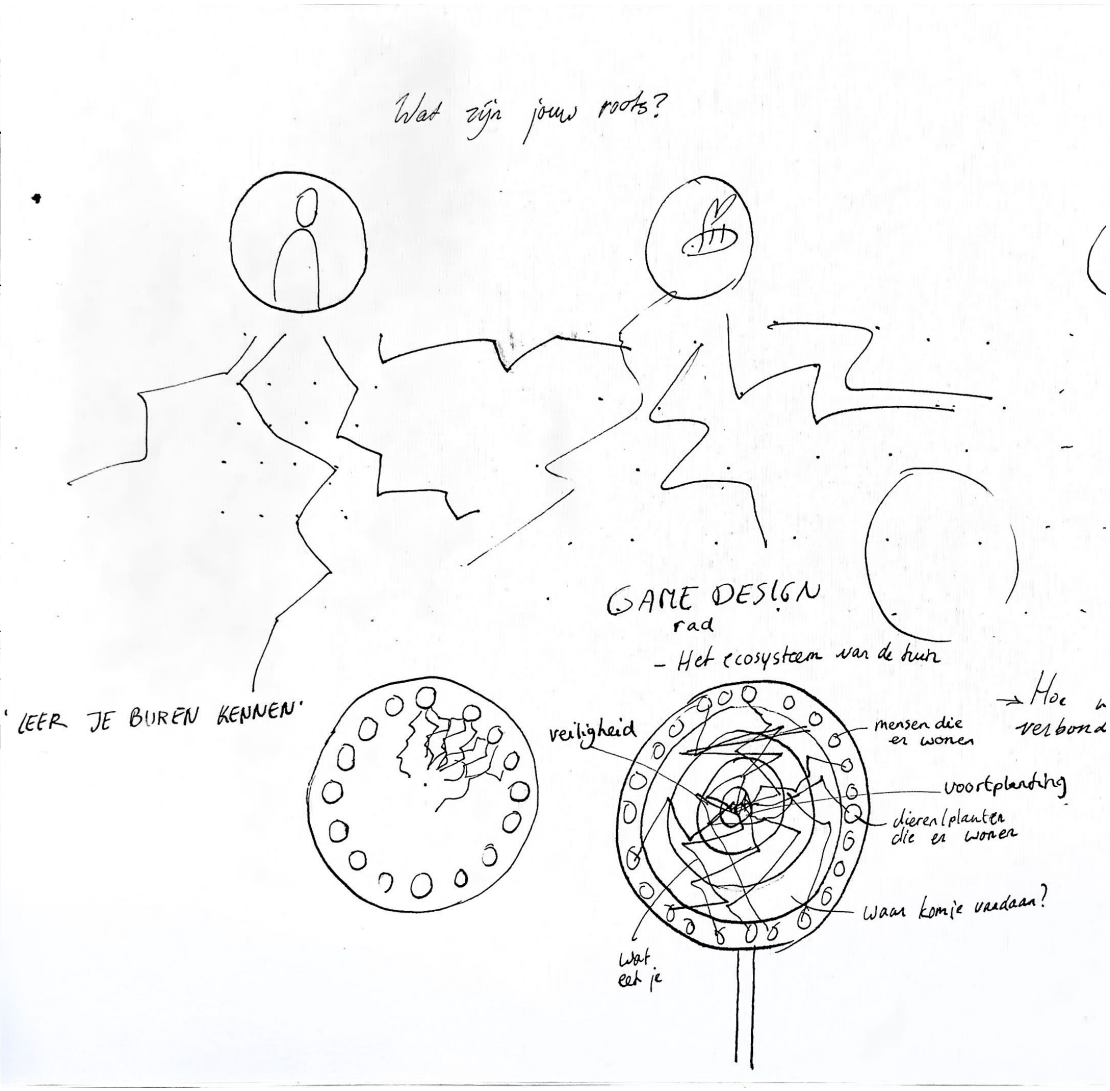
Weigerend zich te laten verslaan, verzamelde _____ (naam) haar kracht en ging door, vastbesloten om voedsel te vinden in deze betonnen jungle. En terwijl de zon onder de horizon zakte en lange schaduwen over de binnenplaats wierp, zette ze haar zoektocht voort met onwankelbare vastberadenheid, wetende dat morgen nieuwe kansen en de belofte van een volle buik zou brengen.

K – Concept iterations






HOE BEN JIJ GEWORTELD?

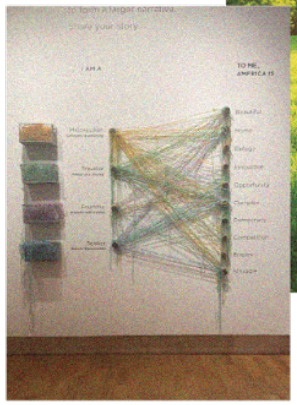

Wat zijn jouw roots?
GAME DESIGN
rad
- Het ecosysteem van de buurt
'LEER JE BUREN KENNEN'
veiligheid
mensen die er wonen
voortplanting
dieren/planten die er wonen
waar komje vandaan?
Wat eet je

L - Concept collage

Tree at the center

Persona creation

Roots of a tree as a metaphor



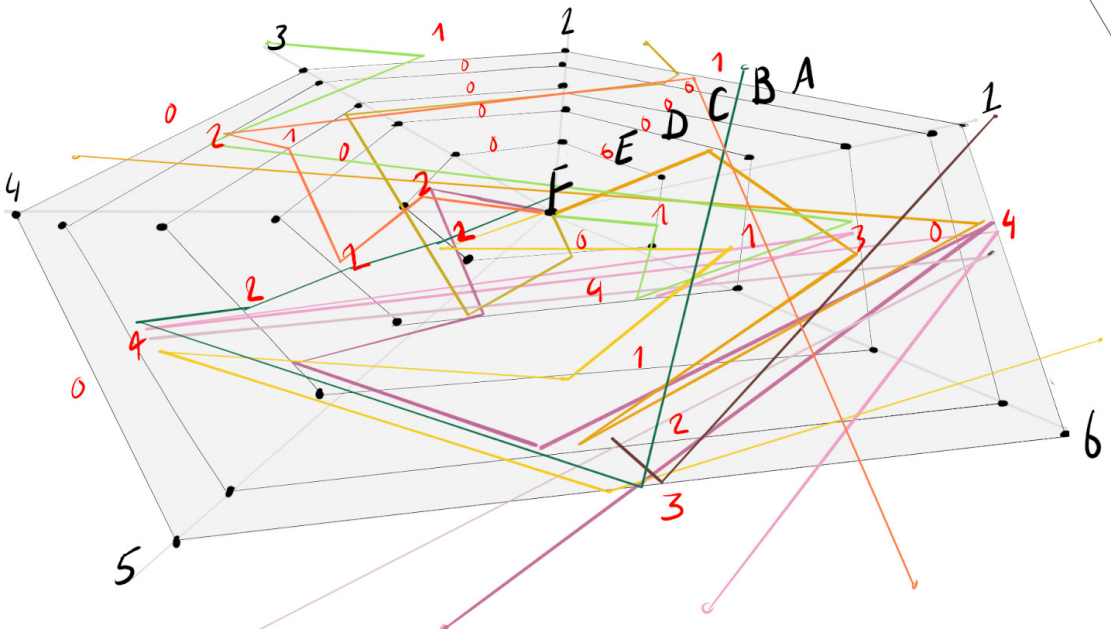
Visually selecting options

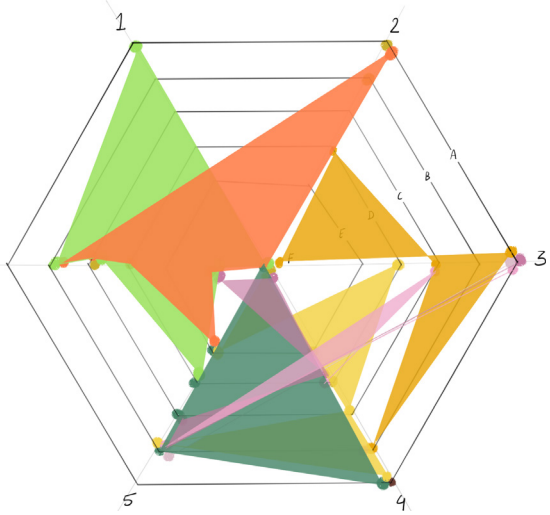
Identification of plants

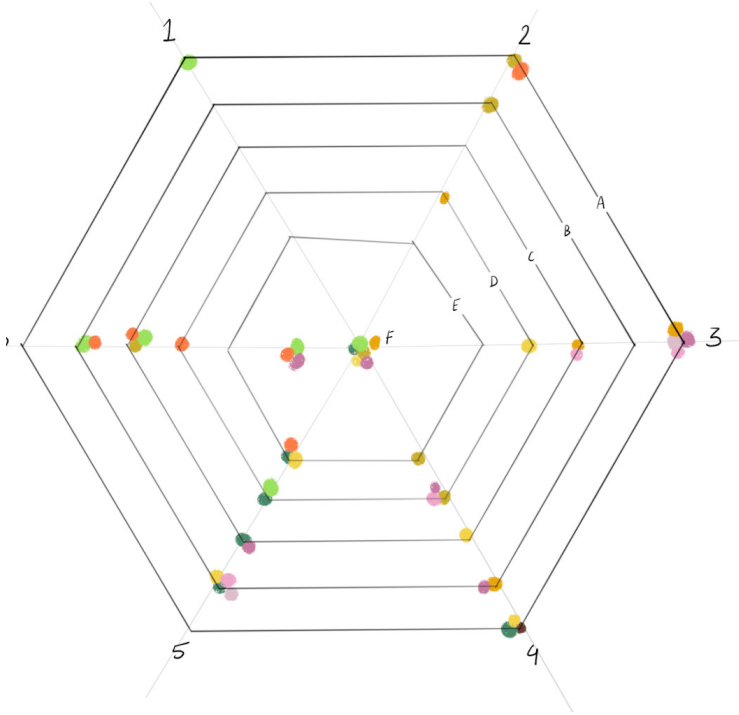
M - Test plan

A	B	C	D	E	F	G
Time (min)	**Duration (min)**	**Parts**	**Goal/aim**	**notes**	**materials**	**individual/group**
5	1	**Welcome**	Understanding assignment	Hi Welkom bij de workshop **In verbinding met je buren**. Jullie gaan meewerken aan een kunstwerk. Hiervoor is de eerste stap een kaartje van jezelf maken. Dan nemen we die daarna mee naar een boom waar je een paar vragen over jezelf moet beantwoorden. Daarna kijken we naar het web dat is ontstaan.	leuke stand, inschrijfblaadje	Group
3	2	**Persona creation**	Become aware of yourself as a resident and introduce yourself to others	Iedereen neemt plaats aan de stand en tekent zichzelf met stift op het kaartje. Teken een feature van jezelf op het gezicht, en vul een vraag in. Knoop een draadje vast aan het kaartje. Als iedereen dat heeft gedaan stellen we elkaar kort voor. Voorstellen met ervaringen, iet smet thema wortelen/	stiften, persona's, touwtjes	Individual
5	2	**Walk to the tree**	View the structure of the intervention, what do you notice?	Samen lopen we naar de boom. Uitleg: Iedereen mag een rondje om de boom heen lopen en hun kaartje in grond bij een lege haring in de buitenste ring mogen steken. Elke ring bevat een vraag, en de antwoorden staan op de haringen. Ring voor ring beantwoord je de vragen en leidt je het touwtje erlangs tot je bij de boom bent aangekomen.	Boom met sign, haringen	Group
10	5	**Plant your persona**	Plant your persona among other residents and answer questions towards the tree	Tijd om de opdracht in stilte uit te voeren.		Individual
15	5	**Reflection**		Kijk er nog eens naar. Wat valt jullie op? Zijn er verrassende overeenkomsten/verschillen? Wat vinden jullie ervan dat je tussen dieren en planten bent geplaatst?	Notitieblok om op te schrijven wat er is gezegd	Group
15		**Afsluiting**	Bedanken, open voor vragen	Deze workshop is afgelopen maar wat ik hiermee wilde laten zien is hoe we in deze buurt verbonden en geworteld zijn, zowel de mensen als planten en dieren. Neem als je wilt vooral nog even de tijd om te blijven kijken. Ik wil jullie bedanken voor het meedoen.		
		Opschrijven		Opschrijven wat er is gezegd		

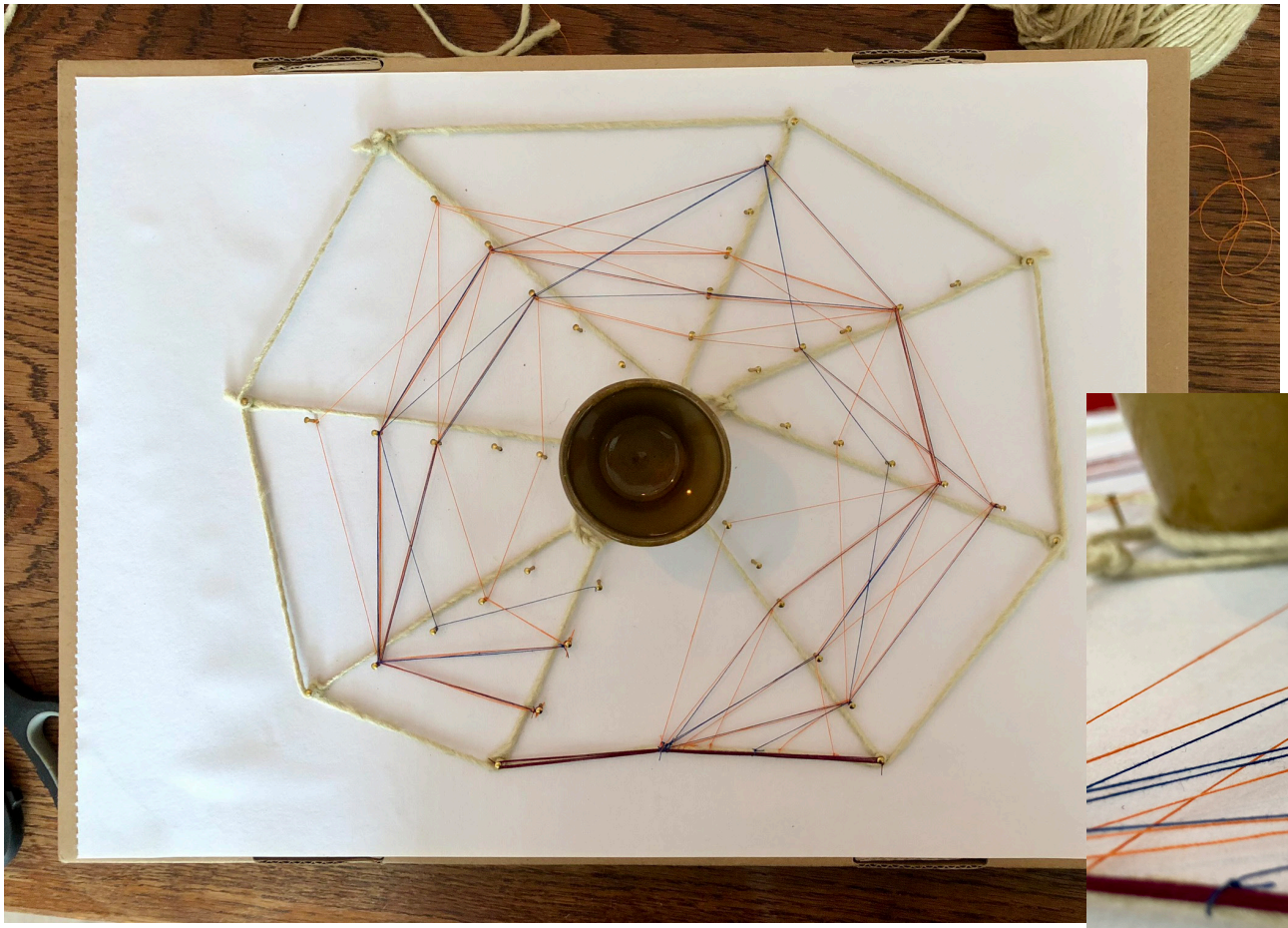
N - Data evaluation - try & error

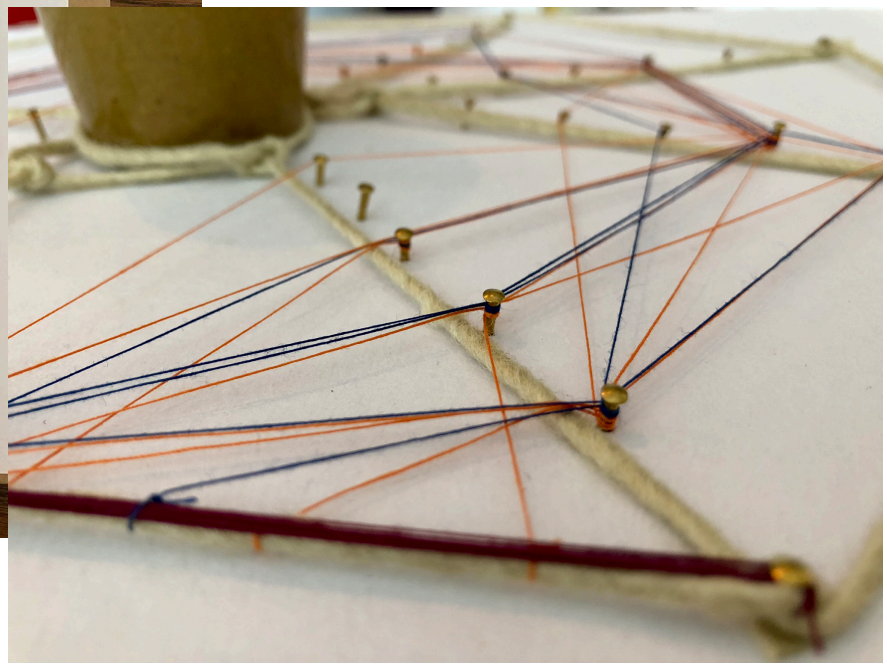






0 – Exploring emmodiments and variations





P -Initial story tree (the final version was shortened)

Story of the tree

1.My grand grandparents settled long ago, their seeds blown through the wind towards the rural area with wide fields and where the skyline of Rotterdam, back then, was a dot on the horizon. Do you remember the time when the view was wide? When I was little, when there was so much life in the grass, that insects constantly tickled my toes and this area was perceived a no-mans-land. That was the time when I grew up, humans call it the year 1930. So, who are you?

2.While growing up, I wasn't here alone, as my roots started to grow first and I felt it touching my parents' roots and my neighbours underground supporting me. They fed me when I was sick. My roots grew and grew and I got to know more neighbours. It kept me stable in the sometimes, harsh environment. We survived the cold winters and rare hot summers. These relationships and roots make me who I am today, a tree here in the Midscheeps. Do you feel rooted in this area, too?

3.It is not like growing up was only fun and pleasurable. But when I had lice, I would invite my friends, the ladybugs, and treat them with an amazing dinner. It's a very mutual relationship. I know there are some species that I like better than others, but I know that it is healthy not to be everyone's friends, as long as we accept each other. Which kind of plants are you favourites?

4.When the wind is whistling through my leaves I feel like dancing. Those are my favourite days. I noticed people like me more on these warm summer days. Suddenly, they comfort themselves against my bast and enjoy the shadows. Do you also visit our garden from time to time?

5.The garden for me is not interchangeable, it's my life! Its where I grew up, where I made friends, where I had my most sad and most happy moments. Remember when one summer, children decided to put up a swing on my right arm? This was amazing, I was accompanied with laughter all spring long. Until there was one accident and an adult took away the swing, how awful! Enough about me, what does our garden mean to you?

6.The water from the rain feeds me. It flows from higher areas in Rotterdam to this garden. I am lucky to be a tree with so much water available because I know some who are very thirsty. But you know, it is often too much for me. I know they say you have to finish your plate, but I wish there were others to help me with it. I can't do it alone, and I hope other plants might join me in the future. How satisfied are you with the garden?

7.The top of my crown can look over the buildings, it took me some years to get there. It is really enjoyable up there, I can see the other gardens and got some inspiration from them. They build small shelters and I saw humans enjoying drinks in there together. I wish I was invited. A few years later I also saw the start of the community garden. That looked really nice, but which activities would you like to do in our environment?

8.I have been talking a lot about myself, I hope you've been able to share some of your stories as well. I don't know if my intentions were clear, but I have been inviting you to join me more often outside, I like a good company. Naturally, everyone has their own needs, and I also like to think that everyone has their own superpowers. Mine is creating shadow, regulating the water and staying in touch with the others through my roots

underground. How would could you use your power to contribute to this garden?

9.Throughout the years, I have been celebrating diversity. You know, the more diverse our garden the stronger she becomes! I have learned that my relationships are a give and take. It is a constant search for where we meet, how we can positively contribute to our relationships and environments. I am wondering with whom do you match? Are your answers aligning with the other neighbours? Are they aligning with me? We don't have to agree all the times, but perhaps we can work on it and have fun times in the places where we meet.

Q – Questions tree

Vragen rondom de boom

1) Wat bent u?
    a. Mens
    b. Ander dier
    c. Plant
2) Voelt u zich hier, op deze plek, net zo geworteld als ik?
    a. Ja
    b. Een beetje
    c. Nog niet
    d. Nee
3) Van welke natuur geniet u het meest?
    a. Bloemen
    b. Struiken
    c. Bomen
    d. bodembedekkers
4) Komt u weleens in mijn buurt in onze tuin?
    a. Ja, vaak
    b. Soms
    c. Niet zo vaak
    d. Nooit
5) Wat levert onze tuin u op?
    a. Afkoeling
    b. Rust
    c. Beweging
    d. Sociaal contact
    e. anders
6) Bent u zo tevreden over onze tuin?
    a. Ja
    b. Een beetje
    c. Nog niet
    d. Nee
7) Wat voor activiteiten zou u graag in mijn omgeving willen doen?
    a. Eten (moestuin)
    b. Sociaal (tuinbank)
    c. Rust (chillen)
    d. Spelen
8) Hoe bent u het liefst betrokken in de buurt waar ik sta?
    a. Actief → meehelpen in de tuin
    b. Actief → een verbindende rol
    c. Passief → liever meer genieten
    d. Ik kom er liever niet
9) Welke antwoorden zijn populair? Zijn dat vooral antwoorden van mensen en of dieren. Heeft u veel met andere antwoorden gemeen?

R – Invitations for neighbours

Uitnodiging: Laat uw stem horen bij de tijdelijke installatie in de tuin!

Beste bewoner van de Midscheeps,

Ik heb uw input nodig voor mijn afstuderen dat gaat over de toekomstplannen van de binnentuin. Daarom nodig ik u uit om aankomende week langs te komen bij de installatie rondom de boom in de binnentuin. Mijn naam is Rosa de Jong en ik ben een student aan de TU Delft waar ik momenteel werk aan mijn afstudeerproject voor de opleiding Industrieel Ontwerpen. Voor dit bijzondere project richt ik mij op het verbeteren van gedeelde tuinen voor zowel de mensen als de natuur in Oud-Mathenesse.

Wat houdt het project in? De installatie vertelt het verhaal van de boom als buurtbewoner en geeft ruimte om ook uw stem te laten horen. Ik ben benieuwd naar hoe een ideale tuin eruit ziet voor alle bewoners. Deze informatie zal verder worden gebruikt door Bioto die samen met bewoners aan een herontwerp van de tuin werken.

Hoe kunt u meedoen? Door dit project tot leven te brengen! Neem een kijkje en geef uw stem bij de installatie in de tuin rondom de boom. Hieromheen kunt u 8 vragen beantwoorden door een touwtje rondom deze antwoorden te weven. **Dit kost ongeveer 5 min.**

Wanneer? Vanaf aanstaande zaterdag middag tot en met woensdag middag zal de installatie in de tuin staan. Bij de opening op zaterdag ochtend/middag en de sluiting woensdag middag rond 13.00-15.00h sta ik er ook bij om uitleg te geven en kom ik graag met jullie in gesprek.

Wat zijn de voordelen voor u?

- U kunt uw mening geven over de (toekomstige) tuin, inzichten worden gebruikt!
- Kennismaken met de mening van uw menselijke (en dierlijke) buren
- Deelname aan een project dat bijdraagt aan de vergroening en verfraaiing van uw tuin

Hoe kunt u zich aanmelden? Dat is niet nodig, u kunt vanaf a.s. zaterdag 6 juli tot en met woensdag 10 juli op elk moment langskomen.

Alvast hartelijk dank voor uw tijd en overweging. Ik kijk ernaar uit om samen met u iets moois te creëren in deze buurt!

Met vriendelijke groet,

Rosa de Jong