Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Wieke van Ulsen
Student number	4725158

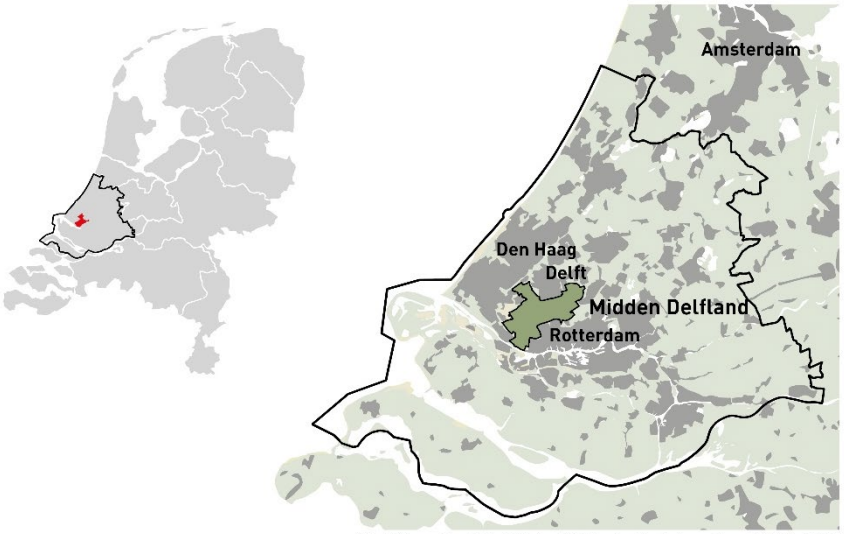
Studio		
Name / Theme	Metropolitan Ecologies of Place	
Main mentor	Kristel Aalbers	Urbanism: Environmental Technology & Design
Second mentor	Remon Rooij	Urbanism: Section Spatial Planning and Strategy
Argumentation of choice of the studio	**Metropolitan Ecologies of Place** My interest in urban ecology led me to think about choosing the theme ''City as an ecosystem'' as a topic for my thesis. I have followed msc 1 and 2 of both tracks of Landscape Architecture and Urbansim. This combination of topics helped me to gain more insights on the topic of urban ecology. When designing for the city of the future, I think being aware of the interwovenness of city and landscape is highly important, during which green infrastructure cannot be neglected. I think this studio is most suitable to bridge the two master tracks and their topics, to have as much attention for the built cityscape or city itself as for their connection with ecological corridors and parks, within and outside of the city, in my case also towards the hinterland of Midden-Delfland. The studio's emphasis on ecological and socio-economic transitions aligns with my thesis, which explores sustainable transitions in an ecologically oriented area like Midden-Delfland. An area with an agricultural sector that calls for a more sustainable transition as well. Apart from that, Midden-Delfland plays a socio-economic role as a recreational outdoor 'park' for the surrounding, expanding cities of South-Holland. The relationship between design, space and life becomes evident in this studio, and I think this studio takes a real life problem and tries to fix this problem through design, incorporating the social consequences, which is what I am doing with the position of farming in an ecological area. Besides, this studio also highly focuses on systemic design, which is relevant for my thesis, where I try to integrate different systems, by chosing the themes of 'ecology', 'agriculture' and 'recreation'. The technicalities of all the systems need to be thoroughly understood in my area, something in which this studio can contribute the most.	

Graduation project

Title of the graduation project	**Midden-Delfland:** **The Metropolitan Park towards 2070**

Goal

Location	Borders of 'Bijzonder Provinciaal Landschap' Midden-Delfland, Province of South Holland, The Netherlands:



[Fig.2] Location BPL Midden-Delfland . Made by author. (QGIS, 2023)

The posed problem	Problem Statement

Midden Delfland's Open Green Character

Midden-Delfland, located in Zuid-Holland, is an open peat-meadow landscape primarily dominated by livestock and dairy farming. The area is bordered by cities like Delft, Den Haag, Rotterdam and urban areas like Vlaardingen, Pijnacker-Nootdorp and Schiedam. Another border is the productive urban area of Westland: a greenhouse landscape.

In current times, the vulnerability of the endurance of Midden-Delfland is increasing. This began as the national government withdrew from responsibility in terms of long-term policies for this area around the start of the 21st century, forcing a decentralization towards the province for the task of future governance of Midden-Delfland.

That is why, in 2017, the area was granted the classification of ''Bijzonder Provinciaal Landschap'' (Bijzonder Provinciaal Landschap Midden-Delfland, 2021), underlining the existence as special provincial landscape and apart from its openness, protecting its rich agricultural, ecological, cultural, and recreational heritage. However, this title, that lasts for a period of eight years, is not legally binding and serves more as a qualitative label. Besides that, the endurance of this classification is threatened by future developments, whilst this protection of an open, more 'natural' area has become more and more urgent over the past decade.

Rapid Urbanization

During the past 50 years, human influence and development have transformed the landscape (Provincie Zuid-Holland et al., 2017). Urbanization has played a crucial role in reshaping the spatial arrangement, turning the province into a densely urbanized and fragmented part of the Southern Randstad, with de development of housing but also of economical areas like the harbor and greenhouse landscape. The canvas changed from

cities in the middle of a landscape, towards city and the hinterland being intertwined and almost dependable entities (Gemeente Delft et al., 2009). This urbanization trend, mostly driven by of the expanding Rotterdam-The Hague metropolitan region, intensifies the battle for space. The province of South-Holland for example wants to build 170,000 new homes by 2040 (Move Mobiliteit & Verstedelijking et al., 2019).

Apart from this urbanization trend, the upcoming challenges of climate change predict a temperature increase of 4.9°C and a sea-level rise of 2.5 meters by 2100 with the KNMI climate scenarios (Bessembinder et al., 2023). Zuid-Holland is situated in a delta landscape and the majority of land is located below sea-level. As the sea-level is rising and more extreme weather events and participation patterns are expected, this region becomes more vulnerable to floodings.
With these growing threads of climate change, there is a need for the province to develop a smart strategy to mitigate these changes. This strategy should involve smart allocation of space, searching for areas that can store and collect excesses of water and that can serve as buffer zones for water shortages in longer periods of heat stress and drought. The region of Midden-Delfland emerges here as a location of interest.
Beside the intention to create more green buffer zones for the province, the importance of connecting cities with rural areas becomes evident. The municipality of Midden-Delfland, within their vision toward 2040, (Bijzonder Provinciaal Landschap Midden-Delfland, 2021) talks about their role as an outdoor green area, directed at 2,3 million inhabitants of the metropolitan region of Rotterdam-The Hague. The downside of this huge amount of people in search of possibilities to recreate in green area, is that it puts significant pressure on Midden-Delfland.

Ecological values of the landscape
At the same time, the ecological richness of Midden-Delfland, including peat bogs, wetlands, meadow bird zones, and forests, should be protected. The area is attractive as a resting spot for migratory birds on a more international level and thus contributes to a larger ecological habitat. While nature conservation authorities like Natuurmonumenten and Staatsbosbeheer manage many of these areas, the agricultural sector of Midden-Delfland also plays a big role. Numerous farmers participate in managing their land to be suitable for meadow-birds in the designated season (Altenburg & Wymenga ecologisch onderzoek, 2018).

Unsustainable Agriculture
Despite their beneficial contribution, the agricultural sector still has a negative impact on environmental changes in Midden-Delfland. Farmers strictly control the water-level to ensure their agricultural practices and productivity. Low water levels dry out the peat soil, which causes the peat to oxidate and emit CO2. Peat oxidation leads the subsidence of soil, making the land even more vulnerable to floodings and droughts. Besides this, pesticide, manure, and fertilizer use by farmers result in eutrophication, water pollution, and excessive nitrogen and CO2, harming nature (Altenburg & Wymenga ecologisch onderzoek, 2018).

Envisioning a future
Opportunities for Midden-Delfland lie in creating a stronger alliance between ecologists and famers in the area, to find a way how the agricultural sector can benefit the ecological values in a more circular and sustainable way. This could foster the endurance and ecological health of the area, which would a the same time strengthen the position as a green, recreational center for the surrounding cities. With current trends like urbanization and unsustainable agriculture posing threads, it is an interesting quest to continue the direction of sustaining important values for Midden-Delfland. This thesis will try to find a way how the open landscape, ecological aspects, sustainable agriculture and sufficient recreational possibilities can last, to make the Special Provincial Landscape eventually last.

research questions and	Main Researh Question & Sub-questions

Main Research Question:

"How can the development and integration of the ecological character, agricultural sector and recreational functions contribute to fostering a sustainable future for the region of Midden-Delfland towards 2070?''

Sub Questions:

problematization

What aspects characterize the area of Midden-Delfland and have led to the assigning of the title ''Bijzonder Provinciaal Landschap''?

What challenges in anticipation of future developments is this region currently facing?

analysis

What is the current condition of ecology, recreation and agriculture for the region of Midden-Delfland and how can each of these facets be sustained into the future by the implementation of sustainable solutions?

maximization & design

How can the maximization of the three perliminary themes - ecology, agriculture and recreation - be achieved for the given location and what would be the outcome of this maximization mean spatially?

How can the three preliminary themes be optimized and combined to create a vision towards 2070, re-evaluating the core values of BPL Midden-Delfland?

strategy

What development strategy is needed for Midden-Delfland to accomplish the created vision towards 2070?

design assignment in which these result.	Design Assignment

With climate change, unsustainable agriculture and urbanization as upcoming threats and challenges, an urgency for new perspectives arises, particularly considering Midden-Delfland's potential for surrounding cities. While the current Special Provincial Landscape (BPL) title acknowledges the area's value and aims to counter rapid urbanization, existing policy documents lack sufficient plans for future developments. This is why this thesis will try to look ahead towards the year 2070, with a vision-design approach, to investigate how the area can adapt to changes in the best way, focusing on the three main themes: agriculture, ecology and recreation.

These themes are interconnected, and by optimizing each, they can strengthen each other. For instance, fostering connections between urban dwellers and the area through recreational activities can enhance awareness of its significance and drive nature preservation efforts. Consequently, the area can serve as a green centre mitigating the impacts of climate change. Prioritizing the ecological health of the region is crucial for this purpose, and f armers can benefit from an ecologically healthy environment, with high rates of biodiversity for example. Through recreation they can find opportunities how to operate and connect locally. A literature review and analysis will delve into these themes, seeking future-proof and sustainable solutions for the challenges at hand..

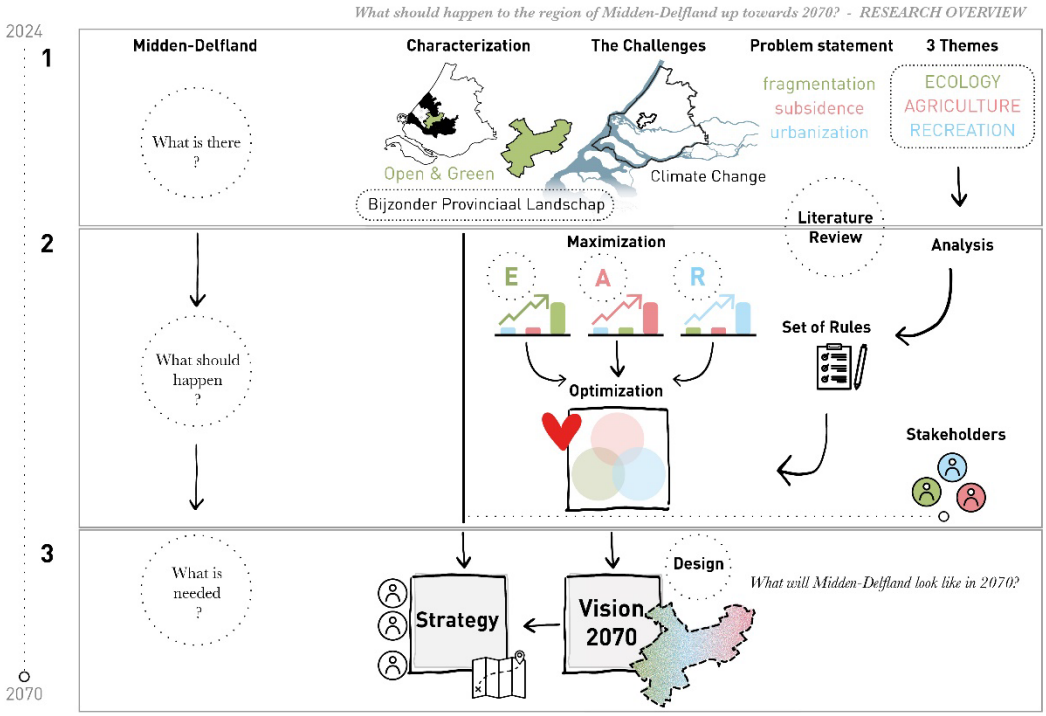
The right design-oriented visualizations that combine these three themes are needed to support the vision. To arrive at the best desired combination of the three themes, the maximization method will be used. This is a method to weigh and compare different scenarios or options in a comprehensible way. After this, visualizations by design will show how an optimal combination and integration of the three themes is spatially contextualized.

Additionally, attention will be given to policy development, identifying stakeholders and outlining strategic steps for governmental bodies to facilitate the realization of the vision. The thesis aims to be insightful for municipalities with ties to the landscape, such as Delft, Rotterdam, The Hague, and Midden-Delfland itself. Besides being insightful for farmers or nature conservatists as well, like Natuurmonumenten or Staatsbosbeheer, it aims to be e a document that steers the governance of the municipality to nudge these actors to change their trajectories and start integrative alliances.

Process

Method description

Visualization of the process / concept of the thesis:



Methodology:

Literature Review
Theoretical knowledge to answer the research question is gained through literature review. This literature study on topics like nature-inclusivity, circular agriculture, biodiversity, urbanization and climate change will support the design- choices made for the three themes with scientific proof.

Spatial analysis
An in-depth knowledge of the spatial characteristics for specific topics are necessary to make decisions during the creation of a vision-design for 2070. So analysis on topics of the landscape are for example: which (agricultural) practices are where, soil-typology, water management, subsidence, distribution of species and biodiversity, habitat connections and corridors and so on. Apart from spatial information gained through literature and google maps, Spatial data is collected with QGIS-mapping, which is a software providing geographic information.
Documents and maps from municipalities like Delft, Rotterdam, Den Haag and Midden-Delfland are consulted, as well as open data useful for QGIS provided by the province of South Holland and municipalities. Dutch governmental institutions also provide many different open data-sets, with examples like PDOK, BAG and BGT.

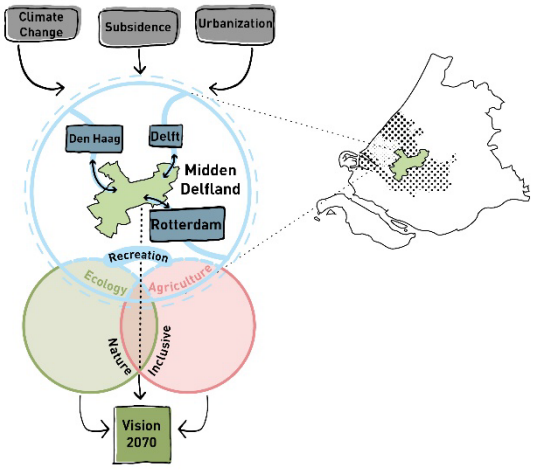
Interviews
To gain specific more personal information and to become familiar with the area, interviews are conducted with experts closely involved with the area. So far, interviews have been held with an urban ecologist for the city of Delft (Diny Tubbing), a biological farmer (Jan Duijndam) and a member of the municipality of Midden-Delfland (Kees Boks). Note: these interviews will later be included in this thesis once permission is given to use the gathered information.
The advice and input of different experts from different governmental levels (designers, employees of municipalities, experts, students) will be used to test the results of the designed vision as a result from the maximization phase. This will give the result more depth and will help to make it more realistic and supported by real stakeholders.

Design
Design will help me to make visible what spatial qualities would be achieved when developing the two different themes and integrating them. It makes visible what the future of Midden-Delfland looks like, and what would be the outcome if agriculture, ecology and recreation work in synergy.

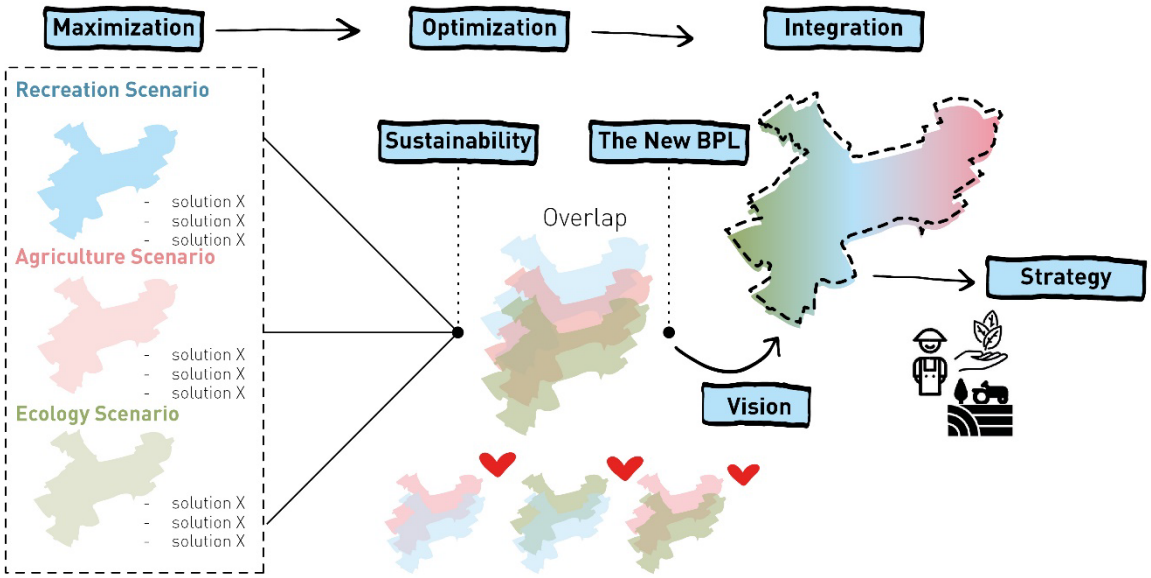
The Maximization Method
The final result of this thesis will be a vision design and development strategy based on the Maximization Method and research through design. This method is used to design urban spaces that optimize specific objectives while satisfying various constraints. This method consists of four steps: analysis, maximization, optimization and integration. It is used to reach the optimal situation for a sustainable future urban metabolism based on the three main themes of the thesis: agriculture, ecology and recreation. Each theme has its own autonomous future optimal situation. Out of this method, the most relevant spatial conflicts between the three themes will come up and the challenge lies in finding a compromise between these conflicts. It helps to make a spatial division based on the themes and to make the right choices at concrete locations (NWR Quintis et al., 1998).

Chosen Timeframe
The chosen timeframe for this thesis spans 50 years, up until the year 2070. This choice can be argued by the selected themes influencing the vision's creation. Primarily, it aligns with existing policy documents on the future planning of the Netherlands. Most of the documents like the NOVI (governmental) (Rijksoverheid, 2020) and the KNMI-climate scenario's (Bessembinder et al., 2023), take 2050 as the main benchmark. Within this timeframe, the predictions can stay quite concrete. However, this thesis extends the exploration beyond 2050 to 2070. Especially the ecological aspect of the vision has determined this choice, as designing for and with nature, not just in spite of nature, requires a long term plan, commitment and patience. This is also important for the development of an ecosystem. Vink, Vollaard and de Zwarte (2017) state that nature-inclusive design is a practice that starts an ecological process, which needs maintenance. This process is rather important than creating just a green image by only planting specific species for a design: creating the right living conditions for the desired ecosystem is the key. Traditional parks and gardens in the city are normally designed in a certain layout which is maintained to prevent them from evolving into a non-predicted state over time. In this case, 'time' is really needed to shift the way of designing into process-based design of a landscape.
Looking back at the past of Midden-Delfland, the Reconstruction law (Gemeente Midden-Delfland et al., 2017) started in the 1970s and the recreational parks derived from the plans have now matured, 50 years later. To start a new cycle with implementation of a new vision, a new timespan of 50 years will be needed to see clear results.

3.5 Conceptual Framework



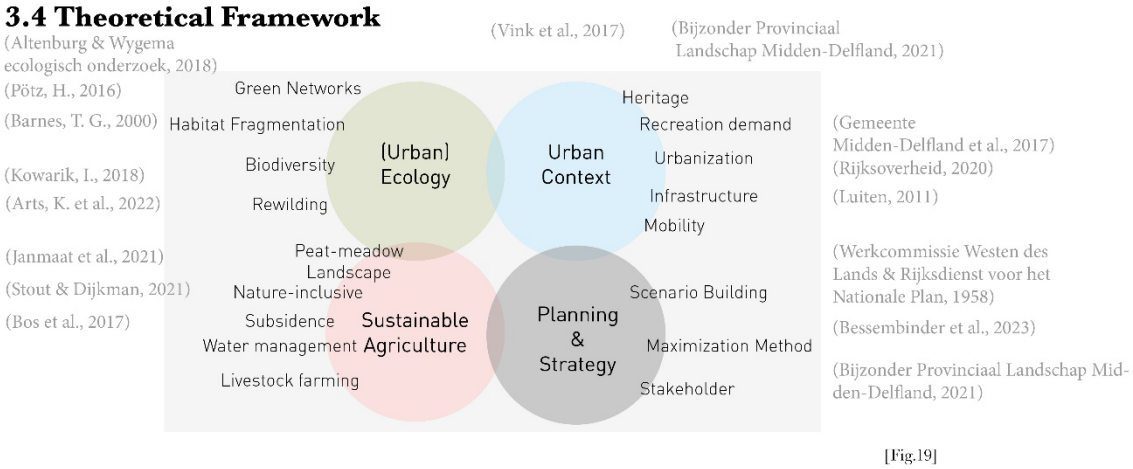
[Fig.20]



[Fig.18] Steps of the Maximization Method

Literature and general practical references

The main literature consulted is regarding the topics of:



[Fig.19]

Ecology:

Urban Ecology & Biodiversity – (Vink et al., 2017) & (Pötz H., 2016)
Green Networks & Habitat Fragmentation – (Barnes, T. G., 2000) & (Altenburg & Wygema ecologisch onderzoek, 2018)
Rewilding – (Arts, K. et al., 2022) & (Wild Europe Initiative, 2013) & (Kowarik, I., 2018)

Agriculture:

Peat-Meadow Landscape - (Altenburg & Wygema ecologisch onderzoek, 2018), (Arts, K. et al., 2022), (Bijzonder Provinciaal Landshap Midden-Delfland, 2021), (Gemeente Delft et al., 2009)
Subsidence - (Arts, K. et al., 2022), (Bos et al., 2017), (Stout, Dijkman, 2021)
Water management – (Hoogheemraadschap Delfland, 2018), (Stout, Dijkman, 2021)
Livestock farming & Sustainability – (PARK Noord-Holland et al., 2021) (College van Rijksadviseurs, 2020), (Provincie Zuid-Holland et al., 2022)
Nature-inclusivity & circularity – (Janmaat et al., 2021)

Recreation:

Urban context – (Provincie Zuid-Holland et al., 2017), (Luiten, E., 2011)
Heritage & recreation - (Gebiedstafel Bijzonder Provinciaal Landshap Midden-Delfland, 2021), (Latour et al., 2018)
Infrastructure & Mobility – (Metropoolregio Rotterdam Den Haag, 2016), (Move Mobiliteit & Verstedelijking et al., 2019)

Planning & Strategy:

(Gebiedstafel Bijzonder Provinciaal Landshap Midden-Delfland, 2021)
(Bessembinder et al., 2023)
(Move Mobiliteit & Verstedelijking et al., 2019)
(Rijksoverheid, 2020)
(Gemeente Midden-Delfland et al., 2017)

- A full reference list can be found at the end of this Graduation Plan -

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

With my research topic, I try to combine the disciplines of Landscape Architecture and Urbanism, tracks from the whole master program. By choosing an area that touches on both the urban (Urbanism) and the rural (Landscape), Midden-Delfland is relevant for both disciplines. The M.E.P. studio mainly focuses on the ecological and socio-economic transition in the light of climate change. This ecological transition also becomes visible in my thesis as I try to ague the preservation and further development of an open green landscape in the province with ecological significance. I think the overall master addresses the topics of climate change but in the architectural and urban realm. Sustainable solutions combatting climate change are also addressed in my thesis, like for example improving the availability the accessibility of green in cities and investigating the role of an agricultural sector for environment and the city. In my thesis the aspect of design practice is used to envision a possible different future and to spatialize my ideas, in order to clearly communicate the results of my research to different stakeholders. As a student of landscape architecture and urbanism, I can combine my knowledge about the built environment to study the ecological systems of a city and its hinterland and predict urban development and future spatial demands.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

My thesis tries to broaden perspectives on traditional agriculture, nature conservation and the relationship between urban and rural areas for recreational purposes.
The expertise of the Netherlands of reclaiming land and pumping our polders dry is worldly known, and keeping an unnatural water-level to be able to practice agriculture is common ground. However, awareness of issues such as nitrogen emissions and soil subsidence has grown, highlighting the need for more sustainable practices. The Netherlands is one of the most advanced countries in terms of agriculture, crop cultivation and cattle breeding, with a high level of technical expertise (Bos et al., 2023). However, there is a gap in how all this knowledge is executed towards a more sustainable future.

Most farmers are aware that they will have to diminish their carbon footprint, and limit their nitrogen emissions. This demand contradicts their position on the global market, which demands upscaling their production to keep their prices low, resulting in more unsustainable choices.
There is an urgent need to transition towards sustainable, circular, and regenerative agriculture, considering the growing impact of climate change on agricultural processes and ecosystems. Recognizing agriculture not just as an industry but as an integral part of natural processes is crucial, especially in vulnerable areas like the Netherlands' delta region With our expertise already at hand, we can become pioneers in the world.
There is a necessity of awareness of soil, water systems and ecosystems in agriculture. For urbanization this topic also becomes more relevant. Building in vulnerable areas while having limited space is a hot topic in the Netherlands. The principle that soil and water conditions should form a more prominent basis for urban planning choices is getting more acknowledged by governmental parties, designers and planners (H+N+S Landschapsarchitecten et al., 2023).
Regarding nature conservation, existing policies in the Netherlands are outdated, focusing primarily on sustaining old ecosystems and specific species. A more future-oriented approach should prioritize restoring and establishing self-sustaining ecosystems through natural processes (Arts, K. et al., 2022) .

The societal relevance of my thesis lies in preserving green spaces like Midden-Delfland, a rural area in the middle urban development. By promoting the area's significance in terms of heritage, recreation, biodiversity, and agriculture, my research supports the argument for maintaining it as a natural recreational area for the surrounding inhabitants of the metropolitan region. As the province of Zuid-Holland is a delta and very vulnerable to sea-level rise and flooding, the necessity to remain some permeable land is urgent. Besides, this area should counter balance the loss of biodiversity due to urbanization.

My work aims to inform policy decisions and inspire positive change in land planning practices, with the support of scientific knowledge. This contributes to the fields of landscape architecture, urban planning, and environmental management.

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