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# **METROPOLITAN FOODSCAPES WITH MULTIFUNCTIONAL LAND USE**

**A design proposal for a peri-urban area in the Metropolitan Region of Rotterdam - The Hague**

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We hope this thesis will inspire you and provide you with valuable information about this current, interesting and important subject.

# ABSTRACT

Multifunctional land use in and around cities is becoming increasingly important to meet many sustainability objectives of today. Due to today's rapid urbanisation, a division has been developed between urban and rural areas, which in turn has resulted in a gap between producers and consumers. The aim of this thesis is to find solutions on how to create multifunctional land use in peri-urban areas and integrate urban and rural land in order to reduce the gap between farmers and the city dwellers. Planners need to recognize the multifunctional character of peri-urban zones and there is a need to change from single-use to more flexible mixed-use areas. Mixed land use, with the inclusion of agriculture, close to cities has been proved to support the local market and contribute to shorter food chains. Urban consumers purchasing directly from farmers has also been proved to enhance the urban-rural relationship.

This thesis focuses on a design proposal of a multifunctional foodscape in a peri-urban area including food production, education and recreation. The concept Farmer's Garden and its guiding principles are implemented on a site located on the city edge to Schiedam, in the Metropolitan Region of Rotterdam-The Hague (MRDH). The design proposal serves as an inspiration of what functions and activities could be used to transform peri-urban areas into more multifunctional areas as well as what design elements could be used to contribute to the experience of food. It also exemplifies how peri-urban areas could function as transition zones between urban and rural landscapes.

In order to understand the preconditions and potentials of this thesis' specific context, an empirical pre-study was conducted to gain knowledge about the production landscapes of MRDH. The foodscapes in focus for this thesis is urban farming in Rotterdam, dairy farming in Midden-Delfland and greenhouse horticulture in Westland. The thesis also presents theories and concepts related to the subject including agriculture, multifunctional land use and local food. The paper also includes the notion of foodscape, food hub and Edible Forest Garden.

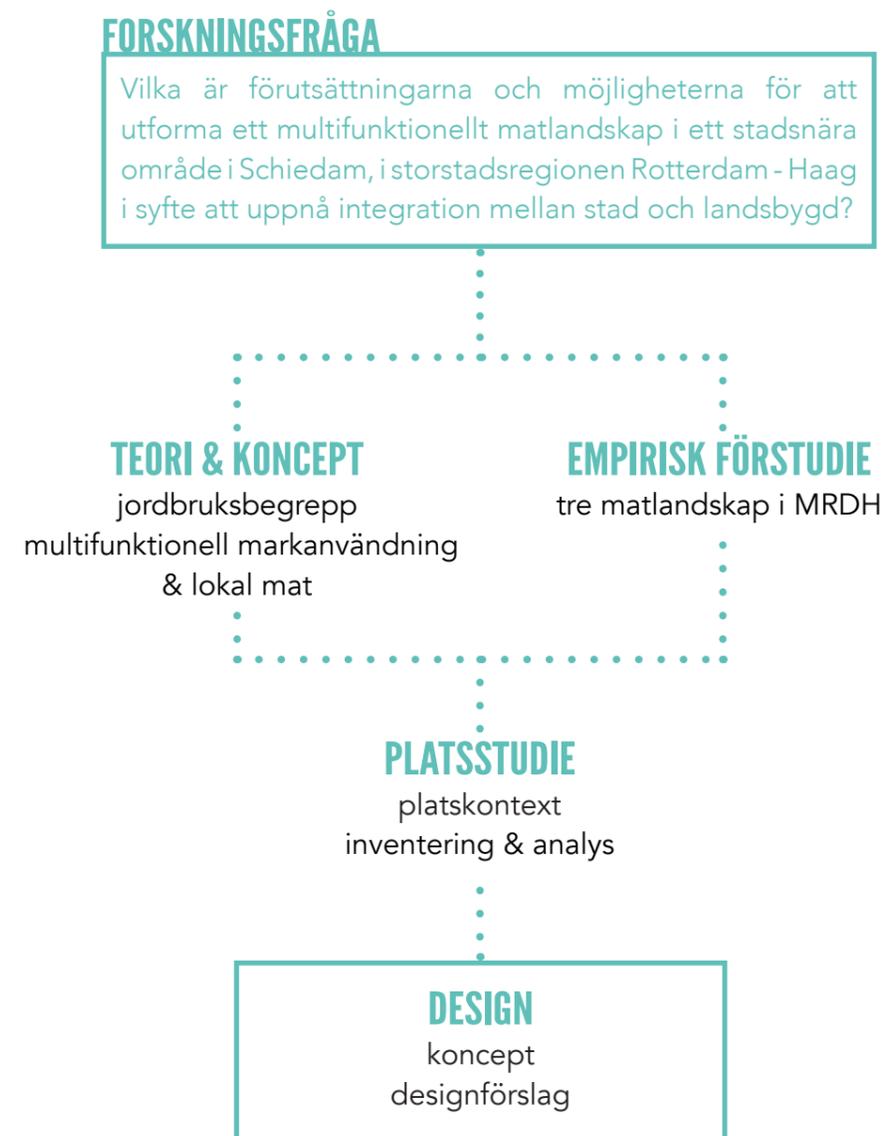
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*"It also requires public planning to acknowledge the multifunctional character of periurban and urban agriculture locations, and therefore a shift from strict single-use to more flexible mixed-use planning designations in the periurban farmland zone."*  
(Van der Schans, 2010, p. 42)

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# SAMMANFATTNING

Den här avhandlingen är ett examensarbete i landskapsarkitektur, i samarbete med landskapsarkitekt kontoret LOLA landscape architects utfört under våren 2016. Nedan följer en kort sammanfattning av arbetet där syfte, metod och resultat presenteras. Projektets huvud syfte är att utforma ett förslag till ett multifunktionellt matlandskap på en peri-urban plats i storstadsregionen Rotterdam-Haag (MRDH). Fokus i projektet är att skapa ett koncept och ett designförslag som inkluderar rekreation, utbildning och matproduktion. För att uppnå det huvudsakliga målet är bi-syftet med denna avhandling att genomföra en empirisk förstudie för att få en kunskapsbakgrund om tre utvalda matlandskap i MRDH.



Figur 1: En schematisk skiss som presenterar strukturen för examensarbetet. De olika delarna delarna medverkar till att svara på forskningsfrågan.

## METOD

Uppsatsen är uppbyggd av tre olika delar, teori & koncept, empirisk förstudie och platsstudie som tillsammans resulterar i ett koncept och designförslag. Teori & koncept grundades övervägande på en litteraturstudie. I den empiriska förstudien intervjuades initiativtagare och bönder för att få en överblick om rådande förutsättningar i den specifika kontexten. Platsstudien byggdes mestadels på egna inventeringar och analyser samt studerande av relevanta planeringsdokument. För att förstå den, för oss, nya kontexten utfördes även intervjuer med planerare, landskapsarkitekter och entreprenörer inom ämnet.

## TEORI & KONCEPT

Samtidigt med urbaniseringen har starkare gränser utvecklats mellan stad och land och detta har i sin tur orsakat en klyfta mellan producenter och konsumenter. En hållbar stad kräver en närmare, geografisk anknäring till landsbygden och en bättre förståelse för jordbruk och livsmedelskedjan. Multifunktionell markanvändning i jordbruksnära städer har visat sig stödja den lokala marknaden och förkorta livsmedelskedjan. Direkt konsumentkontakt mellan stadsbor och lantbrukare har också visat sig stärka relationen mellan stad och landsbygd.

Det finns ett behov av mer flexibel markanvändning i tätorter för att möta dagens hållbarhetsmål och socioekonomiska mål. Multifunktionell markanvändning kan förbättra och främja användningen av jordbruksmark i stadsnära områden. Stadsplanerare måste uppmärksamma de peri-urbana områdenas multifunktionella karaktär och det finns ett behov av att vända sig från ensidig markanvändning till en mer flexibel, blandad markanvändning. Livsmedelsproduktion i peri-urbana områden blir allt mer viktig eftersom konsumenter i allt högre grad föredrar regionala produkter. I det här examensarbetet behandlas ordet matlandskap som syftar till alla platser som innehåller matproduktion, där mat införskaffas, lagas eller i allmänhet där människor skaffar sig någon mening som förhåller sig till mat.

## EMPIRISK FÖRSTUDIE

Den empiriska förstudien genomfördes för att förstå förutsättningarna och möjligheterna för att designa ett multifunktionellt matlandskap i MRDH. De undersökta matlandskapen i den empiriska förstudien var stadsodling i Rotterdam, växthusodling i Westland och mejeriproduktion i Midden-Delfland. Landskapsanalyser samt platsbesök och intervjuer med bönder utfördes i varje matlandskap. För varje platsbesök och intervju drogs slutsatser om vad som var relevant för designen. För varje matlandskap gjordes övergripande observationer. En SWOT analys utfördes, vilket innebar analys av styrkor, svagheter, möjligheter och hot gällande de tre matlandskapen.

Resultatet visade att det fanns en rådande klyfta mellan professionella bönder och stadsbor samt att det fanns behov av en integrering av de olika matlandskapen. En sammanställning gjordes av vad som togs vidare till designförslaget. Sammanställningen innehöll bland annat slutsatser om hur intervjudeltagarna arbetade med matproduktion, rekreation och utbildning i de olika produktionsområdena samt slutsatser från SWOT-analysen.

# SAMMANFATTNING

## PLATSSTUDIE

Den utvalda platsen valdes att placeras i den peri-urbana zonen för att bidra till integrering mellan stad och land samt för att göras lättillgänglig för både bönder och stadsbor. Platsen hade en tydlig karaktärsuppdelning där den östra delen karaktäriserades av öppet gränslandskap och den västra delen av täta, vildväxande trädplanteringar. I stort behölls dessa karaktärer när den nya designen tillfördes på platsen. Majoriteten av faciliteterna placerades centralt på platsen för att knyta ihop hela området, samt nära bostadsområdet i närheten av befintlig infrastruktur för att minimera påverkan på landskapet och underlätta för transporter.

## DESIGN

Designens syfte är att skapa ett multifunktionellt matlandskap som ska bidra till integreringen av stad och land samt konsumenter och producenter. För att stärka konceptet formulerades en beskrivning av Bondens Trädgård (på engelska: Farmer's Garden) med design principer som implementerades i vårt designförslag och som ska fungera som inspiration för annan framtida forskning och planering.

## KONCEPTET BONDENS TRÄDGÅRD

Bondens trädgård är en plats för matproduktion, där produktionen utformas och används för att bidra till rekreation och utbildning om mat. Bondens Trädgård är en kombination av den industriella, storskaliga matproduktionen och den intima och varierande trädgården. Det är ett matlandskap där alla är inbjudna, som om det var en trädgård eller en park. Produktionen av livsmedel kombineras på ett färgglatt sätt och med utsikt över landskapet. Det är en plats för provsmakning och matupplevelse som uppmuntrar möten mellan stadsbor och jordbrukare samt konsumtion av lokal mat. Bondens Trädgård är också en port till det rurala produktionslandskapet där livsmedelsproduktionen kan upplevas i en större omfattning och på samma gång en port i andra riktningen, till de urbana böndernas småskaliga och varierade produktion.

## DESIGN PRINCIPER

**En port i båda riktningarna:** Bondens Trädgård ska placeras i zonen mellan stad och landsbygd för att fungera som en övergångszon och port i båda riktningarna.

**Lokal marknad:** Utformningen och funktionerna bör uppmuntra både jordbrukare och stadsbor att besöka platsen, där fokuset är på mat. Platsen bör innehålla en butik eller marknad där bönderna får hjälp med att lära sig att marknadsföra sina egna produkter och dit stadsbor kan komma för att handla lokalproducerade och hälsosamma livsmedel. Detta uppmuntrar även möten mellan producenter och konsumenter.

**Multifunktionell användning:** Bondens Trädgård bör ha multifunktionell användning som inkluderar utbildning, rekreation och matproduktion, vilket innebär utbildning om livsmedelskedjan, design med mat, produktion och tillredning av mat samt utställningar.

**Matupplevelse:** Matproduktionen ska förekomma i både en naturlig miljö och en industriell miljö, matproduktionen ska kunna upplevas i ett vilt, självförsörjande systemet samt i en industriell miljö som kräver ständigt underhåll. Detta är ett sätt att visa på mångfalden av olika matlandskap.

## DESIGNFÖRSLAG

Gestaltningen fungerar som en inspiration till vilka funktioner och aktiviteter som kan användas för att göra peri-urbana områden mer multifunktionella och vilka designelement som kan användas för att bidra till upplevelsen av mat. Till exempel förekommer;

- » Växthusutställning - där man kan uppleva växthusproduktion på nära håll.
- » "Plocka ditt eget mål" - ett koncept där besökarna kan gå runt i området för att samla ihop sin egen måltid och som kan tillredas i uteköket eller förberedas av en kock i restaurangen.
- » Dygnet-runt-affären - en stor försäljningsautomat med de populäraste varorna.
- » Praktrabatter med grönsaker - estetiskt utformade rabatter som samtidigt informerar om vilka grönsaker som är säsongsbetonade och hur man kan äta klimatvänligt.
- » Örtträdgård - en enkel trädgård att sköta om för personer med lite erfarenhet och som kan bidra med inspiration för den som vill börja odla själv.
- » Pollineringssträdgård - en trädgård som innehåller ätbara blommor omtyckta av pollinerare.
- » Edible Forest Garden (Ätbar skogsträdgård) - blandning av ätbara- och nyttoväxter samt andra växter som behövs för att skapa ett nästintill självförsörjande system.
- » Food hub (Mat-knutpunkt) - där bönder kan sälja sina produkter, starta nya samarbeten samt få hjälp att starta företag.
- » Marknadsplats - där bönder har möjlighet att marknadsföra och sälja sina egna produkter samt hålla i provsmakning av nya produkter och få återkoppling från konsumenter.
- »

En viktig del i förslaget är även kopplingarna till befintliga funktioner och initiativ som presenteras i slutet av arbetet och hur de förhåller sig till kontexten av vår plats.



Figur 2: Edible Forest Garden (Ätbar skogsträdgård) är en del av designförslaget och är en naturlig plats där du har möjlighet att plocka din egen mat för att förbereda i uteköket.

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## INTRODUCTION

This part presents an introduction to the subject, aim & objective and methodology of the thesis.

# INTRODUCTION

Today's rapid urbanization is the greatest shift in human settlement pattern the world has ever experienced (Steel, 2013, pp. 14-15). Along with urbanization, stronger boundaries have been developed between urban and rural areas, citizens and farmers (Vejre et. al, 2015, p.16). The food is coming from an area we call the rural landscape or the countryside and these words bares a limited relationship of the reality of modern food production. It is a complex situation that on the other hand also offers opportunities; to bring food back to the local market (Steel, 2013, pp. 14-15). The Netherlands is a country dominated by large-scale farming and export of food to the world market, which has led to that farmers and growers are situated together in large clusters far away from the city (Van der Schans, 2010). The increasing gap between the two worlds of producers and consumers are especially true for the Netherlands due to a strong urbanization and a highly efficient agricultural- and horticultural sector (City of Rotterdam, 2012, pp.7-8).

Agriculture has changed from subsistence husbandry of the fifteenth century, to industrialized production, to the community gardens and urban farming of the twenty-first century. Today's urban agriculture is built on a long history. In fact, urban agriculture was a basic start that stands behind the rise of most early cities. In pre-industrial cities, agricultural activities took place in the city. Further, the Industrial Revolution brought trends such as garden cities and allotment gardens, where citizens produced their own food. Tendencies show that today's urban agriculture is moving forward to a renaissance, trying to adapt to the new fast-growing megacities (Vejre et. al, 2015, p.19). According to Per G. Berg, professor in landscape planning at The Swedish University of Agricultural Science:

*The future's sustainable urban-rural systems, need - in several scales and in a modern form - geographically come closer to eachother. (Berg, Per G., 2008, p.291, translated from swedish)*

Planners require to acknowledge the multifunctional character of urban and peri-urban agriculture and there is a need for a shift from single use to a multifunctional use in peri-urban locations. In addition, urban and peri-urban agriculture are oriented to the local market and people living close to the production location (Van der Schans, 2010). Farmers in peri-urban areas usually have closer relationships

with consumers when it comes to the marketing of products (Zasada, 2010).

As a part of a project called Metropolitan Foodscapes, by LOLA landscape architects in Rotterdam, this thesis focus on how the peri-urban zone can be used as a transition zone to connect urban and rural areas in the Metropolitan region of Rotterdam-The Hauge (MRDH) in The Netherlands. The thesis contributes with a new concept, Farmer's Garden, which is a foodscape integrating food production, recreation and education in order to achieve multifunctional land use and to shorten the gap between consumers and producers.

## THE PROJECT METROPOLITAN FOODSCAPES

The project Metropolitan Foodscapes started in November 2015 and is supposed to continue the rest of the year 2016. LOLA (Lost Landscapes, a landscape architect office in Rotterdam and the project leader) first organized a debate to discuss the role of agriculture and urban agriculture in the MRDH and the project plan for Metropolitan Foodscapes, together with researchers, stakeholders and municipalities. The aim of the project is to research the benefits of a possible connection between urban and rural agriculture in the MRDH. MRDH is one of the most urbanized areas in the Netherlands. It exemplifies the presence of several large and small urban centres surrounding an agricultural area, among them Rotterdam, The Hague and Delft. A part of the project is to write a biography about three production landscapes of MRDH - greenhouse horticulture, dairy farming and urban farming. Further, new food chains and a business case for a Food Hub in the city edge of the region will be developed, to shorten the gap between producers and consumers. The mission is also to design a landscape vision for the production landscape of MRDH.

## AIM & OBJECTIVE

The main objective of this thesis is to plan and design a foodscape with multifunctional land use in a peri-urban in Schiedam, a suburb of Rotterdam. The aim is to create a concept and design considering the aspects of recreation, education and food production. The area of interest should function as a transition zone in order to reduce the barrier between urban and rural areas in the MRDH and contribute

### MAP: EUROPE

The location of The Netherlands in Europe  
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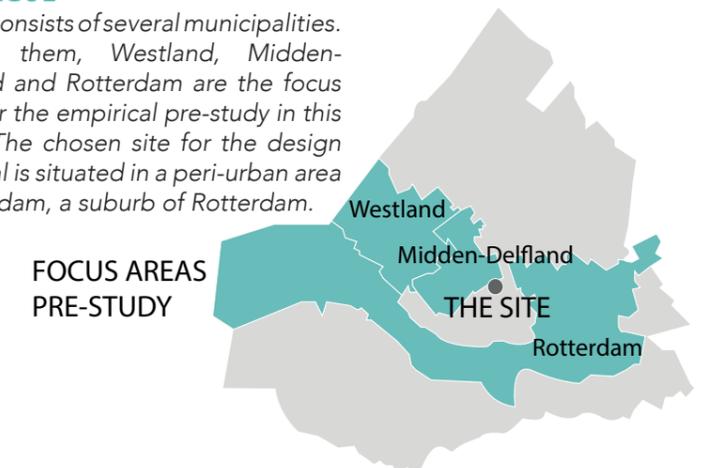
### MAP: THE NETHERLANDS

The four largest cities in the Netherlands (Amsterdam, The Hague, Rotterdam and Utrecht) are together known as Randstad. MRDH (Metropolitan region Rotterdam-The Hague) is situated in Randstad.



### MAP: MRDH - METROPOLITAN REGION OF ROTTERDAM THE HAGUE

MRDH consists of several municipalities. Among them, Westland, Midden-Delfland and Rotterdam are the focus areas for the empirical pre-study in this thesis. The chosen site for the design proposal is situated in a peri-urban area in Schiedam, a suburb of Rotterdam.



# INTRODUCTION

to a closer relationship between farmers and city dwellers, to regain trust between producers and consumers. To achieve this, the design aims to reflect three production landscapes of MRDH - greenhouse horticulture in Westland, dairy farming in Midden-Delfland and urban farming in Rotterdam.

In order to accomplish the main objective, the sub objective of this thesis is to conduct an empirical pre-study to gather information about greenhouse horticulture, dairy farming and urban farming. The existing urban farms in Rotterdam are investigated to define pre conditions and potentials to inspire the design proposal. The rural landscape, in the outskirts of Rotterdam, is examined to understand the pre conditions of the production landscape and define solutions on how to bring producers closer to consumers.

## RESEARCH QUESTION

What are the preconditions and potentials to design a multifunctional foodscape in a peri-urban area in Schiedam, in the Metropolitan region of Rotterdam - The Hague, in order to achieve urban and rural integration?

## LIMITATIONS

This thesis considers the European context of urban and rural relationships with mainly European references and examples. The focus areas chosen for the empirical pre-study were the urban farms in Rotterdam and the agricultural areas of Midden-Delfland and Westland, since these were the three food production landscapes addressed in the framework for the project Metropolitan Foodscapes. The site chosen for the design proposal is situated in Schiedam, a suburb of Rotterdam. The site does not have a formal name itself. Other surrounding areas and activities were also included in the context of the design. The focus areas of Rotterdam, Midden Delfland and Westland were chosen because they are part of the project "Metropolitan Foodscapes" by LOLA, where this thesis has its starting point. The master thesis was produced during twenty weeks of full time study. The time for the empirical pre-study in the Netherlands was limited to eight weeks.

## METHODOLOGY

The working process started with a *preface*, discussing the project and collaboration with LOLA over Skype. Further, literature studies were conducted, followed by a study visit to Järna eco community outside Södertälje in Sweden in order to get inspired before the trip to Rotterdam. The *first phase* of the working process took place in The Netherlands, where an empirical pre-study about the foodscapes of MRDH was conducted in order to create an understanding of the context of the region. The site study was also conducted during this phase. Simultaneously, we had scheduled meetings and guidance at LOLA's office every other week. The *second phase* was conducted back in Sweden, where the design proposal and the theoretical part were compiled.

The methods conducted in this thesis are described below. First, an empirical pre-study of the foodscapes in the MRDH was made, followed by a site study and a design. Parallel to these, a literature study was conducted.

### EMPIRICAL PRE-STUDY

The empirical pre-study was mainly focused on investigating urban farming in Rotterdam, greenhouse horticulture in Westland and dairy farming in Midden Delfland, but exceptions have been made in the case of two farms that were part of the study even if they are situated in Pijnacker, another municipality of MRDH. This was due to their interesting approach to sustainable farming. Three greenhouses, three dairy farms and eight urban farms were visited to gain knowledge about the forms and characteristics of existing types of production in the MRDH, and to serve as a platform of ideas for our design. The urban farms were recommended by Eric-Jan Pleijster, partner and cofounder of LOLA, and the greenhouses were found through homepages and through contacts of LOLA. To get an overview of the history, context and visions of Westland and Midden-Delfland, informal discussions with two urban planners, one from each municipality were conducted. These oral references are presented anonymously.

### Qualitative semi-structured interviews

During every site visit, a qualitative semi-structured interview was conducted, see questions in Appendix 1. The chosen method made it easier to overcome the language difficulties and let people tell

their own story in detail about what they considered most important. Three dairy farmers, three greenhouse farmers and eight initiators or experienced employees of the urban farms were interviewed. The interviewees are presented anonymously. The questions for the urban farms concerned topics such as urban context, accessibility, development and main purpose of the project, previous use of the site, crop/animal diversity and facilities. The questions for the greenhouses and dairy farms differed since they had rural landscape context. These questions were more focused on food production and the farmers' view on the relationship between the city and countryside, as well as the relationship between consumers and producers.

### Observations of the sites

During all site visits, the urban context and accessibility of the sites were observed. Though, the intention was not to do a complete, schematic observation study. For urban context, we observed the location of the site and how it related to the functions of the surrounding areas, such as residential, parks, offices or industries. For accessibility, we looked at opening times, if the site was fenced and enclosed and also if it implied a private zoning. Interesting examples and inspiring functions for design proposal were also registered and photographed. For example how to enhance biodiversity in food production, ways of educating and experiencing food, business- and marketing models, visual qualities, recreational opportunities and accessibility. On each site, conclusions and considerations were made on what could be valuable to bring further to the design.

### SWOT-analysis and conclusions

After the site visits, a SWOT analysis was made on all the three foodscapes. The SWOT described the most relevant aspects of landscape character and aspects from the empirical pre-study. The conclusions and considerations from every site were turned into design applications, structured in three categories - education, recreation and food production, which are the fields in the extent of this thesis. Lastly, the present situation in MRDH was described together with a future vision in order to present the potentials for an integration of the foodscapes.

# INTRODUCTION

## SITE STUDY

The site was chosen after discussing with LOLA and after studying planning documents for future development of peri-urban areas in MRDH, made by G.Z-H (Groenservice Zuid-Holland). G.Z-H works for the Dutch government, with access and maintenance of recreational areas in southern Holland, a region in the Netherlands. The site was chosen to be situated in a peri-urban area in Schiedam, to achieve the function as a transition zone between the urban and rural food production landscapes. An inventory was conducted both on the site and its context. The site inventory were based on following categories; spatial characters, existing sightlines to/from the area, landscape character, routes, accessibility, connections and entrances, nodes in the surrounding area, public transport connections, plant material, cultural historical values and ecology. Municipal planning documents were also considered in the inventory phase. Parallel to this, we had an informal discussion with a landscape architect and an urban planner at the municipality of Schiedam, to discuss the context and surroundings of the site.

The analysis of the site was focused on connections and entrances, sightlines and spatial character as well as landscape character. After this a program was made with solutions on how to improve the site. With spatial character we mean the experience of the area as open or enclosed. For sightlines, we analyzed possibilities for improving poor or blocked views or preserving valuable views to/from the area. With landscape character we mean visual characters such as shapes and structures as well as cultural character which stem from how the landscape has been shaped by humans. According to Jenny Nord and Ingrid Sarlöv-Herlin (2011, s.3), the method Landscape character Assessment is used to describe how elements in the landscape creates patterns that influence its character. Examples of such elements are culture- and history, land use, buildings and vegetation.

## DESIGN

The concept of a Farmer's Garden was created from inspiration from the empirical pre-study in order to inspire the design proposal. Further, guiding principles on how to implement the concept were formed. The guiding principles were used to programme the functions and design solutions for a design proposal in a peri-urban area in Schiedam. Lastly, connections to surrounding activities and nodes

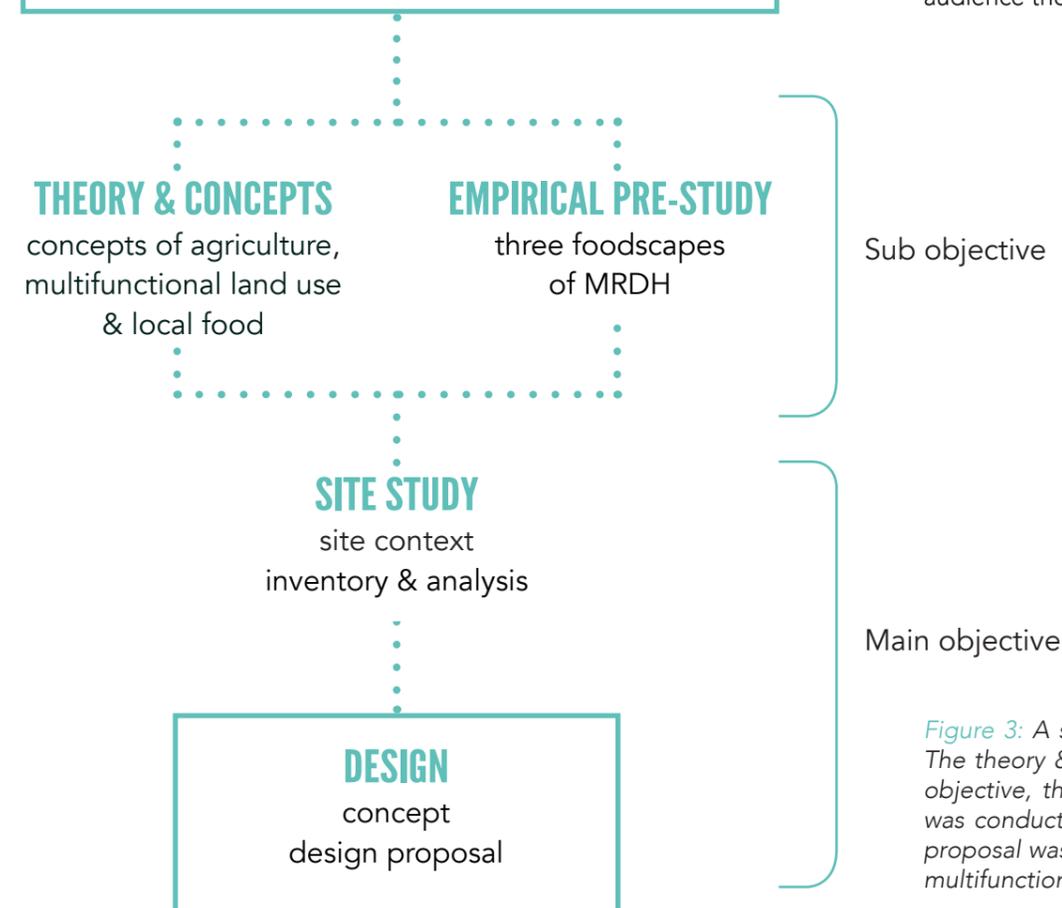
related to education, recreation and food production was gathered in a map, to show how the site relates to its context.

## LITERATURE STUDIES

Parallel to the interviews in the empirical pre-study, a literature study was conducted, considering the three food production landscapes of MRDH. This literature was found in municipal documents, local research reports and internal documents from LOLA (Lost Landscapes). The information was mostly in Dutch and needed to be translated.

## RESEARCH QUESTION

What are the preconditions and potentials to design a multifunctional foodscape in a peri-urban area in Schiedam, in the Metropolitan region of Rotterdam - The Hague, in order to achieve urban and rural integration?



Second, a theoretical literature study was conducted to find theories and concepts relevant for the thesis with focus on Europe and the Netherlands. The theoretical literature study considered concepts of agriculture, urban and rural areas, multifunctional land use and local food production. The choice of literature was mostly based on tips from professionals in the field of planning and agriculture. Despite from that, the key words used for when searching for literature was: multifunctional land use, food hub, foodscape, local food, Edible Forest Garden, peri-urban, agriculture, urban, rural and farming.

## TARGET GROUPS

This aim of this thesis is to provide knowledge, inspiration and examples for landscape architects, researchers and students who work with or studies planning, design or food related topics connected to both urban and rural contexts. In order to reach an international audience the report has been written in English.

Figure 3: A schematic sketch presenting the structure of the thesis. The theory & concepts and the empirical pre-study created the sub objective, that aimed to guide us through the design process and was conducted in order to achieve the main objective. The design proposal was the main objective of the thesis, which was to design a multifunctional foodscape in the MRDH.



## THEORY & CONCEPTS

This part presents relevant theories and concepts and how we relate and define them in the thesis.

# THEORY & CONCEPTS

Since the establishment of cities, a distinction has been made between urban and rural land. In general, cities are hubs of commerce, trade, finance, education, institutional power etc. The rural land, in contrast, is in the scope of primary production, especially agricultural products (Vejre et. al, 2015, pp.16-18). The countryside has always supported the city with food, water, energy and other materials but the way of organizing today's cities is unsustainable and resource demanding (Berg, 2008, p. 291).

*"Because urban regions will likely remain key loci of intensive processing of global resources, they must take corresponding responsibility and that responsibility must connect to rural regions." (Sybil P. Seitzinger, 2012, p.790)*

The distinction between urban and rural has, however, not excluded the idea of agricultural activities taking place in the city and its outskirts. In fact, urban agriculture was a basic start that stands behind the rise of most early cities. Though, the characteristics have changed over time. The intense industrialization and territorial specialization reduced the connections between the town and its countryside. New interests and models have been taking place in the end of the twentieth century, trying to reconnect the peri-urban sphere with



Figure 4: The border between the urban and rural areas are very distinct in MRDH. This photo is taken close to the site for the design proposal, with Schiedam in the back. Photographer: Sybren Lempsink, LOLA landscape architects, 2016.

the city. Agriculture has changed from subsistence husbandry of the fifteenth century, to industrialized production, to the community gardens and urban farming of the twenty-first century (Vejre et. al, 2015, pp. 16-18).

## THE CONCEPT OF URBAN AND RURAL

The contradiction of Urban Agriculture may stem from a modern interpretation that areas are either rural or urban. Basically, the modern urban society defines rural areas as an area outside the urban. In fact, the view of urban and rural lifestyle goes back to ancient times in Rome. What is actually urban and what is rural? Urban areas were built to deal with trade, industrial production, legal systems, administration and education. The rural areas were meant for production and supply of food, energy and fibres (Vejre et. al, 2015, pp.18-19).

In the nineteenth century, urban dwellers saw themselves as the opposite of rural farmers. Although they were supposed to differ in functions, they were dependent on each other. Since then, the relationship has changed and the distinction has become vaguer due to globalization and industrialization in the agricultural sector. European urban areas today, are a variety of green and peri-urban areas. The patterns of urbanization vary in terms of clear urban boundaries or more undefined and sprawling urban areas. The distinction between urban and rural has been blurred. In the modern system, farmers produce food for the global market and at the same time they buy all their groceries in supermarkets, while their family studies or work in the cities. However, the use of urban relative to agriculture seems to imply something different in contrast to rural (Vejre et. al, 2015, pp.18-19). A sustainable city can not be considered apart from the resources it uses and have to develop in agreement with its non-urban areas. Cities will continue to increase and shape the Earth system, which requires more responsibility (Seitzinger, 2012).

*"Planetary stewardship must take into account the planet's limited resources, interconnected issues, increasing urban population, and the reliance of urban areas on rural resources and their communities. Urban and rural are no longer useful boundaries to make with regard to planetary stewardship." (Sybil P. Seitzinger, 2012, p.790)*

## THE CONCEPT OF CITIES AND AGRICULTURE

There are a few characteristics that are the same for every agricultural activity: they are dependent on biological systems and land, human labour and investments in the production system. Agriculture is mostly bounded to an economic unit like a farm, that is either publicly or privately owned (Vejre et. al, 2015, p.18).

*"Agriculture is the practice of producing food, fuel, fibres, or fodder in an organized manner. It may be viewed as a contrast to nomadism and hunter-gatherer cultures." (Vejre et. al, 2015, p.18).*

The relation between citizens and food production started to fall apart during the Industrial Revolution in the middle of the 1800's in England. In the late 1900's, people had lost the immediate contact with agriculture due to the urbanization and lack of green spaces. This was the period when allotments were established as compensation to poor, landless people for the enclosure of common land. Urban food production and especially allotments were emphasized through Ebenezer Howard's book *Garden Cities of Tomorrow* published in 1898, where food production was a key element. Howard's



Figure 5: Rotterdam's harbour and trade port is one of the largest in the world.

# THEORY & CONCEPTS

theories largely affected urban planning across Europe along with Le Corbusier's *The City of Tomorrow* and its Planning, 1971, that later in the twentieth century influenced architecture and urban planning all over the world. At that point, Le Corbusier considered what would be called peri-urban agriculture today. In addition, Frank Lloyd Wright wrote the book *The Living City* in the 1950's, about the integration of agriculture in dispersed urban settlements (Bohn, Howe & Viljoen, 2005 pp.98-100).

Although architects had a great influence on urban agriculture, the most dramatic effects arose from starvation and blockades campaigns during the two World Wars. In the 50's and 60's, the combination of the new welfare states and increasing prosperity led to a decrease in growing your own food since there were no longer need for it. The creation of allotments suffered from being associated with hard wartimes instead of progress. During the 60's and 70's, environmental awareness and alternative life styles started to develop and self-sufficient food production was again appreciated. It also gave birth to urban farms and community garden movements. In recent years, the interest for allotment holding, urban farming and community gardening has steadily increased and led to a revitalization of urban food production (Bohn et. al, 2005, pp. 101-105).



Figure 6: Community garden in Edinburgh, Scotland. Photographer: John Lord, 2013

## THE CONCEPT OF URBAN AGRICULTURE

In the developed world, the idea of growing food in the city sounds naive to many people. On the other hand, urban food production is an essential part of everyday life in developing countries where it is not a matter of recreation or aesthetic values (Bohn et. al, 2005 p. 97). In *Urban Agriculture Europe* (Vejre et. al, 2015, p.19), Urban agriculture are described in six different dimensions: Spatial dimension, functional dimension, motivational dimension, market dimension, origin dimension and actor dimension.

The *spatial dimension* relates to the location and urban context where urban agriculture takes place. There is a definitional problem about where the urban-rural border is, since cities have a strong influence on the countryside when it comes to social, cultural and economic conditions. The location is a key characteristic for Urban agriculture. Urban agriculture must adapt to the urban conditions but at the same time it is also a possibility to take advantage of the city, for example the easy access to infrastructure. Urban agriculture might be disconnected from the rural community and network but thrives through close contact with markets (Vejre et. al, 2015, p. 19).

The *functional dimension* has to do with the aim of the farms. For rural agriculture, production is mostly the main purpose. For urban agriculture, the production scope is often broader and more flexible. Also, recreational, educational and health related functions are often considered more important than production. That means new functions arise through the integration of agriculture in the cities. For example, disposal of certain kinds of urban waste in rural areas might not be necessary any more since urban agriculture could play a role in closing water and nutrient cycles, by taking care of organic waste and polluted water in the city (Vejre et. al, 2015, p. 19-20).

The *motivational dimension* describes how urban agriculture historically developed from allotments for the livelihood of the working-class to the vision of the garden city, for healthier living conditions in the post-modern cities. With increasing welfare in the cities we are nowadays experiencing other motivations such as well-being and social networks (Vejre et. al, 2015, p.20).

The *market dimension* describes how the agricultural at least partly should turn to the local market and residents rather than the world market, to be considered as urban agriculture. Though, urban

agriculture sometimes develops without matching these criterions (Vejre et. al, 2015, p.20).

The *origins dimension* relates to the origin and presence of agricultural areas within or close to cities. Spaces that for some reasons were not suitable for development or spaces that are preserved for future urban expansion are often used for urban agriculture. The so-called introduced areas are areas that are spontaneously made by city dwellers or business enterprises. In some cases, agricultural areas are planned to be preserved and protected in the city or its perimeter. They are defined by strict regulations to control the land use, to guarantee access to open, green space for city dwellers and to prevent the urban sprawl. London, Copenhagen, Frankfurt and Randstad, the city ring of the four largest cities in central-western Netherlands, are examples of this (Vejre et. al, 2015, p.20).

Lastly, the *actor dimension* considers the groups of people performing agricultural activities. One major group is the ordinary, either full-time or part-time, farmers working close to cities of rapid urban growth. This means in the near future they might find themselves surrounded by urban areas, being forced to react to the new urban conditions. There are also hobby farmers, working on an amenity basis with smaller farms in peri-urban areas. These groups either own or rent



Figure 7: Agriculture in an urban context in Rotterdam's city center. This is the roof top of Dakakker, one of the site visits in the empirical pre-study and part of the urban planning project Luchtsingel. Photographer: Ossip van Duivenbode, June 2015.

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their land on a legal basis, in contrast to actors in Urban Agriculture. These actors usually perform on land belonging to private or public authorities, commons or trusts. They often start without experience and backgrounds of agriculture, often emerge from alternative, idealistic movements and new business entrepreneurs (Vejre et. al, 2015, p.21). To summarize, following quote takes into account all varieties of dimensions, characters and contexts of Urban Agriculture:

*“Urban Agriculture spans all actors, communities, activities, places, economies that focus on biological production in a spatial context, which – according to local standards – is categorized as “urban”. Urban Agriculture takes place in intra- and peri-urban areas, and one of its key characteristics is that it is more deeply integrated in the urban system compared to other agriculture. Urban Agriculture is structurally embedded in the urban fabric; it is integrated into the social and cultural life, the economics, and the metabolism of the city.” (Vejre et.al, 2015, p. 21)*



*Figure 8: Voedseltuinen is situated in an urban context in the city of Rotterdams and works with social aspects through re-integrating people that has become distanced from the labour market. Photographer: Menno Leutscher, Stichting Voedseltuinen.*

Can agriculture be urban? The answer for this question is yes. Urban Agriculture develops on many levels, some more urban than others. Agriculture can have urban character – the more it is integrated with the urban metabolism, the more it is strengthened. Today, urban agriculture takes place in various styles in all regions. Our post-modern world is facing challenges such as climate change, stable food-supply and increasing urbanization. Urban agriculture may contribute to future resilient cities, but to achieve this there's a need to reveal its potential for planners, environmentalists, policy makers, as well as for the public (Vejre et.al, 2015, p.21).

## MULTIFUNCTIONAL LAND USE

The activity range in urban agriculture is unlimited when it comes to advocating a green urban world. In Europe, there are many business combinations based on urban agriculture that contributes to mixed land use functions. For example, livestock farmers that work with education or health care, food production combined with recreation and wastewater treatment, urban forestry projects offering health-and microclimate benefits as well as organic food and beverages associated with tourism. The rural areas are becoming more multifunctional and the urban areas use agriculture as a tool in reshaping landscape architecture and making cities greener. Still, there is a need for more flexible land use in urban areas in order to meet the many sustainability- and socio-economic objectives of today. The integration of farmland for a multifunctional use within urban areas could be a winning situation for all (Van Leeuwen, Nijkamp & De Noronha Vaz, 2010).

Land resources for agricultural activities are shrinking and new urban exploitation is almost entirely made on farmland. The Netherlands has sorted this problem by making buffer zones, areas adjacent to the city where urban development is restricted or forbidden. One critic against this preservation approach is that it enhances the division of urban and rural planning and lacks a visionary and positive development approach. The peri-urban areas are represented as being fragmented and in conflict with urban and rural areas. Also, the preservation approach often highlights natural areas rather than farmland which limit the farmers to survive in peri-urban zones (Zasada, 2010).

The densely populated western parts of The Netherlands are known as Randstad (Ring City) and include the four largest cities of the country: Amsterdam, Rotterdam, The Hague and Utrecht. The urban areas are situated in a distinctive pattern surrounding an open agricultural area called the Green Heart. Randstad serves as an example of spatial planning towards growth management. In 1966, the first national policy for spatial planning came as a reaction to the sub-urbanization and to prevent urban sprawl that was threatening the Green Heart. The 1980's national policy for a compact city planning included preservation of open agricultural land and environments. Even though the implementations have been successful there is still a hot debate going on in The Netherlands (Dieleman & Wegener, 2004). In Randstad, there is a hard zero-sum relation between different land use categories such as nature-and recreational areas, agricultural land and urbanization. There is need for a more coherent strategy to achieve a landscape of interlinked ecosystems with improved functions and ecological services (van Eeten & Roe, 2002).

*“Nevertheless, planning instruments have to be adapted to the requirements of multifunctional agriculture. The peri-urban area needs to be recognized as an individual policy arena to overcome the urban–rural divide and strengthen urban–rural relationships. Agricultural policies and financial incentives should take into account a peri-rural area's difference to the rural countryside, and target development guidance at the situation within the border of urban and rural zones.” (Ingo Zasada, 2011, p. 646)*

With an increased living standard and more leisure time, citizens tend to use the countryside for a multitude of values and activities. It is proved that natural landscapes usually have stronger positive health effects than urbanized ones. Outdoor recreation has become important for the quality of life and positive health aspects. Multifunctional peri-urban areas are important locations for these services. In addition, agriculture plays an important role in maintaining peri-urban areas. For example, using grazing animals is an effective way of maintaining landscapes of large contexts. Agriculture close to cities provides ecosystem services and plays a key role for social, environmental and

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aesthetic values for urban areas nearby. It also functions as a supportive element for the rural image in the eyes of city dwellers (Zasada, 2010).

Multifunctionality is characterized by jointness and mitigation of conflicts, which provides for different types of land use in one spatial context. Multifunctional farming, including recreational or educational activities, is a tool for the survival of a farm or a transition process in land use (Zasada, 2010). Examples of activities and functions contributing to recreation and leisure are petting zoos, hunting and fishing operations, horseback riding (Brown & Reeder, 2007) and constructions of pathways on privately owned ground. Farming could also be combined with tourism by offering accommodation (Zasada, 2010). These kind of agri-tourism activities are more related to rural areas than peri-urban areas, since rural landscapes are often more characterized by natural elements like forests, mountains or water areas. Though, educational- and social farming are growing activities on peri-urban farms. Farms offering educational programs for school or social and caring functions like rehabilitation or reintegration for people that are distanced from the labour market, strengthen the social responsibility that agriculture has. All these activities on farms provide economic benefits and rural reactivation as well as



Figure 9: Embedded in Schiedam lies Kethel park consisting of a piece of Dutch historical landscape with grasslands and canals that are maintained by grazing sheep, that support the image of the rural landscape for the city dwellers.

contribute to diversification and development in both rural and peri-urban areas. More recognition is required of what kind of values and functions agriculture could give to urban populations, such as social, environmental and recreational values, cost-efficient provision of landscape features as well as local food (Zasada, 2010).

A recent policy change for Rotterdam's regional green areas has developed in order to create new recreational areas and nature conservation areas. Among them, areas in the north of Rotterdam are considered, trying to make the peri-urban areas more accessible for citizens. Large-scale land purchases from farmers will be suspended and recreational activities on farms as well as urban agriculture will be stimulated (City of Rotterdam, 2012, pp. 7-8).

This thesis focuses on combining food production with recreation and education to achieve multifunctional land use in a peri-urban area. The definition of recreation in this thesis means the ability to walk and cycle in a natural area, with views over the landscape. It also relates to the recreational benefits provided by greenery, water and animals. Addressing education, this thesis considers education about the production, process and distribution of food turning to both children and adults. The education is oriented to contribute to an entertaining experience of food.

## LOCAL FOOD

There is a wide range in perspectives on local food and consumers are interested in local products for different reasons. Motives for consumption of local food are not necessarily based on facts, but rather on individual perception of what local food is. Some of the meanings are identified as; food security, support of local economy, transport efficiency, animal welfare, preservation of open landscapes, closer relation between producer and consumer, increased opportunity to develop local systems between urban and rural areas and lastly the conviction that local food is healthier and more fresh than conventional food. In these differences of what local food means for different consumers, there is a risk that consumers feel deceived when the local food do not fit with their perceptions. With defining and regulating the meaning of local food there comes a risk that the definition will not include the values for a certain consumer (Granvik, Jossee, Hunt & Hallberg, 2016) .

One common definition of local food is "food produced, processed, traded and sold within a defined geographic radius, often 30 miles" (DEFRA, 2003,). Another definition is that local food means goods with a short distribution chain between producers and consumers, produced and processed in a defined geographical area (Kneafsey et al 2013). According to us, these definitions only consider where the products are produced and sold but do not define how it is done. The consumers are not informed about the production- and distribution methods and therefore not either informed about the actual quality of the product or its proper impact of the environment, which is a criteria for the purchase of local food in this thesis.

The exact geographical radius of local food concerned in this thesis is not defined, but the maximum affected area, the production, processing and sale is within the MRDH. The food production on the site for the design proposal is all organic but despite that, the market turns to all local farmers and not exclusively organic farmers. Nina Planck, 2005 a farmer working for London Farmers' Markets, argues;

*"All farmers should have a chance to meet the public, so that they can learn what the public want" (p.79).*



Figure 10: Every weekend there is a market at the city farm Uit je eigen Stad in Rotterdam, one of the site visits in the empirical pre-study. They sell locally produced food from the region.

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She states that if farmers change their production method in any way, by having more contact with consumers, it will be in a greener direction and not the other way around. Also, many farmers fall short for legal regulations of organic production even if they practice green agriculture (Planck, 2005 pp. 79-81). The focus on local food in this thesis will consider the meeting between producer and consumer, the connection between urban and rural and issues regarding landscape management. Although, the focus to some extent also includes natural fresh food, healthy food choices and animal ethics.

In recent years, there has been an on-going global trend towards a society that cares more and more about the quality of the food (City of Rotterdam, 2012, s. 7-8). The interest in urban Farmers' markets has increased a lot and is probably a response to the globalized food market and a way for consumers to support local economies and farmers (Bohn et. al, 2005 p. 72). Consumers purchasing directly from farmers enhances the urban-rural relationship. Such social interactions between farmers and consumers also play an important role when it comes to building trusts and shorten the supply chain. Though, the motivation for interactions differs a lot among farmers. (Zasada, 2010)



Figure 11: Farmers market near Brooklyn Bridge in New York. Photographer: Devon D'Ewart, June 2011



Figure 12: The entrance to Voedselbos Vlaardingen, an Edible Forest Garden developed in a peri-urban area.

One critic against marketing of local products is that it has a limited potential on the globalized food market. Also, direct marketing often turn to wealthy and educated individuals. (Zasada, 2010) Still, food production remains important in peri-urban areas, since farmers operating here often find ways of direct marketing. Farms situated close to markets have the advantage to quickly respond to consumer's changes in demand of products. Better communication and great responsiveness does often lead to improved quality of products (Petts, 2005 p. 71). Urban and peri-urban agriculture also contribute to waste recycling and therefore reduce the cost of waste disposal and landfill. Also, the storm water management could be reduced since agricultural land, compared to hard surfaces, retains water for longer periods and reduces the risk for flooding damages. Where urban and peri-urban agriculture as well as urban and rural connections are well functioning, the food supply is more effective and therefore food prices are expected to be lower. This will also support resilience and work as a buffer for both external and domestic economic crisis in providing the population with food security (Petts, 2005 p. 72).

## EDIBLE FOREST GARDENS

A Forest Garden is a structure of a young woodland which includes useful plants, which often means edible plants. It is a designed and maintained ecosystem that includes species with direct and indirect benefits for people. It can contain large and small trees, shrubs, herbaceous perennials, annuals, herbs, root crops and climbers. The plants shall mainly be perennials so that the system can be sustainable in the long-term. All shall be structured to maximize the positive interactions between the plants so that the system can completely or almost completely maintain itself. The system includes plants that reduce disease problems, nitrogen fixing plants and other species that are good at raising nutrients from the subsoil make the system self-fertilising. High diversity is essential since diversity almost always increase the health of the ecosystem (Crawford, 2010 p. 17).

### Layers of the Edible Forest Garden

1. Canopy: medium to large trees (over about 10 m)
2. Small trees and large shrubs (4-9 m)
3. Shrubs (up to 3 m)
4. Herbaceous perennials and evergreen plants
5. Ground cover plants and creepers
6. Vertical plants (climbers, perennial or shrubs)
7. The underground layer (root crops)

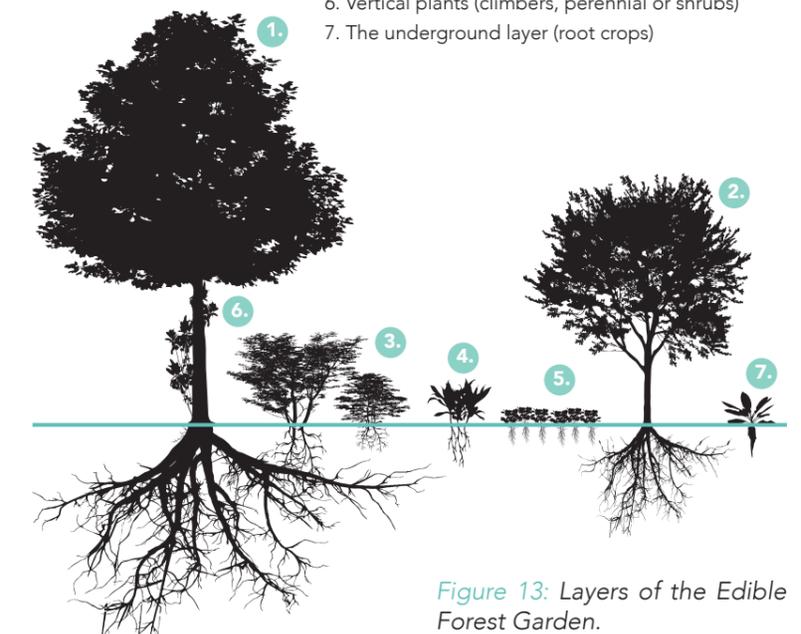


Figure 13: Layers of the Edible Forest Garden.

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*"In a moist temperate climate, the climax vegetation is a woodland or forest - i.e. if you do nothing to a piece of land it will eventually become a forest; the force of nature actively moving towards a woodland. The further agricultural and horticultural system is from a woodland, the more energy it takes to maintain and the more disturbed and distant the system is from a long-term sustainable ecological state." (Martin Crawford, 2010, p. 19)*

Forest Gardens is something between an orchard and a wild natural woodland which makes it the lowest energy input system for production of edible crops and other useful products. Other benefits with a Forest Garden is that it gives a wide range of products, it requires low maintenance apart from some pruning, it is a low- input

system which makes it high efficient, it has a high nutritional value since perennial plants tend to be more nutritious than annual plants, in case of weather extremes forest-based systems are the most resilient, it is biologically sustainable because of the diversity and interactions between species, it is aesthetically beautiful because the perception of wild nature compared to other cultivation gardens. It is also environmentally friendly because it is good for wildlife, it stores carbon dioxide and prevent flooding and erosion (Crawford, 2010, pp. 20-22).

In temperate climate there is a need for good levels of light to reach the ground to be able to grow productive plants there. The Forest Garden is designed with an open, broken canopy structure and maintained to a young or mid-succession stage woodland (Crawford, 2010, pp. 22-25).



Figure 14: A Chinese toon, *Toona sinensis*, in Voedselbos (Food forest) Vlaardingen situated in a suburb to Rotterdam. The leaves are harvested when they are still young and have the taste of a leek.

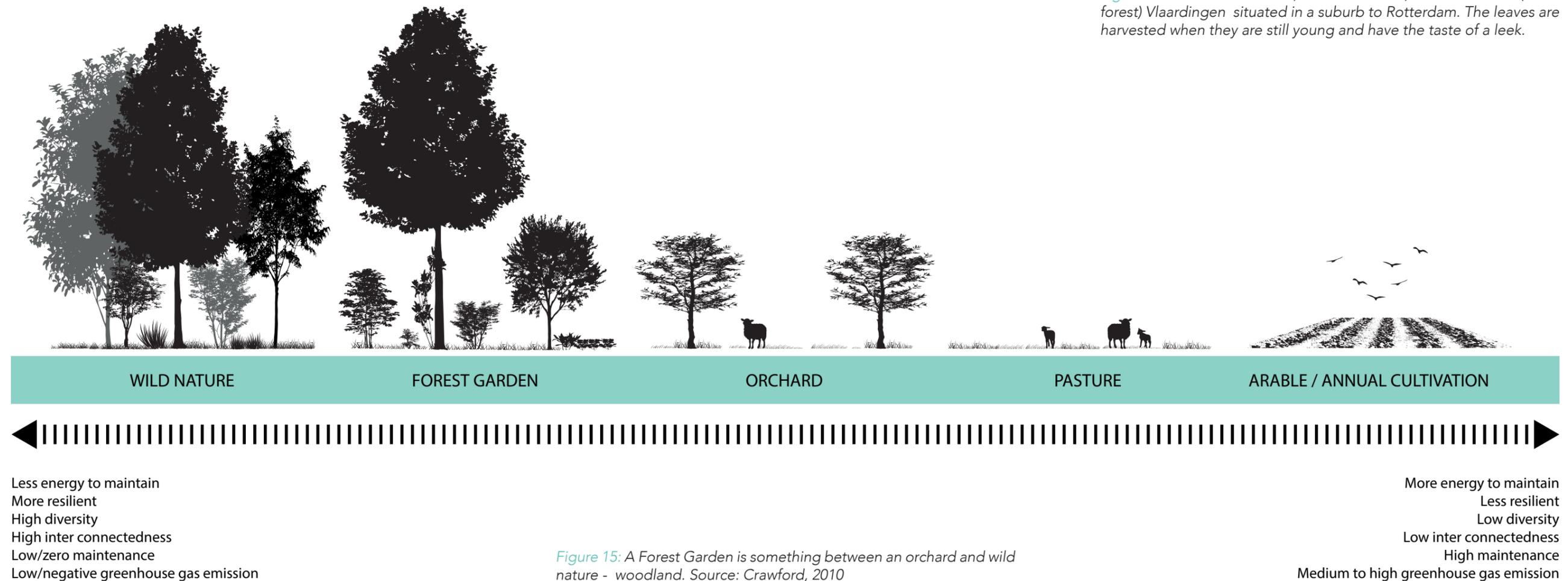


Figure 15: A Forest Garden is something between an orchard and wild nature - woodland. Source: Crawford, 2010

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## FOODSCAPE

This thesis refers to the definition of a foodscape by Norah Mackendrick (2014) who studies and teaches food politics, gender, and environment;

*“Consider the places and spaces where you acquire food, prepare food, talk about food, or generally gather some sort of meaning from food. This is your foodscape. The concept originated in the field of geography and is widely used in urban studies and public health to refer to urban food environments. Sociologists have extended the concept to include the institutional arrangements, cultural spaces, and discourses that mediate our relationship with our food.” (Norah Mackendrick, 2014, p.16)*

This means that everything related to food like a grocery store, farmers market, community gardening, restaurants, food trucks and on-line shops is considered a foodscape (Mackendrick, 2014).

In our empirical pre-study, a foodscape also considers a production

landscape in relation to a specific landscape condition. The definition considers the type of production and how it has shaped the landscape as well as why it is situated in a certain place. In the empirical pre-study, a foodscape is described from the relationship to the landscape’s context and character. The main foodscapes examined in the pre-study is urban farming in Rotterdam, greenhouse horticulture in Westland and dairy farming in Midden-Delfland that we considered three different types of foodscape.

## FOODHUB

Jim Barham writes a blog for the United States Department of Agriculture (2010) have noticed that more and more small and mid-sized farmers have problems to efficiently get their products to the market. They struggle to get access to for example processing space storage and warehouses. Things like this require capital investments that these producers usually can not afford themselves. The working definition of a food hub from the United States Department of Agriculture is;

*“A centrally located facility with a business management structure facilitating the aggregation, storage, processing, distribution, and/or marketing of locally/regionally produced food products.” (Jim Barham, 2010, December 14)*

By accommodating these activities, food hubs are providing institutional and retail market for small and mid-sized farmers. This in turn leads to an increased access of fresh healthy local food for consumers (Barham, 2010).

In our thesis, a Food hub is a building that will include functions like storage, processing, marketing and sale of local farmers’ products. The focus is to design the outdoor environment around the building. The food hub is considered in terms of placement and what functions it should include and the surrounding area will be designed to support the functions and activities. The food hub will be the main attraction that encourages farmers to use the site for marketing, starting cooperations etc. The surrounding area will include functions contributing to the experience of food in terms of education and recreation and therefore strengthen the citizens objectives to visit the food hub.



Figure 16: An illustration describing the wide meaning of foodscapes, used in our thesis, with activities and functions connected to food in our society.



Figure 17: A model describing the functions of the food hub in this thesis.



## EMPIRICAL PRE-STUDY

This part presents the Empirical Study of three foodscapes of MRDH. It is focused on urban farming in Rotterdam, greenhouse horticulture in Westland and dairy farming in Midden-Delfland. The information presented is gathered from interviews and own observations if no other reference is specified.

# EMPIRICAL PRE-STUDY

In order to create the design proposal, an empirical pre-study was conducted to gain knowledge about the context of the foodscapes of MRDH. The empirical pre-study mainly focused on three foodscapes; urban farming in Rotterdam, greenhouse horticulture in Westland and dairy farming in Midden-Delfland. All information presented in this part comes from semi-structured qualitative interviews and own observations, if no other references are mentioned. The chapter first starts with a short introduction, from a literature review, to the foodscapes of MRDH. Further, for each and every foodscape, observations of landscape characteristics are presented, followed by presentations of the site visits. A choice of three greenhouses, three dairy farms and eight urban farms are presented. In the end of the empirical pre-study, urban farming, greenhouse horticulture and dairy farming are further analyzed with the SWOT-method. Lastly, a conclusion describing what we chose to consider and applicate in the design proposal.



## AN INTRODUCTION TO THE FOODSCAPES OF MRDH

According to Jan Willem van der Schans (2010), working for Wageningen University in The Netherlands, there is a lack of trust to the conventional food system. As a reaction, new ways of producing food have evolved (Van der Schans, 2010). Urban agriculture – food production in the city or in the outskirts of the city referred to as peri-urban areas, has been growing a lot the latest years. In Rotterdam, particularly in the suburbs, there are large green areas of poor quality and sometimes not utilised. In such places, organizations, initiatives and housing associations have started to create vegetable gardens and in more dense urban areas, undeveloped places and courtyards are turning into edible green areas. In addition, shops and restaurants selling products from the region are increasing rapidly in Rotterdam (City of Rotterdam, 2012, pp.7-8 & 20).

Around Rotterdam, there is an extensive diversity of agriculture- and horticulture businesses although farming in immediate connection to the urban areas has rapidly decreased the latest years. This happened due to urban expansion and the creation of green areas. Despite the strong urbanization there are still authentic landscapes remaining in close connection to the city of Rotterdam. Midden-Delfland is one of them, where the farmers have a high responsibility for the landscape and where high-quality food is produced. Some producers have started care farms, some offers recreational activities or sell their products directly on site as well as directly to local restaurants. This type of diversified agriculture is also, according to the municipality of Rotterdam, a kind of urban agriculture that contributes to a closer relationship between consumers and producers (City of Rotterdam, 2012, pp.7-8). Midden-Delfland is an open and green landscape and according to the urban planner working for the municipality of Midden-Delfland, the area is relatively unique to the Netherlands, sometimes called The Central Park of MRDH<sup>1</sup>. For the soil dependent agriculture in MRDH, there is a difference between products from the peat soil in the north of Rotterdam compared to the clay soil south and west of Rotterdam. Milk and meat are mainly produced on the pasture fields of the peaty soils of Midden-Delfland whereas potatoes, vegetables, fruit trees and a limited amount of cereals dominates the production on the clayey soil in the south (City of Rotterdam, 2012, p.20). In 2008, Midden-Delfland was the first Dutch municipality joining

the movement Citta Slow, a worldwide network of municipalities promoting regional production and trade as well as advocating the authentic and traditional characters of landscapes, while encouraging new innovative techniques (Municipality of Midden-Delfland, 2011).

Westland, one of the largest greenhouse areas in the Netherlands, plays an important role for the export of vegetables and fruits to the world market (City of Rotterdam, 2012, p.20). According to the urban planner working for the municipality of Westland, this is also the largest glass house area in the world and an important innovation center for greenhouse horticulture<sup>2</sup>. The greenhouse horticulture is highly efficient, producing a maximum yield per hectare at a low cost. In addition, Rotterdam imports large amounts of tropical- and sub-tropical fruits, resulting in relatively low prices of fruits and vegetables in comparison to markets in other metropolitan areas (City of Rotterdam, 2012, p.20). According to the urban planner, the greenhouse horticulture in Westland has been forced to adapt to the impacts of urban sprawl of The Hague, by moving greenhouses away from the urban boarder<sup>2</sup>.



Figure 18: Photo from one of the site visits, Spoortuin, with plots developed on an abandoned place next to the railway. The picture shows a small wooden fence around a leek plantation in early spring.

<sup>1</sup> Urban planner Municipality of Midden-Delfland, oral communication 11th of April 2016.

<sup>2</sup> Urban planner Municipality of Westland, oral communication 18th of April 2016.

# EMPIRICAL PRE-STUDY

## THE RISE OF TWO MUNICIPALITIES

Already in the sixties, people started to worry about that the cities of the MRDH would grow together and destroy the green landscape of Midden-Delfland (Midden-Delfland Site, 2003). In addition, the agriculture had been densified since the World War Two, according to the urban planner at Midden-Delfland. The urban planner continued to say that this resulted in the rise of controversial nature organisations, highlighting the need for recreational areas and preserving the nature<sup>1</sup>. In the year 1977, the Reconstructiewet (Reconstruction law) for Midden-Delfland was established on a national level in order to serve both the agricultural - and recreational interests (Midden-Delfland Site, 2003). The reconstruction of Midden-Delfland resulted in the need for a new municipality. In 2004, the two municipalities Maasland and Schipluiden were merged into the municipality of Midden-Delfland (Midden-Delfland Site, 2003). According to the urban planner at the municipality of Midden-Delfland, Westland was simultaneously also formed by a consolidation of smaller municipalities<sup>1</sup>. Both urban planners stated that Westland and Midden-Delfland cooperate on many levels, even though the municipalities have quite different views on planning since their economical and historical perspective differs<sup>1 & 2</sup>. Midden-Delfland was defined by very hard borders to prevent



*Figure 19: The authentic landscape of Midden-Delfland is mostly famous for its historical windmills that drained the water from the polders (land protected from the sea). Large, open grasslands with cattle is a common view in the area.*

<sup>1</sup> Urban planner Municipality of Midden-Delfland, oral communication 11th of April 2016.

<sup>2</sup> Urban planner Municipality of Westland, oral communication 18th of April 2016.

the two cities The Hague and Rotterdam from growing together. The development strategy of the area aims to keep the landscape green and open, where agriculture, nature and recreation interact with each other (Municipality of Midden-Delfland, 2009). The vision for future Westland mostly consider the development of horticulture along with new infrastructure and residential (Municipality of Westland, 2013).



*Figure 20: Bird-eye view over the greenhouses in Westland, the largest glass house area in the world, that is at the front edge in horticulture technology. Photographer: Municipality of Westland.*

# EMPIRICAL PRE-STUDY

## URBAN FARMING

As for the rest of the Netherlands there has been a rapid increase of urban farming initiatives in Rotterdam the last ten years. Rotterdam has several social, economical and environmental problems. The lack of green space implies poor living environments and lack of recreational opportunities. Lack of job opportunities creates high unemployment and health related issues due to pollution, lack of exercise and bad nutrition. Urban agriculture can play a crucial role in solving these issues, the urban farmers goal is often to produce healthy local food, create physical exercise, job opportunities, education, recreation and to improved social cohesion through community activities (Eetbar Rotterdam, 2011). As proved from the empirical pre-study, making use of abandoned places and making the city greener is also often important issues.

Rotterdam has a long tradition of allotment gardens. Though, todays city dwellers are often not willing to become a member of an association and prefer a location closer to home where they can grow herbs and vegetables individually or together with other neighbours. (City of Rotterdam 2012, p. 7)

As discovered in the empirical pre-study, urban farming initiatives in Rotterdam varies from rooftop farms, Edible Forest Gardens, soil based cultivation, cultivation in pots etc. Many of the existing initiatives in the city were started by inhabitants or entrepreneurs and are dependent on funds and volunteer labour. The sizes vary from small community garden initiatives to the Netherlands largest city farm. The urban farmer needs to be creative and adaptable to every place and situation in the city. Even if urban farms have disadvantages, for example smaller plots for production, they have advantages that the rural farmers might not have. Urban farms take advantage of volunteer labour and direct sale.

The municipality of Rotterdam states that the city will become attractive because of the food production in and around the urban areas. They hope that in the future, the region will produce a significant part of the fruit and vegetables eaten by the inhabitants (City of Rotterdam, 2012).



**MAP: SITE VISITS URBAN FARMING**  
Visited urban farms in Rotterdam. Edited by authors, based on LOLA landscape architects Urban nature map.

# EMPIRICAL PRE-STUDY

## FOODSCAPE OBSERVATION - ROTTERDAM

These general foodscape observations are presented to create an understanding and overview of the overall impressions and characteristics of the foodscape of Rotterdam. Interesting examples and inspiring functions for design proposal are registered on regarding visual qualities, biodiversity, learning about and experiencing food, recreational opportunities and accessibility as well as business- and marketing models that were useful for the design. Further, after this page, eight site visits to urban farms in Rotterdam are presented.



The contrast between city and nature reminds you of the urban context you are in.



Bee hives installed at the urban farms provides for animals in the city.



Many urban farms work with education to contribute to the awareness of food among children. This is an outdoor classroom.



Insects hotels that provides for animals in the city.



Multifunctional use of recreational areas are combined with food production and education in this Edible Forest Garden in Vlaardingen.



Most of the urban farms are only open during fixed times and hard to access.



Abandoned places like former railway tracks are used to make the city greener.



Although urban farms in many cases does not entirely make profit from their food production, they promote local production and consumption for awareness of a sustainable food chain.

# EMPIRICAL PRE-STUDY

## ROTTERDAMSE MUNT

**Start:** 2013

**Size:** 3000 m<sup>2</sup>

**Location:** Brede Hilledijk 2 in Feijernoord

**Opening times:** Wed - Sat 10-17 (10-19 summertime) closed January

**Access:** Opening times or appointment

**Membership:** Anyone can join

**Main purpose:** Educational farm

**Previous use:** Abandoned railway-tracks

**Facilities:** Toilet, kitchen, hot water, terrace, greenhouse, storage, shop

**Staff:** 2-3 part-time employed and average 30 volunteers

**Crops:** Mostly herbs and flowers

**Animals:** None

### Description and objectives

According to the interviewed initiator, Rotterdamse Munt is a project about experiencing fresh food from the garden and to inspire towards a healthier lifestyle. Rotterdamse Munt mostly grows and sells herbs and some flowers to restaurants and bars in Rotterdam. During summertime, the chefs pick their own delivery themselves. Rotterdamse Munt grow approximately a hundred different herbs, where there are twelve different kinds of mint species. Mint is their speciality, but they also have a smaller production of vegetables and berries for the



*The terrace and view over the garden.*



*The volunteer building and the store of Rotterdamse Munt.*

volunteers. The reason why they started with herbs was partly because of aesthetic and recreational aspects. Many of the herbs return year after year and are easy to maintain, which is important since volunteers maintain the garden. On sunny days you can hang out on the terrace and enjoy the garden. Every year there is a spring and autumn festival and sometimes they organize parties and film evenings in the garden. They also coordinate educational programs for schools with children in the age of 10-18 years. Rotterdamse Munt has a shop open to the public during fixed times. It offers herbs produced and packed at the garden as well as locally produced products from other small farms in Rotterdam, through the distribution and sale network Rechtstreex.

### Development and history

The initiator of the project works as a landscape architect and wanted to "inspire people to act and think green". The driving force of the project was to make Rotterdam greener. The initiator believes there is a need for functional parks and for people to take part in making their city greener. The area where Rotterdamse Munt is located today is a former train station where goods were exported from the harbour. The soil was once contaminated but since the area is meant to be built on in the future, it has been cleaned up from pollution.



*Two volunteers working in the garden.*

### Accessibility & urban context

The garden is situated in Rotterdam-Zuid, which according to the initiator, is a poor area where people are in need for attention and guidance. Most of the people involved in the gardening live in the area, but some are from other parts of Rotterdam. Everyone is welcome and free to join. The volunteers have different backgrounds and nationalities. In two years, the garden has to be moved to a permanent place and the initiator hopes to increase the garden to 1-1,5 hectares.

### Conclusions and considerations

- » Herbs are easily maintained for persons with a lack of experience of the growing process.
- » Creating a niche, a speciality or expertise is a successful way of marketing.

# EMPIRICAL PRE-STUDY

## DE PLUKTUIN

**Start:** 2011

**Size:** 3000 m<sup>2</sup>

**Location:** RFC weg 190

**Opening times:** Saturdays 14-17 in April-Okt

**Access:** Pass by when a volunteer is there or join an event

**Membership:** Anyone can join

**Main purpose:** Recreational and social farm

**Previous use:** Parking lot

**Facilities:** Greenhouse, storage with tools, clubhouse with a terrace, scene, water pump and irrigation sprinkler system, chemical toilet

**Staff:** Volunteers, 20-25 people and a core group of 8 people

**Crops:** 120 small fruit trees, some berries & herbs

**Animals:** No

### Description & objectives

The interviewee was one of the initiators behind the De Pluktuin, the Picking garden, and described the garden as a city garden with fruit trees, where you are able to come pick your own fruits and berries and participate in social activities. The initiator said there are scheduled activities organized during summertime, such as music nights, poetry evenings, cooking, yoga, fruit picking, reading for children, outdoor cinema, painting and photography workshops. De Pluktuin grow cherries, pears, apples, strawberries, blackberries, raspberries, grapes etc. They have also got a kitchen garden, a terrace with a roof, a scene and a labyrinth.



Cooking event at the farm. Photographer: Cisca van Bommel



The previous parking lot before de Pluktuin was constructed. Photographer: Rio Hällender

### Development & history

The initiator said De Pluktuin was started by the inhabitant initiative ProGroen (ProGreen), addressing the need for green islands and social meeting places in Rotterdam. The initiator said the area was a former, temporary parking lot in asphalt that was meant to be built, but the building project turned out too expensive. Instead, ProGroen struggled to get the chance to build a temporary fruit garden at this spot starting in 2011. The initiator also mentioned a removal of the asphalt was considered too expensive. The only alternative was to create the garden on top of it. De Pluktuin started with only six fruit trees ending up with today's 120. The plant beds and paths were constructed with bark chippings and the fruit trees grow in pots. Unexpectedly, this cheap and temporary type of construction worked perfectly fine. Though, since the area is completely covered in asphalt, the garden has had some problems with flooding and had to install a pump to get rid of storm water.

### Accessibility & urban context

De Pluktuin lies in a residential area called Delfshaven. It is situated between a canal and a railroad which made the volunteers build a float to cross the water to reach the garden from the residential area. The garden is fenced and closed, only accessible to volunteers, but according to the initiator everyone is welcome to join the activities when it's open. There are several other gardening initiatives and urban farms nearby, also involving volunteers from ProGroen. According



De Pluktuin nowadays. Photographer: Joe Johannsen

to the initiator, the whole green strip along the railway is unique to Rotterdam. At the moment, the municipality and ProGroen work with creating a wetland park in one part of the strip. It is called Essenburg Park. The initiator said it will hopefully develop as a permanent green structure together with the existing garden initiatives.

### Conclusions and considerations

- » Different types of workshops and events is a way to engage the neighbourhood.
- » A fruit garden can simply be created on asphalt by planting in pots.

# EMPIRICAL PRE-STUDY

## EDUCATIEVE TUIN

**Start:** 1923 (The Netherlands oldest educative farm)

**Size:** 5000 m<sup>2</sup>

**Location:** Essenburgsingel 59

**Opening times:** usually mon-fri 8.30-16.30

**Access:** when the gate is open

**Membership:** Formal. Every school can join after contacting the municipality.

**Main purpose:** Education

**Previous use:** A farm

**Facilities:** toilet, hot water, kitchen, masonry oven, outdoor classroom, indoor classroom, office, storage

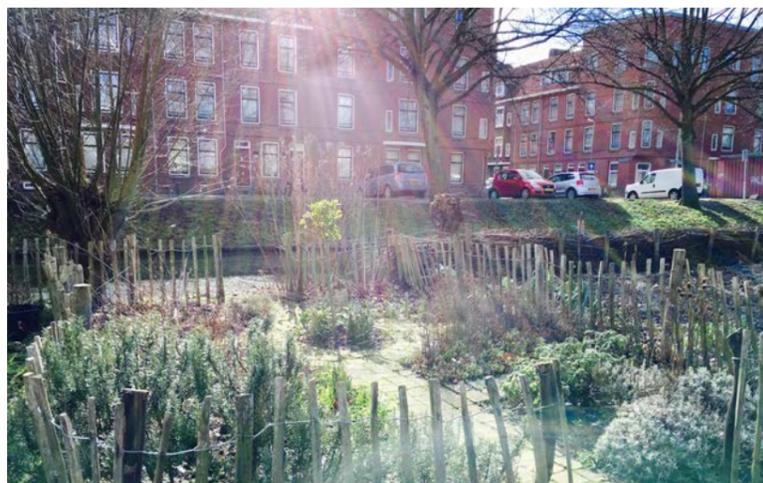
**Staff:** 2 full-time employees, 24 elderly volunteers, six groups of children

**Crops:** Manly vegetables and some herbs

**Animals:** Beehives

### Description & objectives

The interviewee is an employee at Educatieve Tuin, a project run by the municipality of Rotterdam turning to the elementary school with children in the age of 10-11. The employee is educated in organic farming and has worked as a gardener at Educatieve tuin the latest four years. The employee runs the garden together with a colleague, under the department of Sport and Recreation. The employee said the colleague organizes programmes and lessons for the children. The employee told us the children start their work in April when the growing season begins and come back after the holidays to end the season in November. Today there are five groups of children



*The herb garden.*



*The outdoor classroom and an insect hotel.*

from different schools nearby, where each child is responsible for it's own plot of approximately 5 m<sup>2</sup>. Educatieve Tuin grow all kinds of vegetables and some herbs, decided by the children. They also grow flowers that attract insects and have got several beehives and an insect hotel. Educatieve Tuin has both an indoor- and outdoor classroom. The employee said the children learn from practical experience about the growing process. For example, what does a plant need to grow? Why are earthworms useful? Every year the soil is ploughed, fertilized and new seeds are planted. The employee said the fertilizers come from animals from a city farm nearby. When it is time to harvest, the children bring their vegetables home or they cook food together on a fire in the garden. Sometimes they make pizza in a masonry oven. Even shampoo and unguent has been made.

The employee mentioned that a part of the garden is allocated to voluntary elderly people from the neighbourhood, in the age of +55. At the moment there are 24 elderly people joining the gardening. They help especially during the period when the children are not attending. The food that is produced at Educatieve Tuin goes to the children and elderly themselves. Sometimes the employee offers the rest of the vegetables to parents coming by with their children or to the church, that use it to cook food for homeless people.

### Development and history

Educatieve Tuin is the oldest educative farm for schools in The Netherlands. It started already in the year 1923 on an initiative of the municipality. Before that, the land belonged to the Essenburg Farm. The employee mentioned there used to be 29 school gardens like Educatieve Tuin in the city of Rotterdam, but today there are only 9 left. At the moment, the garden provides more land than needed for today's six groups of children, but the municipality wants to keep it that way in case there will be more schools attending in the future.

### Urban context & accessibility

Educatieve Tuin is situated in the same residential area as De Pluktuin, in Delftshaven. It is located in between a railway and a canal but has a path from the street Essenburgsingel to the gate. The garden is fenced and closed when the employees are not there. The employee told us they used to work with more schools before but this changed when the municipality were not allowed to pay the bus trips anymore. Therefore, the centralized schools could not afford it any longer. This means, according to the employee, nowadays there are mostly schools from the neighbourhood attending the programme.

### Conclusions and considerations

- » Cooking together is an effective way of educating children about the food chain.
- » The educational programmes has to be planned after the growing season.

# EMPIRICAL PRE-STUDY

## UIT JE EIGEN STAD

**Start:** 2010

**Size:** 2 ha

**Location:** Marconistraat 39

**Opening times:** Tue 11.00-17.00, wed - fri 11.00-22.00, sat & sun 10.00-22.00

**Access:** Opening times

**Main purpose:** Food production

**Previous use:** Old shunting yard

**Facilities:** toilets, restaurant, shop, greenhouse, conference rooms, market, terrace, playground

**Staff:** 10 volunteers, 2 gardeners, 2 teachers, restaurant/front office 17-20 employees

**Crops:** Vegetables, herbs and fruits (also some forgotten or rare items)

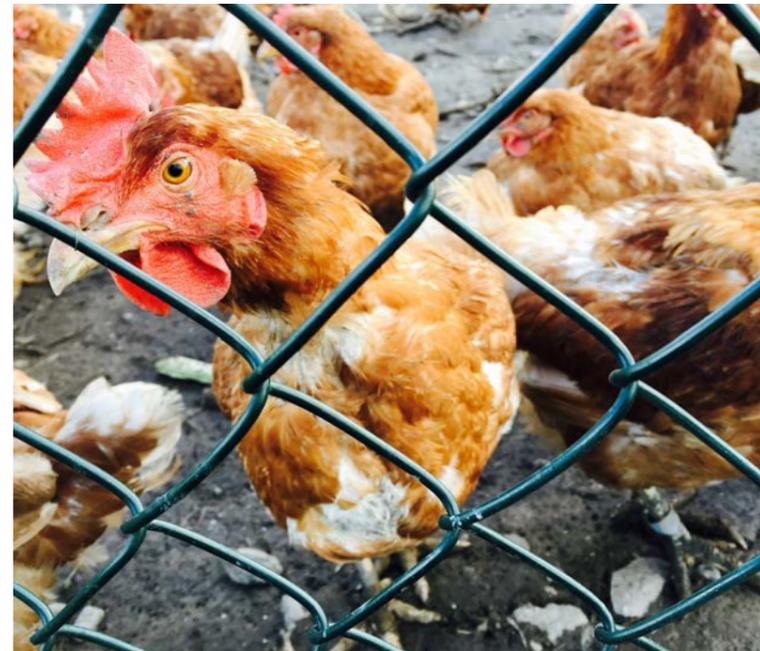
**Animals:** Chickens

### Description & objectives

The interviewed employee at Uit je Eigen Stad agrees to the clean and sustainable vision of the company "we try to teach people how to be sustainable and show them how good, fresh food tastes". The employee stated that the atmosphere is very relaxed and urban-ish and that people who work at Uit je Eigen Stad are honest hard workers. According to the employee, Uit je Eigen Stad grows and process food for their own market and restaurant, the export outside Rotterdam is very small at the moment but used to be bigger before they



Entrance to Uit je Eigen Stad.



The chickens are used to close cycle flows.

experienced it was not lucrative. They produce vegetables, fruits and mushrooms on two hectares. Except from a large field, they have got several tunnel greenhouses and a chicken breeding. Food waste from the restaurant is used to feed the chickens and the chicken manure is used as fertilizers for the soil. Every weekend there is a market, outside during summertime and inside during wintertime where they sell their own food and other locally produced products (Uit je Eigen Stad, 2015a). They organize several workshops and educational programmes, for example cooking, beekeeping and about keeping hens and chickens. Uit je Eigen Stad wants to reconnect the citizens of Rotterdam to the food they are eating (Uit je Eigen Stad, 2015b).

### Development and history

Uit je Eigen Stad is one of the largest city farms in Europe (Municipality of Rotterdam, 2015). According to the employee, the city farm was started by three entrepreneurs in 2012. The employee continued to say the area used to be a shunting yard in the middle of the fruit-ports. The soil was polluted at the start up of the city farm, which forced them to dig out 50 cm and replace it with fresh soil.

### Urban context & accessibility

Uit je Eigen Stad lies in the outskirts of Rotterdam near Marconiplein, which has a metro- and tram station with good connections to the city center. According to the employee, the city farm is fenced but open to the public during fixed times. The surrounding area is also known as Merve-Vierhavens (M4H), one of the four areas of Stadshavens Rotterdam. The area was once one of the largest harbour ports for fruit trade in the world. It is now transforming into a modern residential- and working area. The M4H area offers opportunities for new ideas, with the water front, the industrial atmosphere and plenty of room for new innovative activities. The combination of high tech and low tech side by side is very special for the area and allows a mix between old and new (Stadshavens Rotterdam, 2014, p.3).



The store and restaurant.

### Conclusions and considerations

- » Animals could be used to close cycle flows.
- » One way of keeping the connection and gain trust with consumers is to focus on production for own market & restaurant.

# EMPIRICAL PRE-STUDY

## VOEDSELBOS KRALINGEN

**Start:** 2013

**Size:** 800m<sup>2</sup>

**Location:** Between Oudedijk and Weteringstraat

**Opening times:** Always open

**Access:** Always access

**Membership:** Informal

**Main purpose:** Education

**Previous use:** Old gas-factory

**Facilities:** None

**Staff:** Volunteers from Rotterdam Forest Garden Network

**Crops:** Edible trees and bushes

**Animals:** None

### Description & objectives

The interviewed initiator said Voedselbos Kralingen was created and constructed from the concept of Edible Forest Gardens. This means it is based on a woodland ecosystem with fruit- and nut trees, herbs, perennial vegetables, shrubs etc. It is an agroforest system with low maintenance. The initiator continued to say that the main purpose of the garden is to provide education and raise consciousness for healthy, alternative ways of food production. For the initiator it is also about experience. The initiator is involved in the Rotterdam Forest Garden Network, that maintains the Forest Garden today. The initiator said the garden has a high variation of trees, both smaller and larger species. Some of them are foreign species but they also grow a lot of



The sign presenting Voedselbos Kralingen.



A view over the newly established Edible Forest Garden.

native plants. The shrub layer and ground layer are planted in different phases, to ease the establishment of the plants.

### Development and history

The initiator of Voedselbos Kralingen has been involved in many different projects regarding urban agriculture. The initiator has developed an interest in the field of Edible Forest Garden systems and is self-educated from past projects and inspiring people. Edible Forest Gardens are long term systems which take time to become self supporting. Therefore the main values of Voedselbos Kralingen today is mostly recreational, but in the future it will produce food and they will organize tasting events for the public in the garden.

### Urban context & accessibility

Voedselbos Kralingen is part of a public park called De Nieuwe Plantage in Kralingen, which makes it always open and accessible.

It is situated close to the tram station Jericholaan, with good public transport connections. The surrounding area consists mostly of residentials, shops and restaurants.

### Conclusions and considerations

- » Edible Forest Garden could be used as a recreational purpose and at the same time produce food and enhance biodiversity.
- » In the long run, it is a self sufficient system even though the establishment phase is long.

# EMPIRICAL PRE-STUDY

## DE VOEDSELTUIN

**Start:** 2011

**Size:** 9000 m<sup>2</sup>

**Location:** Keilestraat 9

**Opening times:** Always open (volunteers work mon- thu 9-15)

**Access:** Always open

**Membership:** Formal. Anyone can be a member

**Main purpose:** Social

**Previous use:** a harbour, that is filled with soil

**Facilities:** office, compost toilet, storage, a spartan kitchen, greenhouse

**Staff:** Totally 40-50 volunteers, among them 15-20 working 4 days a week (6hrs). 2 employees working every other week, also 4 days a week.

**Crops:** all kinds of vegetables, herbs and fruit

**Animals:** Bee hives

### Description & objectives

According to the interviewed employee, De Voedseltuin is an employment project and a healthy working place for people that for some reason are distanced from the labour market. There are totally 40-50 volunteers working here growing all kinds of vegetables, fruit trees and herbs for the Voedselbank Rotterdam, that donate food for people in need. The employee also said that, indirect, the project Voedseltuin also raises awareness of the production chain and consciousness of the food you are eating.



*Art in the garden of Voedseltuin.*



*One of the volunteers at coffee break.*

### Development and history

De Voedseltuin was founded in 2011 and is run by two employed coordinators (Voedseltuin, 2015a). The interviewed employee has been working here for 2,5 years. The employee is also a freelancer with a background in different projects related to urban agriculture. De Voedseltuin started with the intentions to contribute to a sustainable urban society, without social exclusion, with healthy food for everyone and with people caring for their environment. De Voedseltuin evolved from an area in the old harbour. Today it has a park-like character and could be a unifying factor between businesses from the area, local residents and nature lovers (Voedseltuin, 2015b).



*Volunteers building a new Wiglo (willow igloo).*

### Urban context & accessibility

De Voedseltuin lies in the Merwe-Vierhavens (M4H) area, close to Marconiplein with good public transport connections. The garden is completely open to the public around-the-clock. It is partly enclosed by a low hedge, as an indication or a way of highlighting the borders. The harbour area is mostly known as one of the largest fruit ports in the world, but is now gradually transforming into a platform for science and knowledge focusing on clean tech, medical business and food. Together with innovative entrepreneurs and market players, Stadshavens Rotterdam wants to transform the M4H area to a new residential and working area just around the corner to the city centre of Rotterdam (Stadshavens Rotterdam, 2014, p.3).

### Conclusions and considerations

- » Food production could be used to help people with social problems, for example people that are distanced from the labour market and need to get back to daily routines and habits.
- » The produced food could be donated to nonprofit organisations and charity.

# EMPIRICAL PRE-STUDY

## SPOORTUIN

**Start:** 2012

**Size:** 1,5 ha

**Location:** Essenburgsingel 48

**Opening times:** The gate is always opened

**Access:** Fence and gate but gate is always opened

**Membership:** Informal. No contracts or papers have to be signed to hire a plot. Anyone can join, but they prioritize people that live nearby.

**Main purpose:** Social and food production

**Previous use:** Tennis-field and leftover space of wild nature in between the railway and the canal

**Facilities:** Water

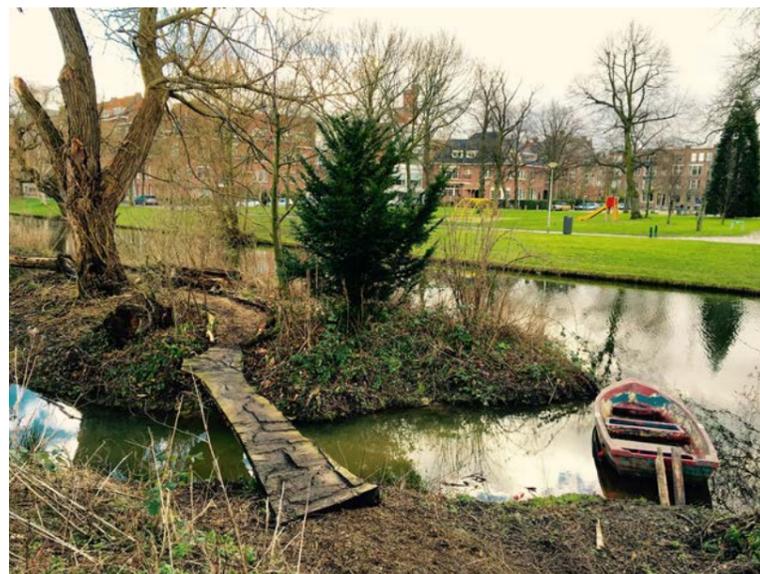
**Staff:** 60 volunteers

**Crops:** Manly vegetables

**Animals:** No

### Description & objectives

The interviewed initiator said De Spoortuin is a community garden, where each household is responsible for its own plot. There are both experienced gardeners and new beginners. They grow all different kinds of vegetables and some herbs. There is a coherent theme and pattern going through the design and the plots are organized in different sizes. According to the initiator, De Spoortuin is also a green strip of wild nature between the railway and the canal, next to Essenburgsingel. You can come here to take a walk or play.



The green strip of wild nature.



The household plots. Photographer: De Spoortuin, Rotterdam.

The initiator said De Spoortuin prioritize people from the neighbourhood to use a plot, but everyone is welcome to join without any costs and without any contracts being signed. The initiator behind De Spoortuin has also encouraged people from the area with alcoholic problems, former criminals and other mental illnesses to join the gardening. The initiator believes that involvement is the most important aspect. Money is not necessarily needed to keep the garden running, but someday they might need a backup for the future.

### Development & history

The project started in 2011, when Nederlandse Spoor (the Dutch railway company) began to cut down trees next to Essenburgsingel to clear the railway. The initiator, found out that the area belonged to the municipality of Rotterdam and asked to preserve the green strip and to do urban gardening. The soil was polluted from the railway transportation, which made them order new soil. The soil was constructed to suit De Spoortuin's growing conditions and is nowadays used specific for urban farming.

### Urban context & accessibility

The garden is situated in between the railway and the canal next to the street Essenburgsingel and a residential area. There is a fence and a gate around the place. The gate to De Spoortuin is closed but never locked, "no signs, no rules" are the leading words expressed by the initiator. The initiator meant the gate is there to give the place a private feeling and to protect it, people that are interested and curious will find out that the gate is not locked and are welcome to enter.

### Conclusions and considerations

- » Community gardens contributes to social engagement and awareness of the food chain.
- » A coherent designed base creates a structured impact.

# EMPIRICAL PRE-STUDY

## DAKAKKER

**Start:** 2011

**Size:** 838 m<sup>2</sup>

**Location:** Schiekade 189

**Opening times:** Wednesday 10-16 (more often in spring-autumn)

**Access:** Opening times, appointment or events

**Main purpose:** Education

**Previous use:** regular rooftop

**Facilities:** Restaurant, water, toilet, store, terrace

**Crops:** lot of Mediterranean herbs and vegetables

**Animals:** Bee hives

### Description & objectives

The interviewed employee works with the management of the Dakakker. DakAkker is a harvestable roof in the center of Rotterdam and is situated 20 meters over the ground level. The growing conditions are very dry and windy and are similar to a Mediterranean climate. They grow fruits, vegetables and herbs as well as keep two hives of honeybees (Dakakker, n.d.a). The interviewee stated that the



*View over the surrounding buildings.*



*Vegetable plantations at the rooftop.*

bees are very important for the ecosystem because they provide for pollination of plants. On the homepage, DakAkker states that the city is an important habitat for bees with its great variety of flowers and plants. An inspection of DakAkkers hives showed that the combs are well filled with honey and pollen and that the colony reproduce well (Dakakker, n.d.b).

### Development & history

The employee said that DakAkker was before just a normal rooftop and the only function was "to keep the rain away". The project was initiated by ZUS - Zones Urbaines Sensibles and created by Binder Groenprojecten in 2012. It is one of the projects of the Urban Initiative The Luchtsingel (Dakakker, n.d.a). DakAkker also has a collaboration with Rotterdam Milieucentrum (Environmental Centre Rotterdam).



*Lunch break at the terrace.*

### Urban context & accessibility

The rooftop garden is situated in a dense urban context in the city center of Rotterdam, surrounded by businesses and offices. The opening times vary around the year according to when the restaurant is open. The rooftop farm is also regularly open for public activities like harvest festivals, dinners and workshops. There is also possibilities to reserve a tour by the staff.

During the growing season, there is a rooftop working day every Friday. Volunteers can sign up to help out with the harvest but currently there is a waiting list to become a volunteer (Dakakker, n.d.c).

### Conclusions and considerations

- » The skyscrapers surrounding the roof top farm create an eye-catching contrast that reminds you of the urban context.
- » Roof tops are important spaces for urban greenery in future dense cities.

# EMPIRICAL PRE-STUDY

## GREENHOUSE HORTICULTURE

The export of fruit and vegetables is the third largest export sector in the Netherlands and stands for almost 14 billion euros, including processed products. The Netherlands export almost three quarters of their cultivation of fresh vegetables and fruits to 150 different countries in the world. Further, the country stands for 16% of the world trade in vegetables and 6% in fruit (Fresh Produce Centre, 2015). The use of substrate instead of soil cultivation was one of the most important breakthroughs for the greenhouse horticulture (Tomato World, 2008).

In 2004, the municipality of Westland was created by a merge of five smaller municipalities - De Lier, 's-Gravenzande, Monster, Naaldwijk and Wieringen. The reason why they became one was to strengthen the horticultural development in the area<sup>2</sup>. Westland, with almost 2,500 ha of glasshouses, is the world largest greenhouse horticultural area. Half of the area is used for vegetable growing (Fresh Produce Centre, 2015). The production of tomatoes started already in the beginning of 1900 (Tomato World, 2008).

The preference of naturally and locally produced food is increasing, people wants to know what their food contains of and where it comes from. Buying vegetables directly from the farmer are getting more common. Consumption of organic products has increased rapidly the latest years, especially for fruit and vegetables (Fresh Produce Centre, 2015).

In the Netherlands, the total greenhouse horticulture production has increased but the total number of companies has decreased due to up-scaling (Fresh Produce Centre, 2015). In 1980, there were more than 15700 companies and in 2007 it had been reduced to 7800 (Tomato World, 2008). The horticulture sector has a strong position on the global stage. However, it is also very vulnerable to changes on the world market (Fresh Produce Centre, 2015).



<sup>2</sup> Urban planner Municipality of Westland, oral communication 18th of April 2016.

# EMPIRICAL PRE-STUDY

## FOODSCAPE OBSERVATION - WESTLAND

These general foodscape observations are presented to create an understanding and overview of the overall impressions and characteristics of the foodscape of Westland. Interesting examples and inspiring functions for design proposal are registered on regarding visual qualities, biodiversity, learning about and experiencing food, recreational opportunities and accessibility as well as business- and marketing models that were useful for the design. Further, after this page, four site visits to greenhouses are presented, among them one is situated in Pijnacker and the other three in Westland.



The visual impression of moving animals in front of the greenhouses increase the variation along the facades.



Small shops with vending machines on the roadside increase the food experience while in the landscape.



Monotonous landscape view with long distances between happenings. Many of the areas are privately owned and there are few public places.



Interesting views into the greenhouses with transparent glass adds visual qualities to the landscape view.



The water in between the greenhouses, planted with reeds, serve as important habitats for birds and amphibians.



Good biking opportunities and connections to the Hauge.



Small gaps between the greenhouses with for example birds and plantations adds surprises along the bicycle roads.



A common view in the horticulture area, where the house is close to the road and the greenhouses are built in the back.

# EMPIRICAL PRE-STUDY

## TOMATOWORLD

**Start:** 2008

**Size:** 1500 m<sup>2</sup>

**Location:** Zwethlaan 2, Honselersdijk in Westland

**Production purpose:** Demonstration

**Sale:** Small domestic sale

**Staff:** 3 employees (2 of them is part-time)

**Crops:** Tomatoes (80 varieties)

**Animals for pollination:** Bumblebees

### Description and objectives

Tomatoworld was founded by a joint effort of companies from the horticulture cluster. The intention of Tomatoworld is to put the Dutch greenhouse production in the spotlight and to establish a platform for knowledge exchange, education and cooperation (Tomatoworld, 2016). Apart from the greenhouse there is a 500 m<sup>2</sup> information- and education centre. Tomato world turns to target groups from other sector peers, policy makers, retailers, students and foreign interested parties (Tomatoworld, 2016). The interview was conducted with one of the employees that works with booking and information. The employee explained the production on Tomatoworld is mostly for demonstration but a small part of the harvest goes to grocery stores. The retailers pick up the tomato boxes themselves on site. The employee continues to explain they do the crop handling and packaging themselves in the greenhouse, but the sawing and breeding of the plants are made by a special breeding company.

### View on the relationship between city & countryside

The employee thinks the concept of Tomatoworld is a good way of bringing the food growing process closer to people. The employee does not believe that greenhouses with a concept like Tomatoworld, reaching out to customers, could replace today's conventional greenhouses. Still, it could function as a complement with an information center for teaching citizens about greenhouse horticulture. The employee thinks there is a gap between producers and consumers today and states that consumers have to be aware of the complexity of farming. Also, producers have to learn about the needs of consumers. The employee thinks the solution to resolve the gap is:

*“To learn children at young age about growing of food, bring visitors to greenhouses, working together with supermarkets to learn about consumer needs and cooperation projects in city-farming.”*



*The tasting showcase at Tomatoworld.*

### Situation and accessibility

Tomatoworld is situated in an area with a high amount of greenhouses and companies related to the horticulture industry. As we arrived at Tomatoworld, we were informed that there were no guides available for us and that we needed to make an appointment if we wanted to visit the greenhouse and the information center. The tour rate would cost us 66 €. After a while we were allowed to have a quick look at the information centre and the tasting station, where we tried some of the different tomato species.

The employee thinks that Westland is an interesting place for recreation since you can sail, cycle, go to the beach in the Hauge and visit the horticulture area. Though, the employee states that there are difficulties in making greenhouses totally accessible for consumers, mostly because of hygiene aspects. Initiatives like Tomatoworld can serve as a showcase for the horticulture sector. According to the employee, there is a need for a cooperation between the producers and tourism sector, to create a better image of Westland.

### Conclusions and considerations

- » The marketing and education of the greenhouse horticulture is something that also could be turned to the general person.
- » Exhibitions and tasting events contributes to the food experience.

# EMPIRICAL PRE-STUDY

## DUIJVESTIJN TOMATEN

**Start:** 1988

**Size:** 15 ha

**Location:** Overgauwseweg 46-A, Pijnacker in Pijnacker-Nootdorp

**Production purpose:** Sale

**Sale:** Domestic 40%, Export 60% (England 40%, 20% Other countries in Europe for example Sweden, Germany and France)

**Staff:** 50 employees (90 people in the summer), 10-15 students

**Crops:** Tomatoes (15 varieties)

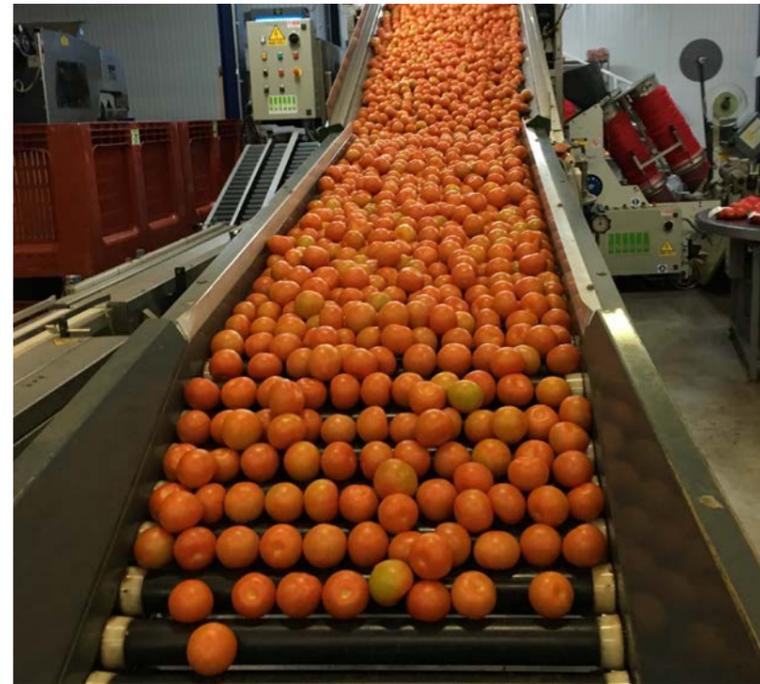
**Animals for pollination:** Bumblebees

### Description and objectives

Duijvestijn Tomaten is owned by four brothers that bought the company from their father in 1988. At that time the size of the greenhouse was 15 700 m<sup>2</sup> (Duijvestijn Tomaten, n.d.). We spoke to one of the owners who said their father started with eco farming in 1975. The owner said Duijvestijn Tomaten works a lot with innovation and sustainable production. The newly built greenhouse has high tech climate regulations, they use geothermal energy and pack



*An employee picking tomatoes.*



*Tomatoes ready to be packed.*

their tomatoes in recycled package boxes made from 30% tomato leaves from their own greenhouse. The owner mentioned that they received an award for "Best tomato grower of the world" at the Tomato Inspiration Event Award in Berlin, 2015. Duijvestijn Tomaten buys 300 000 plants from a breeding company every year. They do the crop handling and packaging themselves. The owner said Duijvestijn Tomaten also do quality checks on imported tomatoes and packaging for other companies. The transportation and sale is managed by other companies. Part of the sale goes to Bee Box, which is a box with eco produced food from the Netherlands that can be delivered to your home. The owner said Duijvestijn Tomaten uses water from the groundwater storage during winter and summer season. The rest of the year they collect rainwater on top of the roof.

### View on the relationship between city & countryside

The owner works with human resources at Duijvestijn tomaten and states that the gap is getting smaller between producers and consumers. The owner said the best way to reduce the gap is to tell the story about the production. The owner tells the story to students, who are the future. Further, the owner says Duijvestijn Tomaten has



*The new, high technology greenhouse seen from outside.*

good contact with students and business oriented visitors from different parts of the world. The owner tells us about Kom in de Kas (Get inside the Greenhouse) which is a two days event, once a year, where many greenhouse producers open up for visitors. The owner said it is a good opportunity for marketing and to meet customers.

### Situation and accessibility

Duijvestijn Tomaten is situated in Pijnacker, a couple of kilometres east of Delft. Pijnacker is a community surrounded by greenhouses. The owner told us there are plans on making a new bicycle road next to Duijvestijn Tomaten and had a positive view on making the area more accessible.

### Conclusions and considerations

- » Being communicative, open to visitors and tell the story about the production is one solution to reduce the gap between consumers and producers.
- » Working with high technology methods and engage students and researchers is a way of providing for future sustainability.

# EMPIRICAL PRE-STUDY

## KWEKERIJ DE HAAK

**Start:** 1928

**Size:** 2,7 ha

**Location:** Haakweg 27A, Hoek van Holland in Westland

**Production purpose:** Sale

**Sale:** Domestic 10%, Export 90% (mostly to Germany but also Belgium, Hong kong, USA)

**Staff:** 7-8 employees (15-20 people in the summer)

**Crops:** Tomatoes and strawberries (some melons and bens)

**Animals for pollination:** Bumblebees

### Description and objectives

The interview was made with one of the experienced employees, who informed us that Kwekerij de Haak is specialized on cherry tomatoes. They buy 33 000 tomato plants every year which they grow and package themselves for further export to retailers. Kwekerij de Haak also grows strawberries and smaller amounts of beans and melons for sale in a vending machine along Haakweg. The customers buying from the vending machine are mostly from the neighbourhood or people passing by on their way to the beach in The Hague.

### View on the relationship between city & countryside

The employee has been working at Kwekerij de Haak for ten years. The employee thought the process of people wanting more qualitative food is underway, but is happening very slowly. The employee believed people only care about the prices of the products.

*“Before, it was not about quality, it had to go fast. It is possible to cheat with the quality if people want it cheap.” - The employee*

The employee also told us there is a local store, part of the large supermarket chain Albert Heijn, that decided to sell a large amount of locally produced food from the neighbourhood. The employee says there are many consumers from the area that are willing to pay more for the products, since they know the origin of the food. The employee thought television is a good way to reach out to consumers. Talking about Kom in de Kaas, the employee states that it is a good idea for bigger farms, who have time and money to open up their businesses. The employee told us it takes much more effort for smaller farmers that does not have time for marketing themselves. The employee also told us due to the absence of minimum prizes today, Kwekerij de



*The vending machine with tomatoes and strawberries for sale.*

Haak sometimes gives away tomatoes almost for free, that is without profit. The employee also mentioned that you directly notice if there has been a couple of bad months for the production in Spain, since the Dutch prices rises immediately.

### Situation and accessibility

Hoek van Holland is a small harbour city by the coast in Westland. A few greenhouses exist in the area. When we mentioned the possibilities to use transparent glass to enable for people to look inside and see what is going on, the employee answered that he does not want anyone watching while working. The employee did not think that it would not be a nice working environment.



*A strawberry plant in the greenhouse.*

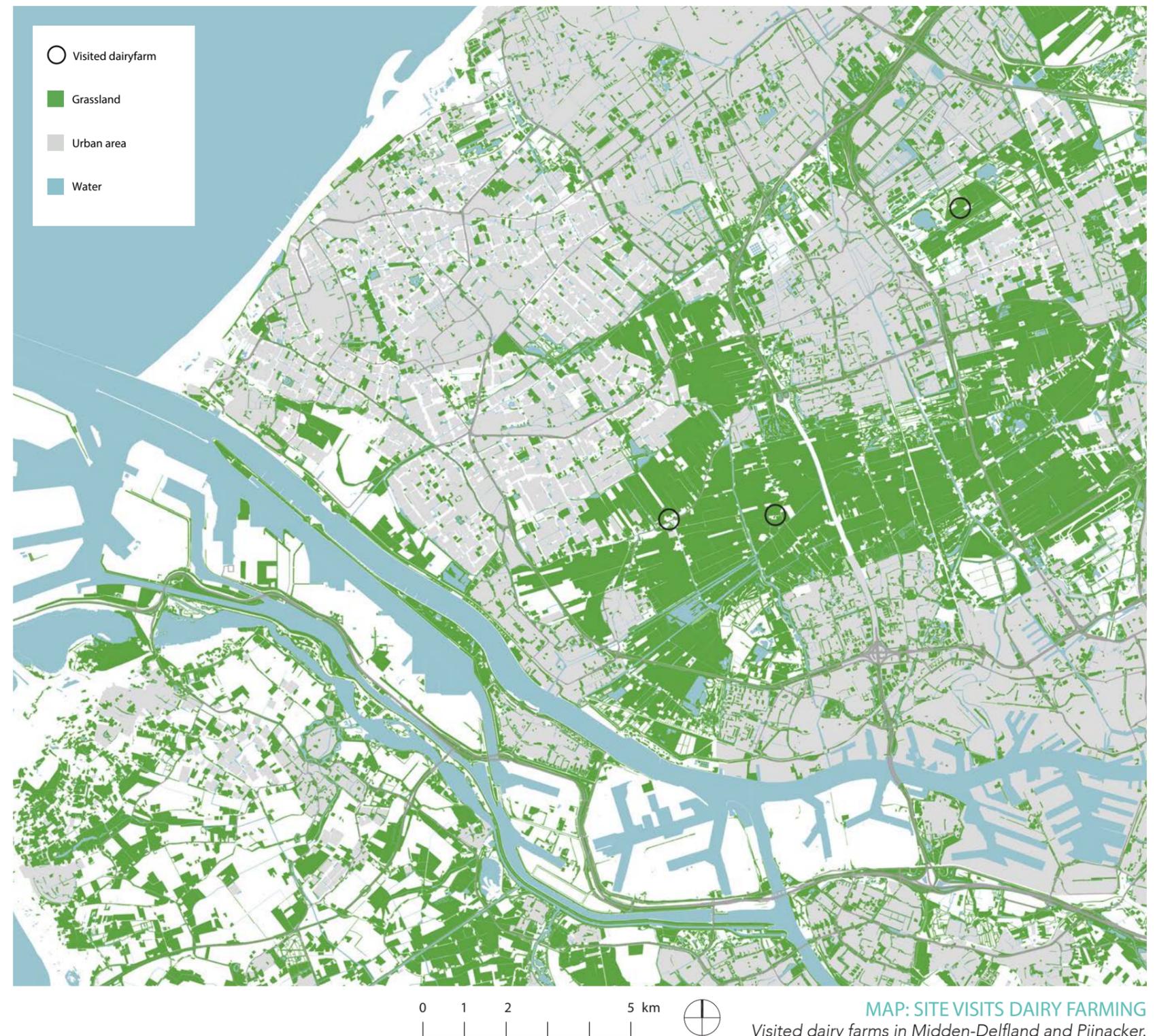
### Conclusions and considerations

- » Crop diversity gives better opportunities to sell on site, since a mixed assortment meets the demand of consumers.
- » Vending machines in road side shops contributes to the food experience while in the foodscape.

# EMPIRICAL PRE-STUDY

## DAIRY FARMING

The consumption and production of milk, butter and cheese in the Netherlands is traditionally known since way back and the dairy industry plays an important role for Dutch economy. The Netherlands is the third biggest producer in milk per capita among EU countries, after Ireland and Denmark. Nearly eighteen thousand dairy farms supply 12,5 billion kg milk to the Dutch industry. 65% of the production is exported, mainly for the EU market, whereas 35% is consumed in the Netherlands. FrieslandCampina, a Dutch dairy cooperative, was the 6th biggest dairy cooperative in the world in 2014. It dominates the Netherlands dairy companies with 23 factories (ZuivelNL, 2014). The urban planner at the municipality of Midden-Delfland mentioned there are about 60-70 farmers in Midden-Delfland and most of them are dairy farmers. The urban planner continues to say because of wet growing conditions, the swamp landscape of Midden Delfland mostly consists of water tolerant grasslands for cattle and therefore dairy farming and meat production traditionally takes place here. Midden-Delfland is one of the few authentic places left in the southern Netherlands with landscape patterns witnessing about the historical development of agricultural systems (Municipality of Midden-Delfland, 2009, pp.37-41). Since the 12th century, farmers have been draining and pumping water from the swamps into the rivers, to protect or reclaim the soil from the sea. The historical agricultural development resulted in today's polder landscapes with grasslands on peaty soil and drainage channels in between (van Schoubroeck & Kool, 2010). On behalf of the municipality of Midden-Delfland the *Continued Sustainable Farming Programme in Midden-Delfland* (2015) was constructed to achieve a collaboration together with local farmers. Among others, the programme aims to reduce the runoff of food and manure to the surface water as well promoting local production and sale. There has also been study groups organized to educate organic farming. The Dutch dairy industry will continue to play a role for the economy and export to the world market (IODS, LTO North, Municipality of Midden-Delfland & Province of South Holland, 2015). According to Govert van Oord, alderman for the municipality of Midden-Delfland, farmers are facing two choices for the future: a rapid up-scaling or turning to a more niched market, which means producing for the world market or choosing shorter food chains.



# EMPIRICAL PRE-STUDY

## FOODSCAPE OBSERVATIONS - MIDDEN-DELFLAND

These general foodscape observations are presented to create an understanding and overview of the overall impressions and characteristics of the foodscape of Midden-Delfland. Interesting examples and inspiring functions for design proposal are registered on regarding visual qualities, biodiversity, learning about and experiencing food, recreational opportunities and accessibility as well as business- and marketing models that were useful for the design. Further, after this page, four site visits to dairy farms are presented, among them one is situated in Pijnacker and the other three in Midden-Delfland.



Poor accessibility to the landscape, with canals and dikes everywhere.



Combinations of recreation and food production. This is a family that decided to start a camping area next to the dairy farm.



Open barns contribute to the visual connection with animals and farms all year around.



When animals are kept inside they are excluded from the landscape picture.



Visual qualities in the landscape view. The Netherlands and foremost Midden-Delfland is strongly associated with grasslands, cattle and windmills.



Open sight lines over the Dutch polder landscape with willows that reminds you about the historical picturesque farmland.



Beautiful water views which also serves as habitats for a many bird species. The water is well used for sailing and canoeing.



Farmers stores with mixed assortment through cooperation with different farmers adds values to the food experience in the rural landscape.

# EMPIRICAL PRE-STUDY

## HOEVE BOUWLUST

**Start:** 1821

**Size:** 27 ha

**Location:** Oostgaag 31, Maasland in Midden-Delfland

**Production purpose:** Tourism, sale, reintegration

**Sale:** 100% domestic and local

**Staff:** 4 employees

**Animals:** 50-60 cows, a few sheep, rabbits and chickens

### Description & orientation

The interviewed farmer runs Hoeve Bouwlust together with the family in Maasland, Midden-Delfland. The family farm dates back to 1821 (Hoeve Bouwlust, n.d, a) and is nowadays two hectares of buildings and 27 ha grasslands according to the farmer. The farmer told us around 1998, Hoeve Bouwlust faced the dairy farming was not profitable anymore and the farm could not expand. Today, Hoeve Bouwlust has about 50-60 cows. According to the farmer, most of them are waiting for being sold to other farmers when they are old enough to produce milk, but five of them produce a special milk for Hoeve Bouwlusts own production. The farmer recently started an own business with A2/A2-cows in the year 2015. The A2/A2-cows has a special gene (A2/A2), which means they produce milk drinkable to people allergic to milk protein. To not be mixed up with lactose intolerance - the A2/A2-milk still contains lactose. 20% of the European population are sensitive to milk and 75% of these people can handle A2/A2-milk (Hoeve Bouwlust, n.d, b). The farmer explained that many farmers have A2/



*The factory where yoghurt and ice-cream is produced.*



*Homemade ice-cream from the farm.*

A2-cows without knowing, since you have to make blood tests to make sure it is an A2/A2-cow.

The farmer describes himself as not really working as a “normal farmer”. About 15 years ago, the family realized they had to do something different to keep the farm running and started a camping place next to it. The visitors come from the whole Netherlands, France, Germany, England. Hoeve Bouwlust has a café and rooms for rent for conferences and family parties. They produce their own yoghurt, milk and ice cream in a small factory on site, which is sold in a store at the farm. They organize driving tours for camping visitors through the surrounding area with the tractor and trailer. Hoeve Bouwlust also keep rabbits and chickens, which are maintained by people with development disorders and they organize educational programmes for children. Different stations are combined to an informative walk around the farm, describing what’s happening everywhere. The farmers’ sister also has a few sheeps in the stable, for meat production.

The farmer just started a smaller dairy cooperative together with seven farmers in Midden-Delfland, which is called Delflandshof. Before, he was part of the dairy cooperative FrieslandCampina. The farmer wants to expand Delflandshof’s A2-milk production, which is a relatively new discovery and business. Delflandshof’s dairy products are sold in smaller specialist shops in the region.

### View on the relationship between city & countryside

Hoeve Bouwlust works a lot with reaching out to customers through their website, presenting the A2/A2-milk, the vacation houses for rent, the children parties, the camping and the catering they offer. The farmer believes the most important thing is to keep the farm open to visitors and answer their questions. Most of the farms in the surrounding area are closed, but little by little they start to open up more. For example, one of the stops of the guided route by Hoeve Bouwlust is at another farmer close by who also works part time as an artist. Another important aspect, according to the farmer, is turning to children and organize educational programmes. It is definitely easier for him to have visitors to come to the farm, because Peter frequently needs to look after the animals.

### Context and accessibility

The farmer explained the conditions for running a camping area at this location are very beneficial since Midden-Delfland decided to abolish the tourist taxes to provide for tourism. The landscape also offered good opportunities for biking close to the farm, which according to the farmer is quite unique to the Netherlands. Though, the connections to Rotterdam were poor and forced us to travel via a detour instead of crossing the fields. Otherwise the farm was located relatively close to the city edge of Delft. Hoeve Bouwlust had a very inviting entrance tending to be open for people passing by. The farmers’ parents stays at the farm and the farmer himself is always present to take visitors. Two times a year they also organize open house days for tasting.

### Conclusions and considerations

- » Working with tourism is one solution to reach out to consumers.
- » Starting a smaller cooperative with a niched product is a way of getting more attractive for the local market.

# EMPIRICAL PRE-STUDY

## HOEVE BIESLAND

**Start:** 1910

**Size:** 150 ha

**Location:** Bieslandseweg 1, Delfgauw in Pijnacker-Nootdorp

**Production purpose:** Sale, reintegration and education

**Sale:** 100% Domestic and local

**Staff:** 4 employees

**Crops:** Different kinds of vegetables

**Animals:** 300 cows, 35 sheep, 25 chickens, 4 pigs, 3 horses, one dog, 7 beehives

### Description & objectives

Hoeve Biesland is a Biodynamic farm and family business that is over 100 years old (Hoeve Biesland, 2016). The interview was conducted with one of the farmers at Hoeve Biesland. According to the farmer it is one of the largest farms in Randstad. Hoeve Biesland was established by the farmers' grandfather in 1910 and in 2010 it was changed to a Biodynamic farm. The farmer explained the land of the farm is 150 ha and everything at the farm is involved in a closed cycle. Hoeve Biesland is a modern farm with for example a robot feeding the cows. They have about 160 dairy cows and 140 calves, 35 sheep for lamb meat, some chickens, pigs and horses. The farmer continues to explain most of the incomes are from the milk, which is sold in two ecological supermarkets in the Netherlands - Ecoplaza and Estafette. Before, Hoeve Biesland sold their milk to FrieslandCampina but nowadays their sale goes to a smaller biodynamic dairy cooperative. The farmers said the meat is for local sale, in the area of Rotterdam, Delft and the



Entry sign to Hoeve Biesland.



The open cow barn.

Hague. Hoeve Bieslands store has 400 visitors a week and a milktap where people come to buy milk in their own bottles. The store has both their own products and other farmers products for sale.

The interviewed farmer is the daughter of the family and has been growing vegetables at the farm for five years. The farmer explained the idea came up while working at a restaurant where they imported a lot of vegetables. The farmer wanted to change this and argued that vegetables grown nearby are more fresh and tasty. She continued to say the garden is not just for growing vegetables. The farmer also work with disabled people and with reintegration of people who are distanced from the labour market. Hoeve Biesland also have contact with schools that visit the farm for education. The school children for example learn where milk comes from and how to milk a cow.

### View on the relationship between city & countryside

The farmer thinks the problem for many farmers is that the production is oriented and focused on only one product. The farmer thinks the solution for smaller farmers is to start collaborations, combine their sale with each others products. The farmer argues that you need more than one product offered in a local store. In addition, one should also know the story of the products to gain trust from the consumers. The farmer also said that the location is important, a close connection to the city is always an advantage. According to the farmer, recreation and food production should be more integrated to create a more



The store selling local food from small farmers.

attractive, recreational landscape of Midden-Delfland. The farmer wants to create a food path in the farmland, providing education and experience for visitors. The farmer ones tried to organize a farmers market in Delft, but since time was scarce the farmer could not put enough effort in advertisement. The farmer argues it is easier for Hoeve Biesland when the costumers comes to the farm.

### Situation and accessibility

Hoeve Biesland is situated quite in the middle of a large farm field, 5 km outside Delft, in Delfgauw. The connections to public transportations are good. South of the farm is a greenhouse area and to the north there is a nature area. The other surroundings are quite densely built areas.

### Conclusions and considerations

- » The physical urban connection is essential for a closer relationship to citizens and consumers.
- » Cooperations between different farms could provide a collected, more mixed assortment at one site for the consumers.

# EMPIRICAL PRE-STUDY

## MOERMAN

**Start:** 1966

**Size:** 50 ha

**Location:** Zouteveenseweg 32, Schipluiden in Midden-Delfland

**Production purpose:** Sale

**Sale:** 30% domestic, 70% export

**Staff:** One full time and one part time employees

**Crops:** Maize and grass for the cows

**Animals:** 120 cows (75 milk cows), a few horses

### Description & objectives

Moerman diary is a family farm with 75 milk cows and 45 young cows. The interviewed farmer works 30% at the family farm and 70% for other farmers. They sell their milk to FrieslandCampina which, according to the farmer, is a cooperation with 17000 farmers connected to the company. The farm earns most of their money from milk production. The farm also sell their young cows, but since cows are very common in The Netherlands, they do not earn much money from that. The farm also rents a stable for citizens' horses. The farmer helps with feeding them but the rest is taken care of by the owner.

According to the farmer, FrieslandCampina export 70% of their milk and 30% goes to domestic consumption. The farmer told us there is right now an abundance of milk at the world market, the demand of milk from the Netherlands is lower because of the boycott from Russia and because the production for China has decreased. The farmer also argued that since the European Union took away the milk quota, the Netherlands is producing 10% more milk. The farmer stated that farmers are usually happy with FrieslandCampina, especially when prices are good. According to the farmer, today's price of milk is 27 cents per liter. One year ago it was 35 cents and 2 years ago 45 cents, which means the prices have dropped with 40% in two years. The farmer described that working as a farmer today is hard, you are pushed by the markets and people expect more from you. In 1960, an average cow produced 4000 liters of milk in one year and today they produce 8500-9000 liters per year. The farmer told us he would like to join a smaller cooperation but does not have the time or possibilities to start one himself.



*The cow barn at Moerman.*

### View on the relationship between city & countryside

The farmer argues that there is a gap between producers and consumers and that the general person do not know how farmers work today. The farmer said people think ecological production is better but what we are doing is basically the same. The farmer said to tell the story about the production would be good, but times is scarce. The farmer continues to say if farmers are about to tell the story to citizens it is important that the person knows how to tell the story. The farmer does not think farmland is suitable for recreation because the ground is very expensive and if people are walking their dogs, there is a risk that the cows will be diseased. The farmer describes that it is important to keep the grasslands opened, the land is a piece of the history. In order to make Midden-Delfland better for recreational purposes, the farmer states there could always be more cycling lanes built.

### Situation and accessibility

The farm is situated south of the village Negenhuizen that is a small village in Schipluiden, in the municipality of Midden-Delfland. The farm is situated two km north of the city edge of Schiedam. They do not have a sign by the road or any official name of the farm, the farm is just named after the last name of the family.

### Conclusions and considerations

- » Most consumers expect farmers to produce certificated products to gain trust, but in some cases the difference in animal keeping is marginal.
- » Large dairy cooperations makes the products more distanced from the producer and increase the gap between farmers and consumers. Most farmers lack time and sale- and marketing experience to start a smaller cooperation.

# EMPIRICAL PRE-STUDY

## SWOT ON EMPIRICAL PRE-STUDY

A SWOT-analysis on the three foodscapes was conducted to define the most relevant aspects of landscape character and aspects to bring further from the empirical pre-study to the design proposal.

	Strengths	Weaknesses	Opportunities	Threats
<p>Urban Farming in Rotterdam</p> 	<ul style="list-style-type: none"> <li>• Varied in appearance and experience</li> <li>• Varied crops enhance biodiversity</li> <li>• Lots of social engagement</li> <li>• Small scale, and intimate feeling</li> <li>• Organizes events, festivals etc.</li> <li>• Creates recreational opportunities in urban areas</li> <li>• Are often developed in abandoned places</li> <li>• Offers education about food production</li> <li>• Local production and consumption</li> <li>• Volunteers work for interest and the engagement is not money oriented</li> </ul>	<ul style="list-style-type: none"> <li>• Many places are only open during fixed times</li> <li>• Some of the places are hidden and hard to find in the urban landscape</li> <li>• Many are dependent on subsidies to survive</li> <li>• Dependent on time and engagement of volunteers</li> </ul>	<ul style="list-style-type: none"> <li>• Abandoned left over spaces in the city can be used for farming</li> <li>• More urban farming initiatives create biodiversity and a greener city</li> <li>• Increased cooperation with schools can increase awareness of the food chain</li> </ul>	<ul style="list-style-type: none"> <li>• Some farms only get temporary permission to use the ground which makes the future unsecured</li> <li>• Urban farming driven by volunteers can be a threat to paid work, such as municipal driven educative programs</li> </ul>
<p>Greenhouse horticulture in Westland</p> 	<ul style="list-style-type: none"> <li>• Visual surprises in gaps between greenhouses creates enhance perception of the landscape</li> <li>• Small animal keeping on the roadside creates variation</li> <li>• Some greenhouses have transparent glass and impressing views inside</li> <li>• Small road-shops with local food contributes to the experience</li> </ul>	<ul style="list-style-type: none"> <li>• Big scale, large enclosed clusters - loss of human scale and monotonous impression</li> <li>• Many greenhouses have none-transparent glass</li> <li>• Long distances between happenings</li> <li>• Private owned areas and few public places</li> <li>• The landscape feels excluding and difficult to access</li> </ul>	<ul style="list-style-type: none"> <li>• Increase local sale and closer connections with consumers</li> <li>• Make the experience less monotonous with plantations and animals in front of greenhouses or transparent glass so you can see inside</li> <li>• More happenings in greenhouses can raise awareness of local food and contribute to education about food production</li> <li>• Create more views into greenhouses</li> </ul>	<ul style="list-style-type: none"> <li>• Up-scaling of greenhouses can lead to even bigger clusters</li> <li>• Residential and public spaces can be neglected in relation to production</li> </ul>
<p>Dairy Farming in Midden-Delfland</p> 	<ul style="list-style-type: none"> <li>• Big scale with opened landscape views</li> <li>• Recreational grasslands areas with animals</li> <li>• Well used recreational area for citizens</li> <li>• Some farms provide social engagement for people with development disorders and reintegration of people distanced from the labour market</li> </ul>	<ul style="list-style-type: none"> <li>• Lots of private land you can not enter - poor physical access</li> <li>• Lack of variation in landscape experience due to very large, monotonous grasslands</li> <li>• Animals kept inside do not contribute to the recreational experience in the landscape</li> </ul>	<ul style="list-style-type: none"> <li>• Good opportunities and strategies for local sale</li> <li>• Increase recreational areas</li> <li>• Combination of recreation and food production</li> <li>• Increase the cooperation with educational programmes and social engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Less demand of milk and reduction in dairy farming threatens the maintenance of the open landscape</li> <li>• Higher pressure on production might prevent sustainable farming and threaten the landscape view</li> </ul>

# EMPIRICAL PRE-STUDY

## CONCLUSIONS

This part presents conclusions from the empirical pre-study. First design applications is presented which is what to bring forward to the design proposal from conclusion and considerations from the sit visits and the swot analysis in the empirical pre-study. Second potential for integration of the foodscapes is presented which consider the site context and integration of the tree foodscapes. The physical urban and rural connection is essential for a closer relationship to citizens and consumers, potentials for this is presented on the next side and is also considered in the selection of site for the design proposal.

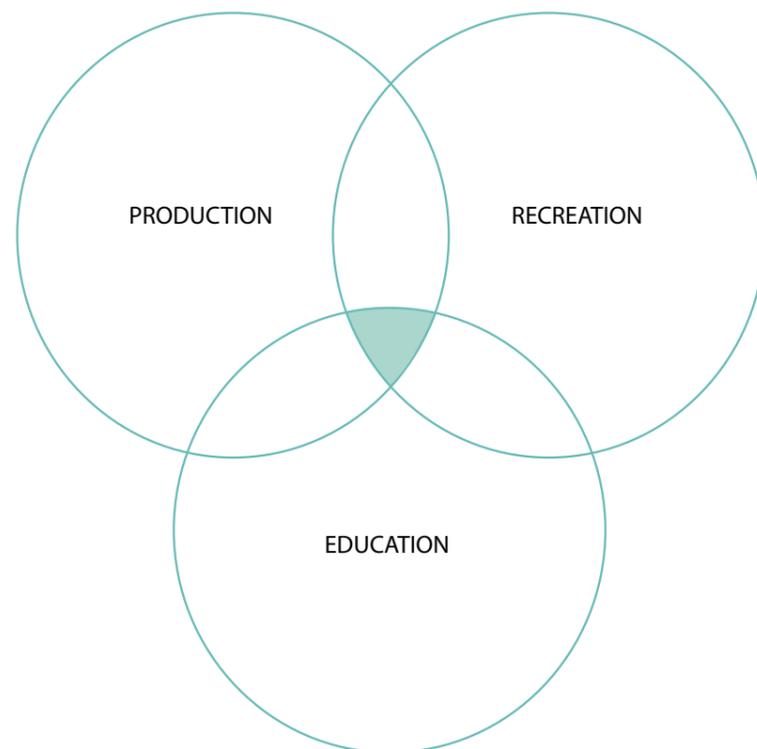


Figure 5: Model showing multi-functional use with integration of production, recreation and education.

## DESIGN APPLICATIONS

The design applications are categorized in the headlines education, recreation and food production but in some cases there are also social aspects included. The social aspect is always something to consider to create a sustainable setting.

### Education

- » Provide for workshops and events to engage people
- » Design places for cooking together, which is a successful way of educating children about the food chain
- » Include community gardening to contribute to social engagement and awareness of the food chain.
- » Provide showcasing of greenhouse horticulture and education about production methods for the general person
- » Use exhibitions and tasting events to contribute to education and food experience
- » Provide for research on high technology methods and include students to achieve sustainable agricultural practices
- » Communicate, tell the story about the production and be open to visitors in order to reduce the gap between consumers and producers
- » Use herbs, since they are easy to maintain for people with lack of experience of the growing process
- » Encourage regular contact between farmers and school children to provide for education about animals and food production

### Recreation

- » Use the concept Edible Forest Garden for both recreational purpose and to demonstrate natural food production as well as to enhance biodiversity
- » Work with tourism and recreation as a solution to reach out to consumers
- » Enable to come close to the greenhouse horticulture, for example through the use of transparent glass to improve the visual contact with the production
- » Make use of grazing animals to maintain the area and at the same time contribute to recreation and food experience
- » Make most of the area accessible around the clock and to everyone

### Food production

- » Make use of manure from animals to close cycle flows in the area
- » Investigate the production efficiency and self-sufficiency of the concept Edible Forest Garden
- » Work with crop diversity to gain better opportunities to sell on site
- » Use vending machines and roadside shops to contribute to the food experience
- » Focus on own market and shop to gain trust with consumers
- » Invite all farmers to the area and encourage them to participate in dialogues and meetings with consumers
- » Include a food hub in the area, that helps farmers to market their products, since their time is often scarce
- » Give farmers opportunities to start smaller cooperatives with a niched product, which makes them more attractive on the local market
- » Cooperate with other farms to provide a collected, more mixed assortment at one site for the consumers
- » Use food production as a tool to help people with social problems or people that are distanced from the labour market and need to get back to daily routines and habits

# EMPIRICAL PRE-STUDY

## POTENTIALS FOR INTEGRATION OF THE FOODSCAPES

The aim of the thesis was to create a design proposal for a meeting place on the edge, in a peri-urban area, between urban and rural landscapes, to contribute to the integration of these. The meetingplace was aimed to reflect and connect the foodscapes of MRDH - urban farming in Rotterdam, greenhouse horticulture in Westland and dairy farming in Midden-Delfland. A future vision was conducted from the conclusions of the empirical pre-study in order to answer the research question.

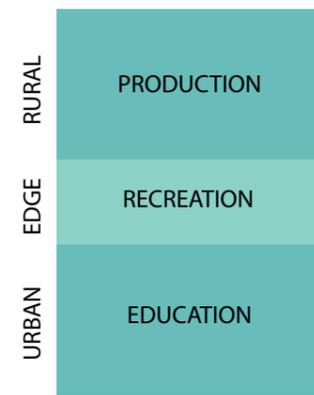
### RESEARCH QUESTION

What are the preconditions and potentials to design a multifunctional foodscape in a peri-urban area in Schiedam, in the Metropolitan region of Rotterdam - The Hague, in order to achieve urban and rural integration?

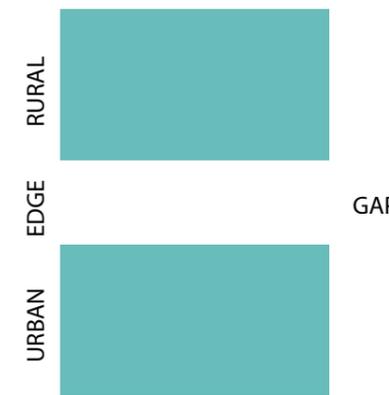
PRESENT SITUATION



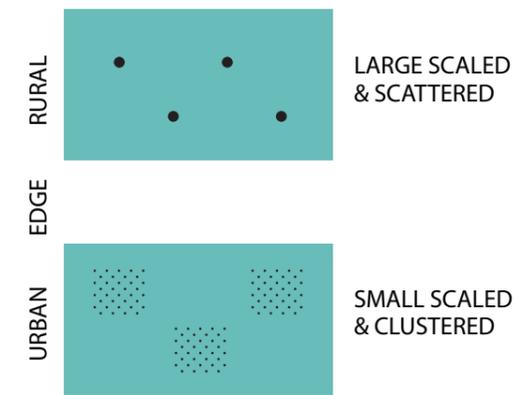
3 foodscapes - 3 identities - 3 worlds



Monofunctional use



Gap between urban and rural

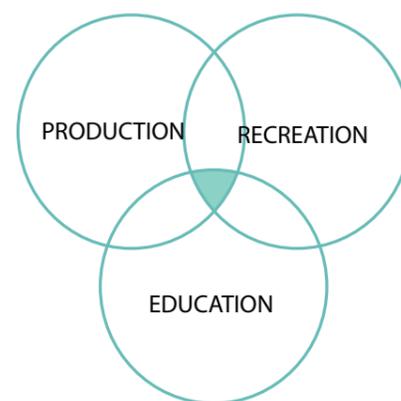


Spatial structure of food production

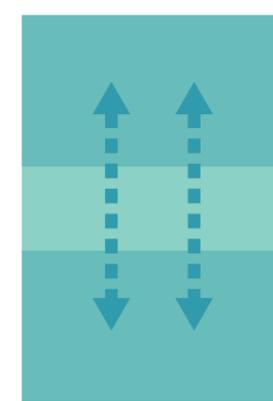
FUTURE VISION



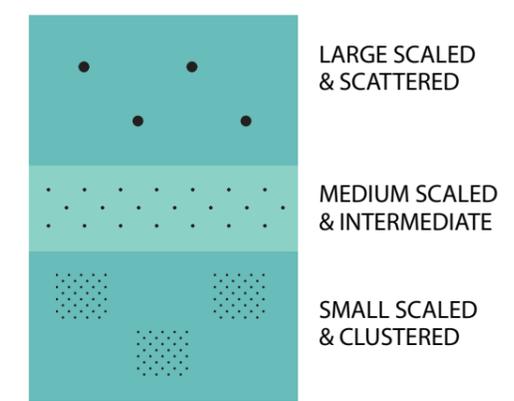
Reflected and connected at 1 meetingplace



Multifunctional use



A transition zone and port to the foodscapes



A place with Intermediate food production inspired by both scales



## SITE STUDY

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This part presents site context, inventory, analysis and program of the site.

# SITE STUDY

## SITE CONTEXT

The site chosen for this design proposal belongs to the municipality of Schiedam, a suburb to Rotterdam. The site borders to the rural areas of Midden-Delfland. The recreational, rural areas on the edge to Vlaardingen and Schiedam are well used by Rotterdam citizens and sometimes mentioned as *Zuidrand, The South Boarder*<sup>3</sup>. The reconstruction of Midden-Delfland lead to that conservation committees were fighting to regain the authentic feeling of the original open polder landscape with cows, pastures and farms. This lead to an action of clearing the planted forest along Zuidrand, at the request of the inhabitants. Woudweg, north of the site, is mentioned in municipal documents in order to preserve its cultural historical values with old farms and pastures (Midden-Delfland Site, 2014).

All recreational areas along Zuidrand are controlled by GZH, *Groenservice Zuid-Holland*, but the site for the design proposal has different owners; the municipality of Schiedam, Staatsbosbeheer, Recreatieschap Midden-Delfland and a privately owned farm in the north of the chosen site. This is due to a grown situation and is now under re-construction<sup>3</sup>.

## RECREATIONAL OPPORTUNITIES

As described in the planning document *Landschapontwikkelingsperspectief Midden-Delfland 2025*, the municipality sees qualities and potential for the rural landscape to be strengthened as a recreational area where people can experience nature and agriculture. Farmers in Midden-Delfland are encouraged to work with improving the accessibility to their pastures for recreational use and to work with methods that gain habitats for grassland birds, typical species for the landscape. For farmers, these improvements are also opportunities that could provide extra incomes from visitors (Municipality of Midden-Delfland, 2009).

One character of Midden-Delfland is the old historic water way-system. There are lots of possibilities to use the water for recreation, for example hiring a tramp boat or canoe. The municipality works with strengthening the connections and create bridges passable for smaller boats (Municipality of Midden-Delfland, 2009). The Netherlands also has a large network of bicycle, skate-and walking paths with routes

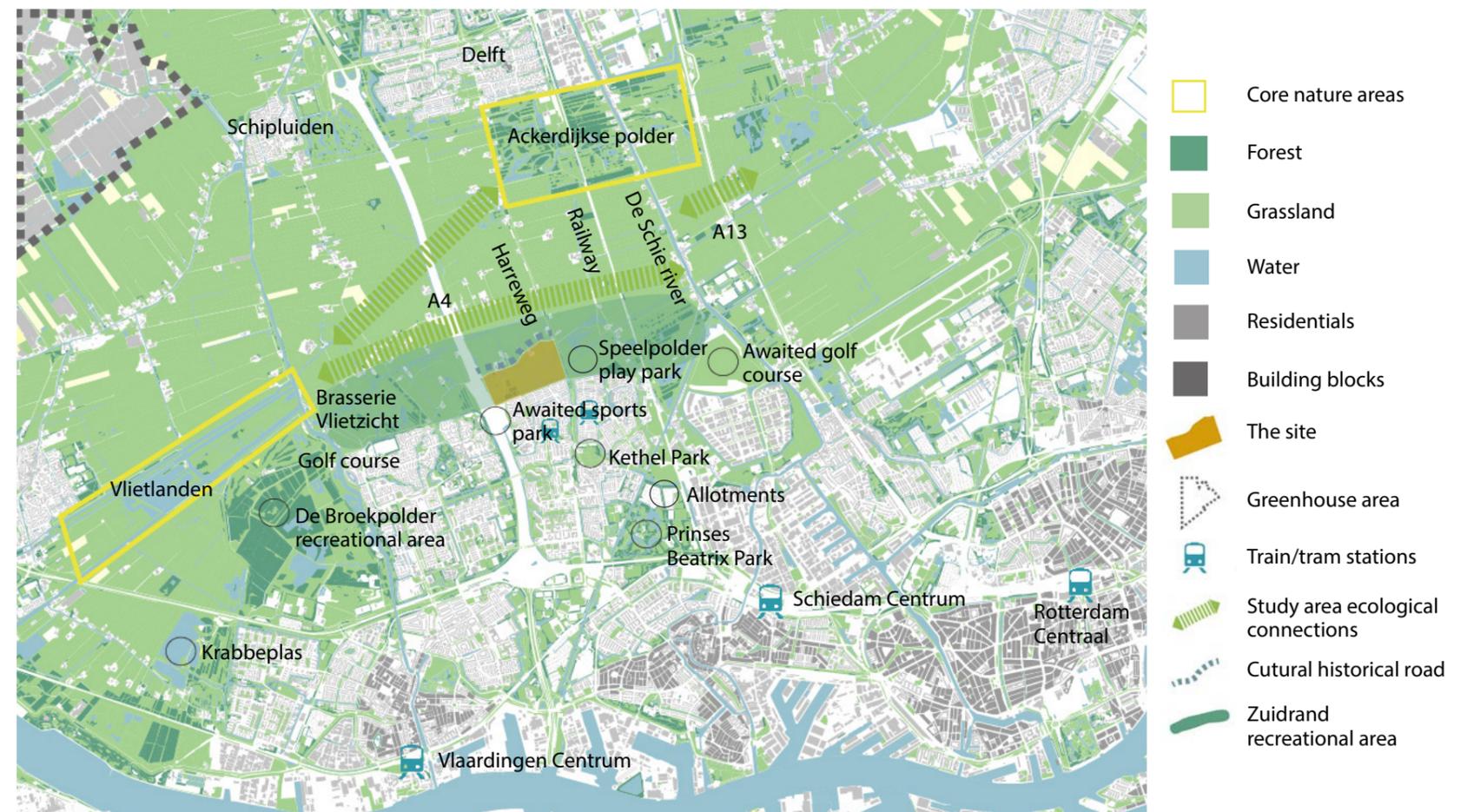
organised in numbers. The system is called *Knooppunts* and can be viewed and planned from a homepage. According to the landscape architect at the municipality of Schiedam, the system is very well implemented in Midden-Delfland, in order to keep the landscape open for recreation. Further, part of Schiedam's vision is to improve the entrances and ports to the recreational, rural areas of Midden-Delfland. One of the most important connections is Harreweg, east of the site, where a bicycle path recently was constructed and the green connection to Schiedam has been improved<sup>3</sup>.

## INFRASTRUCTURE BARRIERS

For five decades, there has been discussions whether to build a highway or not through Midden-Delfland. At the end, the project was accepted but with high demands on the construction and design. The project cost a lot since the road was supposed to be lowered

and very well embedded in the landscape<sup>1</sup>. The development of infrastructure, highway A20, A4, A13 and the railway, has created strong barriers for both humans and animals. By working with reducing these barriers, the municipality of Midden-Delfland wants to improve the east-west connections for the future (Midden-Delfland Site, 2005).

A hundred hectares of new nature and 250 hectares of agricultural nature management and eco-passages are goals supposed to be established over the highway A4 between Delft and Schiedam, over the river de Schie and under A13. The project is called *Groenblauw Lint* and is part of the IODS, *Integrale Ontwikkeling tussen Delft en Schiedam* (IODS, n.d). IODS consists of different projects related to the compensation of the highway A4<sup>1</sup>. As an outcome of this, an ecological green and blue connection will be established between the nature areas Vlietlanden and Akerdijkse polder (IODS, n.d).



<sup>1</sup> Urban planner Municipality of Midden-Delfland, oral communication 11th of April 2016.

<sup>3</sup> Landscape architect & urban planner Municipality of Schiedam, oral communication 15th of April 2016.

# SITE STUDY

## SITE INVENTORY

The site is situated along the sharp city edge, between residential areas in the south and agricultural grasslands in the north. Today it is a recreational area mostly used for walking dogs. The site could be described in two different characters; The east part is characterized by a typical Dutch polder landscape with open grasslands and canals. It is not used for intensive production anymore but it is partly maintained by grazing sheep. The grassland contains several wetland spots and fields with reed. In some places there are scattered trees and small, planted groves. The west part of the site has a nature-like vegetation, with scattered trees and in some parts dense blocks of tree plantations with poor access. The vegetation is enclosed by ridges of soil in straight lines and bicycle roads. In the middle, there is an old dumping ground, slightly polluted. South of Woudweg, inside the area, is privately owned ground by a farm doing horse breeding. West of the site is the tunnel-opening of highway A4 and east of the site there is a nature playground called Speelpolder.



MAP INVENTORY: Map over the site.  
Scale 1:4000 (A3), 1:6000 (A4)

# SITE STUDY

## SITE INVENTORY & ANALYSIS



The east of the site contains grasslands with open views and partly planted smaller groves or in this case alder trees along the path of stone dust. The residential area of Schiedam is seen in the back.



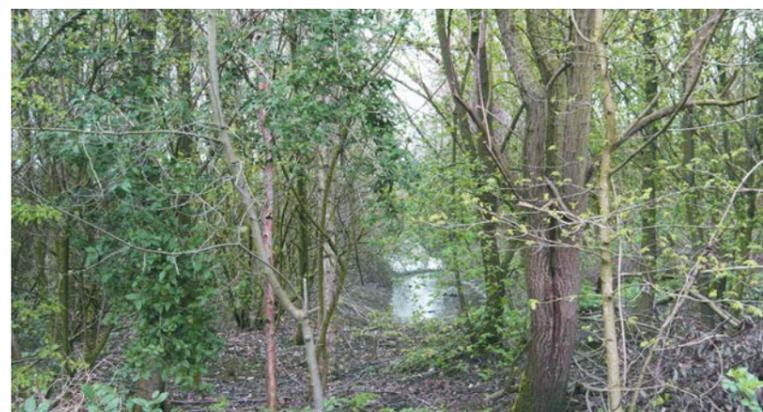
The west part of the site has a more varied terrain and contains of more free-growing nature with scattered trees like Crataegus, Salix, Betula. The ground layer is mostly grass and reed.



The constructed polder landscape in the east part of the site serves as good habitats for ducks, geese, wading- and meadow birds as well as amphibians.



A few narrow bridges are leading over the canals to ease the accessibility and walkability to the polder landscape. All paths are made of stone dust, except from the broader bicycle roads that are made of asphalt.



The west area partly contains of blocks of deciduous dense tree plantations with poor accessibility. Trees growing here are among others Salix, Betula, Crataegus, Prunus, Acer. Due to the dense trees, only a few plants manage to grow on the ground layer.



In the west of the site, there are soil ridges enclosing parts of the area in straight lines that contributes to the squared and organized shape. On top of them are narrow, informal paths.



The tunnel-opening to highway A4 is just right next to the site (to the left). Since the A4 is lowered, the landscape views from the site still remains and the cars emit surprisingly little noise.



Trimmed willow alleys and lines are commonly seen along narrow roads in Midden-Delfland including Woudweg, north of the site. They date back to the historical agricultural landscape.

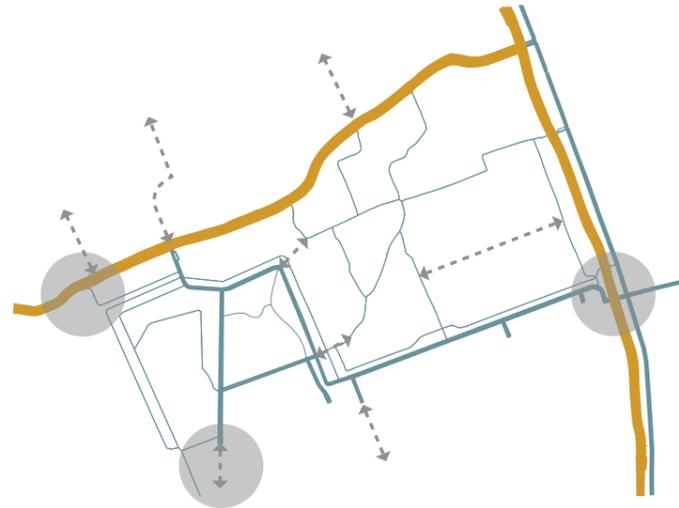


Woudweg, north of the site, has cultural historical values with old farms and gardens and are highly protected to preserve the character of the area.

# SITE STUDY

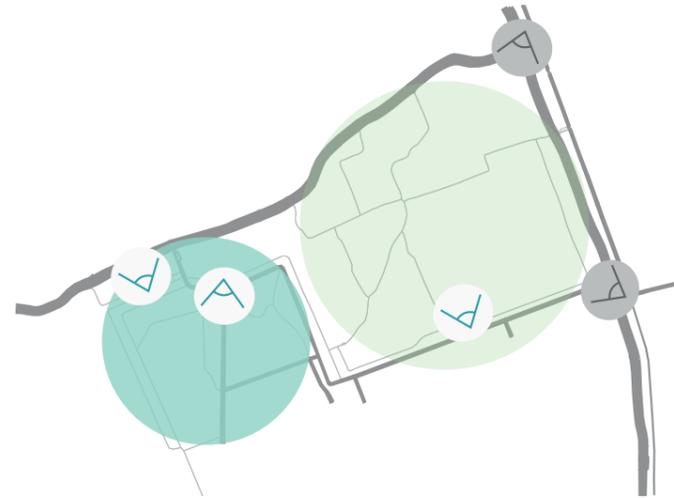
## SITE ANALYSIS

### CONNECTIONS & ENTRANCES



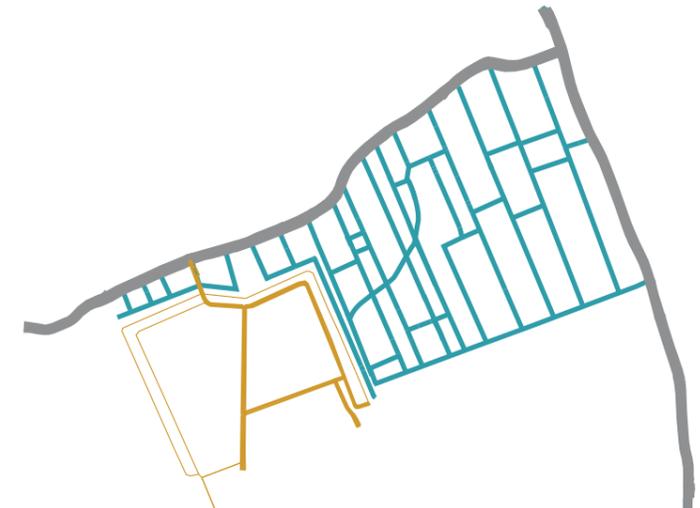
Poor entrances and physical connections to the surroundings.

### SIGHTLINES & SPATIAL CHARACTER



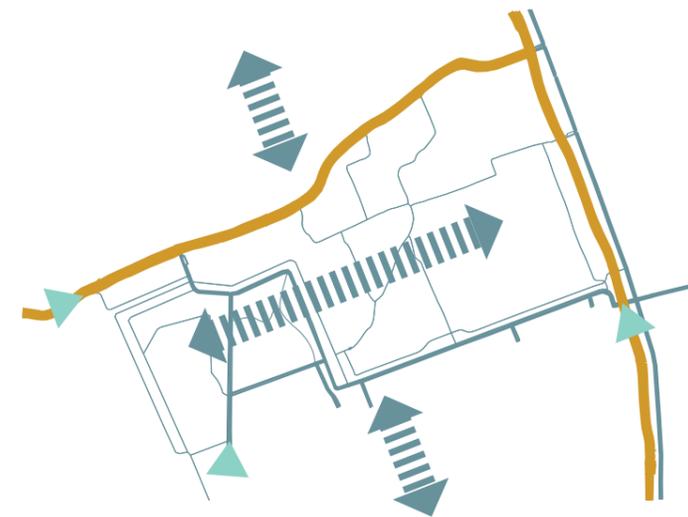
The white sightlines are existing valuable views to and from the urban and rural surroundings. The grey sightlines are poor and blocked. The west part is enclosed by dense planted trees. The east part is open grassland.

### LANDSCAPE CHARACTER

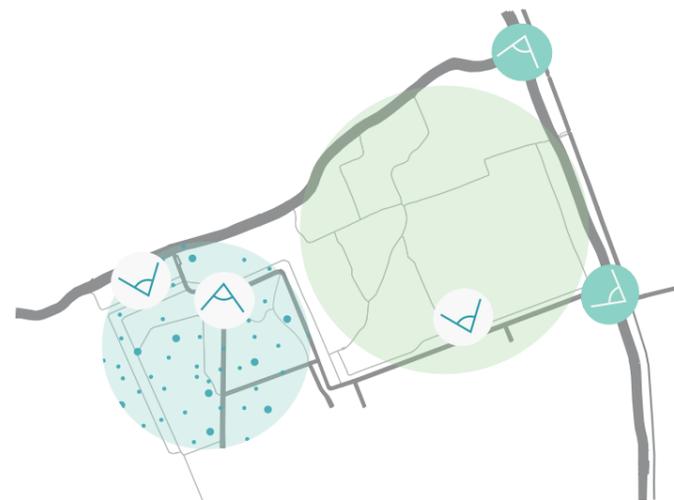


The west part of the area is strictly organized and structured by straight paths. The east area has historical qualities from the agricultural systems of the Dutch polder landscape.

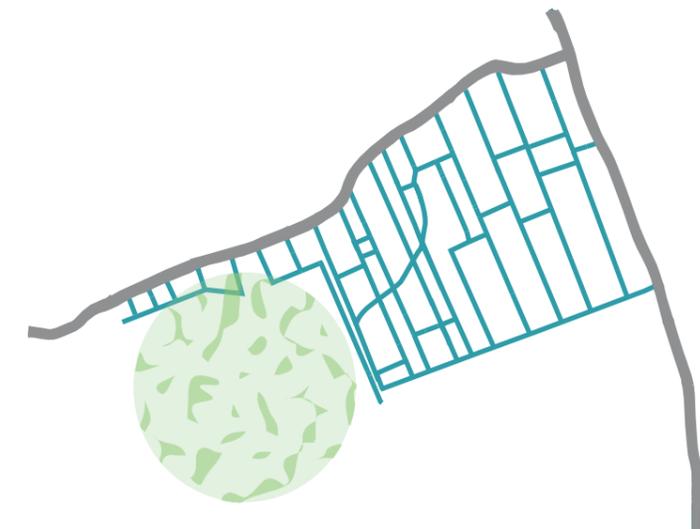
## PROGRAMME



Improve entrances by adding visual, eye-catching qualities. Improve the physical connections both through the area and to the rural and urban surrounding areas.



The eastern sightlines are improved by being opened up or by adding interesting elements that attracts people to the area. The tree plantations in the west part is cleared up to create a more inviting, semi-closed character with improved walkability. The open character of the east part is preserved.



The west part is transformed into a wild, nature-like character with organic shapes and design elements. The east part is preserved.



## DESIGN

This part presents the design of a multifunctional foodscape in a peri-urban area in Schiedam, in the outskirts of Rotterdam. First, the concept and the attached guiding principles are presented. Second, the design proposal is presented as an example of how to implement the concept. The concept and guiding principles are supposed to be applicable on other sites with specific contexts.

# DESIGN

## THE CONCEPT FARMER'S GARDEN

After defining aim and functions for the meetingplace, a suggestion for a concept was constructed - a Farmer's Garden.

A Farmer's Garden is a place where food is produced, where at the same time food production is designed and used to contribute to recreation and education about food. A Farmer's Garden is a combination of large scale food production and an intimate and diverse garden. A piece of production landscape where everyone is invited as if it was a garden or a park. The production of food is combined in a colourful way, with views over the landscape. This is a place for tasting and experiencing food, that encourages meetings between citizens and farmers as well as the consumption of local food. A Farmer's Garden is also a port to the rural landscape where you can experience food production in a larger setting. At the same time it is a port in the other direction, to the urban farmers small scaled production.

### GUIDING PRINCIPLES

#### A port in both directions

A Farmer's Garden should be located on the edge between urban and rural areas to function as a transition zone and port in both directions.

#### Local market

The design and functions should encourage both farmers and citizens to visit the place, where the focus is food. The place should have a store or market place where farmers get help with and learn how to market their own products and where citizens can come to buy locally produced and healthy food. This encourages meetings between producers and consumers.

#### Multifunctional use

A Farmer's Garden should have multifunctional use including education, recreation and production. Education about the food chain, recreational design with food and at the same time exhibitions and production.

#### Food experience

Food production should function in both a natural setting and an industrial setting, that is both the experience of food in a wild, almost self-sufficient system and in an industrial setting, constantly maintained. This is a way of showing the diversity of foodscapes.



**ILLUSTRATION:** Farmer's Garden is a meetingplace offering different ways of experiencing food. The illustration is made by the authors, partly based on photos from Flickr (Schrier, C. 2010, Billings, G. 2011).

# DESIGN

## PROGRAMMED FUNCTIONS OF THE SITE

This part describes the reasoning and motives for every programmed function of the site as well as why they are located at a certain place. All functions are programmed to contribute to the food experience and show ways of creating multifunctional foodscapes including recreation, education and production. The functions also contribute to meetings and awareness of the food chain as well as knowledge about the foodscape characters of MRDH. Facilities, service and sale as well as horticulture demonstration will be open during fixed times. The remaining area is always accessible.

### Facilities, service & sale

This is where the food hub is situated, with facilities and services located close to the residential area and in connection to existing infrastructure, to minimize the impact on the landscape and to ease transport and distribution. It is also intended to be centralized to function as a node or starting point for the other programmed functions of the area, described below. The food hub is the most important function to attract farmers to the Farmer's Garden. This is a place for producers to sell and showcase their products as well as starting new collaborations. The outdoor seatings for the restaurant is located to the south to gain the most out of the sunny hours.

### Horticulture demonstration

This is a greenhouse area demonstrating the foodscape of Westland, showing production methods and horticulture technology in an industrial setting. It is located in connection to the food hub because of the need for infrastructure. The greenhouses are constructed so that you are able to go by tramp boat in between the glasshouses. This is a way of demonstrating how the foodscape experience could be improved through enabling people to see what occurs inside.

### Designing with food

This is a demonstration park with different parts constructed to present how food production could be used in aesthetic and recreational design and how this could contribute to ecological improvements such as providing for pollination. The park area is also for educational programmes about food growing and is supposed to engage the public to put their hands in the soil. The parks with vegetables, herbs and edible flowers is located close to the outdoor seating of the food hub.

### Self-sufficient & natural food production

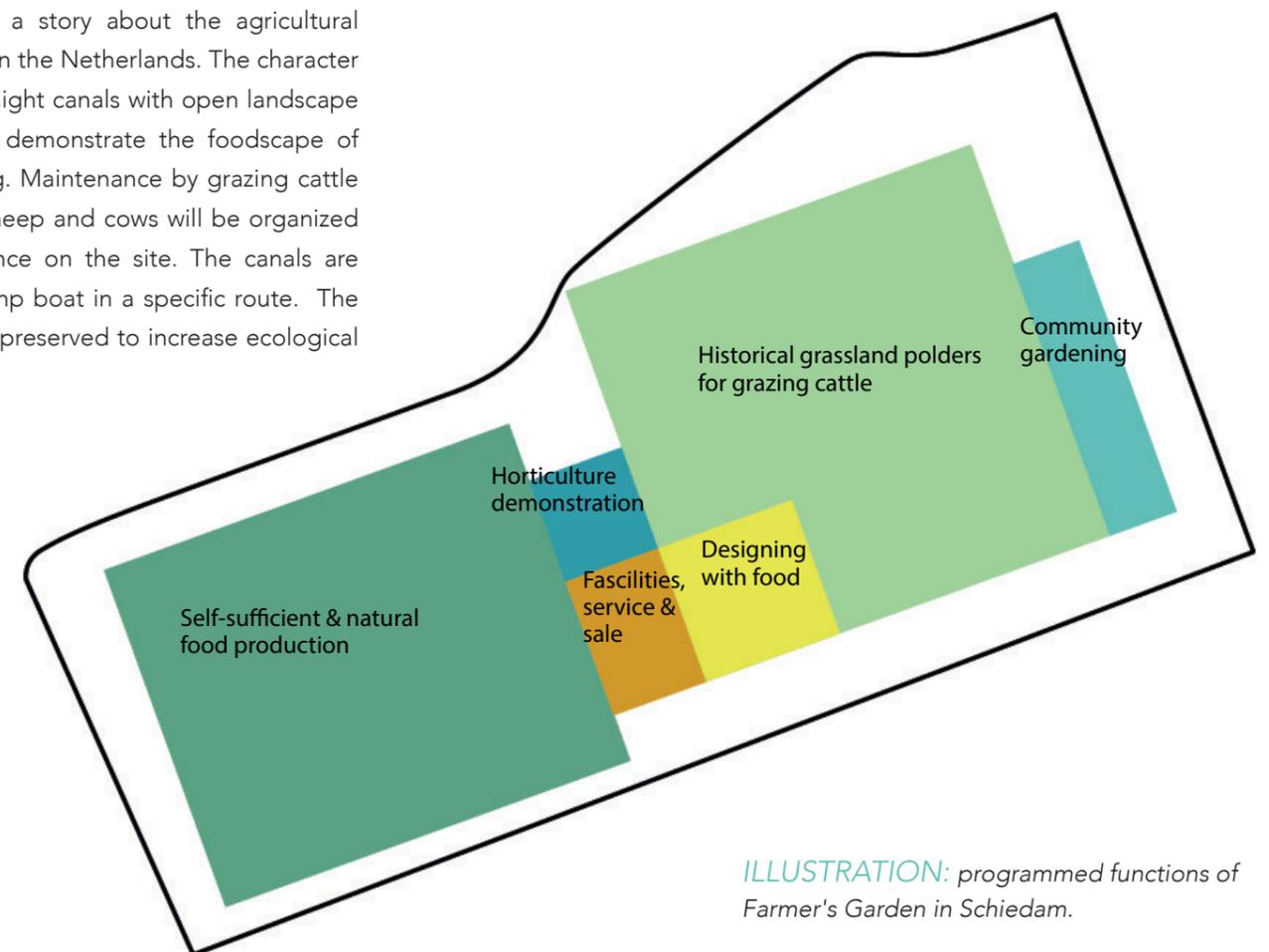
The west part of the area will become an Edible Forest Garden. The Edible Forest Garden is a concept showing another dimension of food production in a wild and natural context, that is self-sufficient and differs from food production in an industrial setting. This is a concept of using food production and at the same time create recreational qualities. The choice of location is based on the existing nature-like character and existing trees that are needed for the establishment of other plants. The exchange of trees will be made in steps to not destroy the enclosure of the vegetation during the development period. The area will remain nature-like and be more organically developed compared to the constructed grassland polders in the east part.

### Historical grassland polders for grazing cattle

The Dutch polder landscape tells a story about the agricultural systems that historically developed in the Netherlands. The character of plain fields of grasslands and straight canals with open landscape views will remain on the site and demonstrate the foodscape of Midden-Delfland, with dairy farming. Maintenance by grazing cattle from the neighbourhood such as sheep and cows will be organized to contribute to the food experience on the site. The canals are maintained to enable going by tramp boat in a specific route. The wetland spots in the grasslands are preserved to increase ecological connections.

### Community gardening

This place is intended for community gardening, as an example of the foodscapes of Rotterdam. The community garden serves as an example of how diverse food production is in urban areas and how it engages people and contributes to social activities. It aims to involve people from the neighbourhood and improves the entrance of the site in the east. It is located here to give the gardeners a more private zone apart from the more busy food hub area. The presence of people might also attract even more visitors to the area.



*ILLUSTRATION: programmed functions of Farmer's Garden in Schiedam.*

# DESIGN

## VISION: FARMER'S GARDEN IN THE MRDH

The Farmer's Garden offers different activities and ways of experiencing food, described below. The garden is maintained by both employees and volunteers. Visitors are also encouraged to participate in activities whenever they like to, a so called *drop in participation*.

### Edible Forest Garden

This place is planned to become a nature-like, organic developed area with opportunities for picnic and to pick your own food. There will also be quiz walks and information signs about edible crops.

### Outdoor kitchen

In the outdoor kitchen, visitors are able to attend workshops and prepare their own meals. *Pick your own meal* means that you collect what you want for your own meal and either you prepare it yourself in the outdoor kitchen or you hand it over to the chef. Visitors are free to pick and taste food from all gardens in the area. The outdoor kitchen also functions as an event stage.

### Herb garden

This is an intimate place for herb growing with small seating places and a pleasant scent. The herbs are used for cooking in the restaurant and is sold at the market and store. It is easy to participate even if you have lack of experience, since herbs are relatively easy to maintain.

### Ornamental vegetable garden

This garden is designed to show ways of using food production to create ornamental plantations with aesthetic qualities. It also provides for education about seasonal vegetables and how to eat climate friendly.

### Pollination park and beehives

This is a place for demonstration of vegetables and edible flowers for honeybees and other wild pollinators. The pollination garden is also a place where you can take part in educational programmes and workshops about how to provide for pollinators and the production of honey. All parks and gardens are aimed to be open for participation to contribute to social and recreational rehabilitation.

### Compost and chickens

The compost and chickens are used to close cycle flows in the area as well as providing eggs for the restaurant. The chickens eat food scraps from the restaurant and their manure, together with compost soil, provides for new healthy plants to grow.

### Food Hub

The store allows for meetings between consumers and producers. The store and the restaurant in the food hub provide products both produced on the site and from local farmers that are able to market their own products here. The Food Hub also offers space and opportunities for collaborations and to start your own small business.

### The 24/7 store

A vending machine selling the most popular products around the clock.



ILLUSTRATION PLAN  
Scale 1:4000 (A3), 1:6000 (A4)

### Greenhouse exhibition

The exhibition shows experimental production methods and innovative technologies. Visitors are also able to participate in workshops about the production stages such as the breeding and harvest. The greenhouses are also a part of the concept *pick your own meal*.

### Community garden

In this part, private persons from the neighbourhood grow their own food and plan their own activities and events. Nearby schools are also invited to grow their own crops.

### Market square

This is a place for outdoor sale and for local farmers to market their products as well as getting feedback from consumers. It is also a place for workshops and events such as tasting events.



**GREENHOUSE EXHIBITION**

**FARMER'S GARDEN**  
Connects local food with people

VIEW: Entrance

# DESIGN



**DETAILED PLAN:** Food hub area  
Scale 1:800 (A3), 1:1200 (A4)

## THE FOOD HUB AREA

When you walk to the food hub you pass ornamental edible plantations with flowers and vegetables planted in colourful patterns. From the entrance walk you see the market, greenhouse exhibition, food hub and people participating in different activities.

The food hub area is meant for marketing and sale of local products as well as experience and education about food. In the greenhouse exhibition, visitors are able to see crops from seeding and breeding to harvesting. Visitors can take part in the harvests and the care of products as well as tasting several crops. You can also pick your own products to bring home or to prepare them in the restaurant. The market square has weekly markets with local and healthy products, where farmers can get feedback from the customers. Through this kind of meetings there are possibilities to build relationships. This has been proved to improve the quality of products and farmers have the possibility to quickly respond to consumer needs. The food hub will help and support farmers to start new businesses and cooperations as well as providing courses about marketing and sale. The indoor store will also provide for small and mid-size farmers to sell their products.

The park area connected to the outdoor seating is inspired by formal gardens where geometry, symmetry and diagonal lines are typical features. There are hundreds of different herb species growing here as well as enclosed seating places with green scenery. The herbs are easy to maintain for new beginners and can serve as an inspiration for the general person to start cultivate at home. The plants provide pollinators with nutrition to produce honey in the beehives. In the ornamental vegetable garden, information about seasonable products and how to eat climate friendly is provided. The park area is a relaxed place where learning should be fun and easy.

# DESIGN



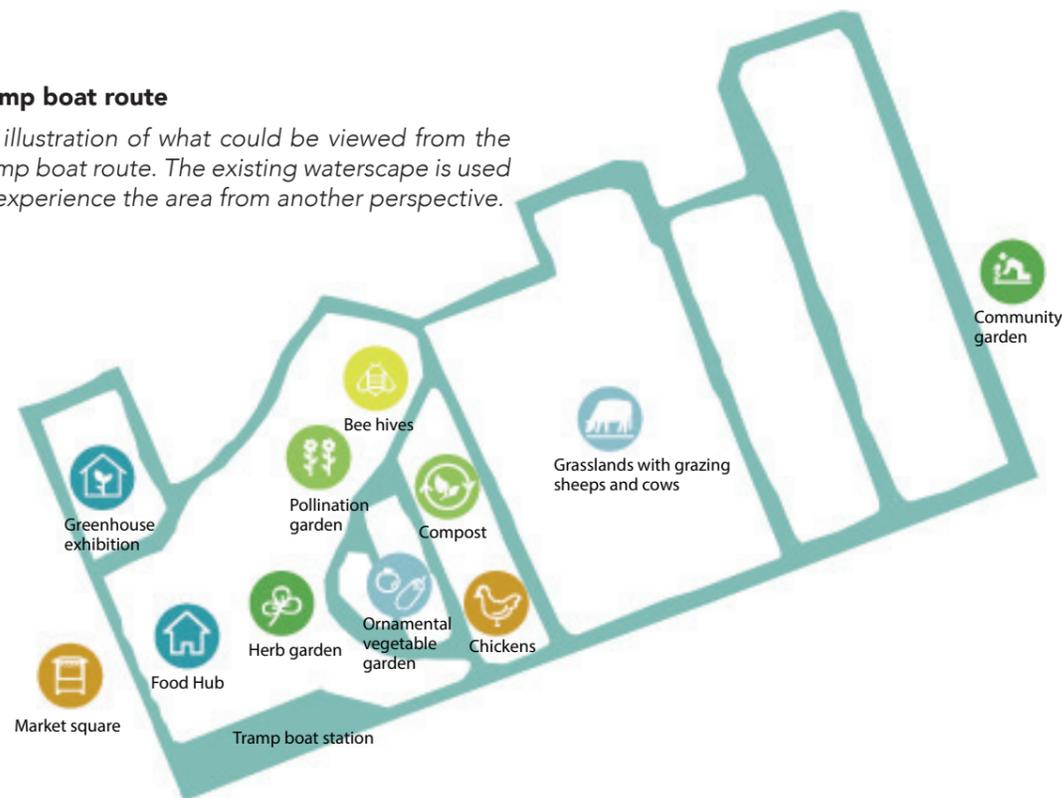
**ILLUSTRATION:** The tramp boat route that passes the grasslands with grazing cattle from the neighbourhood farms. From the tramp boat you are able to come close up to the animals.



**ILLUSTRATION:** The community garden, where people from the neighbourhood have the chance to grow their own food.

## Tramp boat route

An illustration of what could be viewed from the tramp boat route. The existing waterscape is used to experience the area from another perspective.

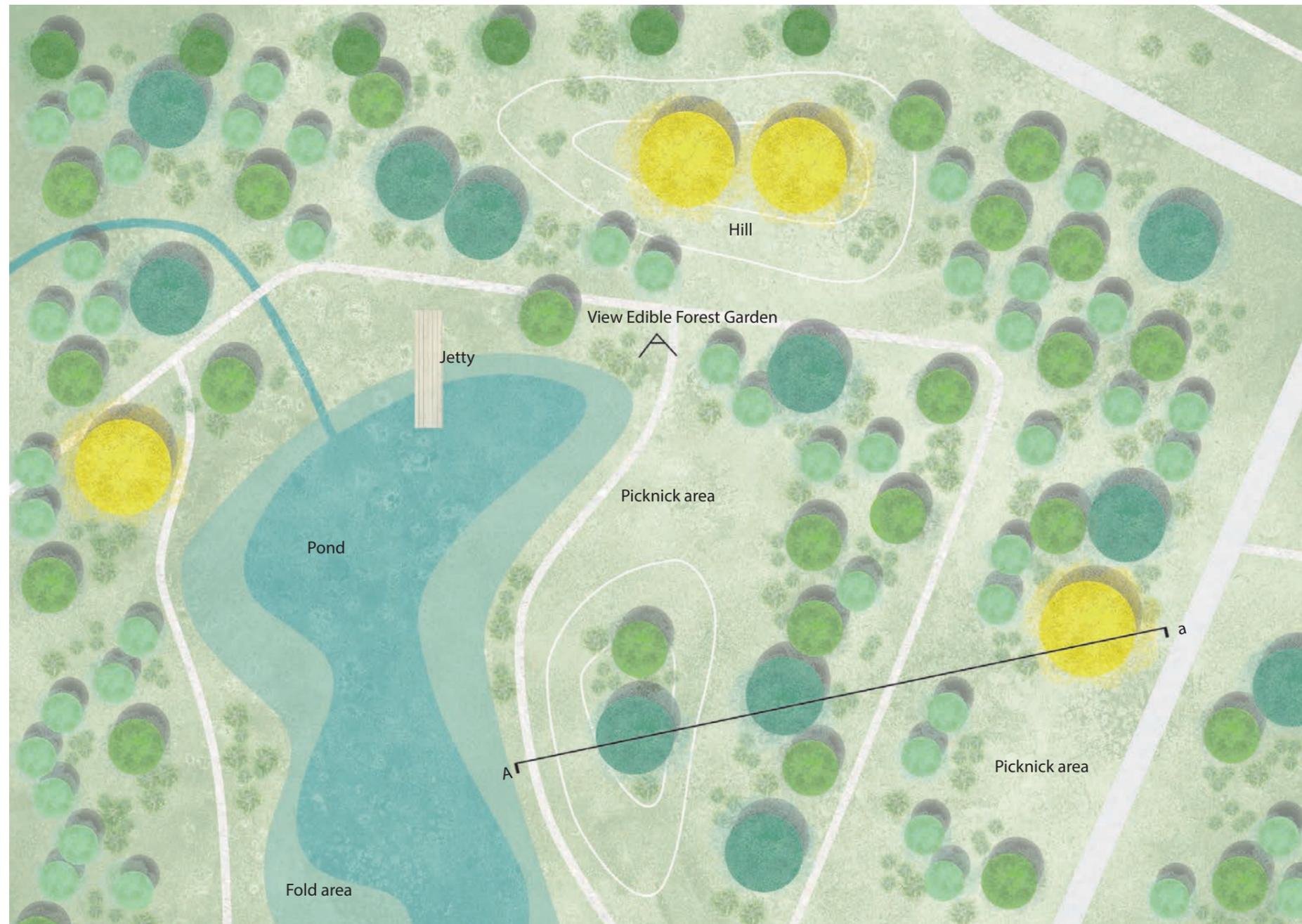


## Roads & paths

An illustration of the walking paths, bicycle- and car roads in the area.



# DESIGN



**DETAILED PLAN:** Edible Forest Garden  
Scale 1:800 (A3), 1:1200 (A4)

## EDIBLE FOREST GARDEN

The Edible Forest Garden has an organic idiom with hills that creates a flowing landscape with varying habitats for different species. In the open forest you can take a walk picking edible plants or sit down for a picnic. New paths are constructed, but there are also possibilities to walk more freely in the forest.

In the Edible Forest Garden a pond is constructed with water from existing canals in the area. It is constructed in a glade, where it will serve both as a recreational element and as habitat for amphibians. The pond will play an important role in ecological connections for amphibians in surrounding areas.

In the forest you can find information signs about the edible crops and recipes on how to prepare them at home or in the outdoor kitchen at the site. There is also quiz walks where visitors learn about the edible plants while recreating in the forest.

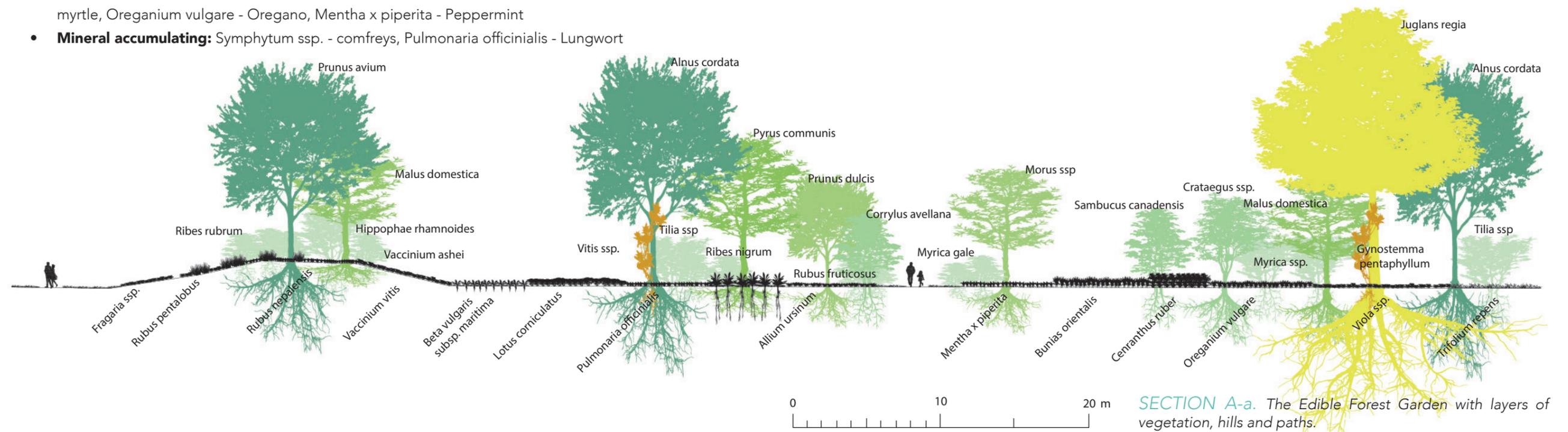
# DESIGN

Species from the Edible Forest Garden are shown in the section and their primary use is presented in the list below. Many species also have a secondary use, for example providing for pollinators. All crops are chosen from the book *Creating a Forest Garden* by Martin Crawford, 2010 (see Appendix 2 for detailed information). Mainly the light conditions of the plants that are considered, since there was a lack of information about the soil conditions of the site. The chosen species create a diverse, mixed forest with beneficial species interaction. However, the interaction between species are not investigated in detail, which means there could be risks that invasive species would compete with other less competitive plants. For example, *Symphytum* ssp. tends to be invasive but is also preferable underneath fruit trees, since they are deep rooted mineral accumulators which provides nutrients without disturbing the tree (Crawford, 2010 p.56).

- **Nitrogen fixing plants:** *Alnus cordata* - Italian Alder, *Myrica* ssp. - Northern bayberry, *Lotus corniculatus* - Bird's foot trefoil, *Trifolium repens* - White clover
- **Nuts:** *Juglans regia* - Walnut, *Corylus avellana* - Hazel, *Prunus dulcis* - Almond
- **Fruit or berries:** *Malus domestica* - apple, *Prunus avium* - Sweet cherry, *Hippophae rhamnoides* - Sea Buckthorns, *Morus* ssp. - Mulberries, *Pyrus communis* - Pear, *Crataegus* ssp. - Hawthorns, *Ribes nigrum* - Blackcurrant, *Ribes rubrum* - Redcurrant, *Rubus fruticosus* - Blackberry, *Vaccinium ashei* - Southern Blueberry, *Vitis* ssp. - Grapes, *Fragaria* ssp. - Strawberries, *Rubus pentalobus* - Creeping bramble, *Vaccinium vitis-idaea* - Lingonberry, *Rubus nepalensis* - Nepalese raspberry/ Groundcover raspberry
- **Edible leaves or/and flowers or/and roots:** *Tilia* ssp. - Lime tree, *Allium ursinum* - Ramsons/ Wild garlic, *Beta vulgaris* subsp. *maritima* - Sea beet, *Bunias orientalis* - Turkish rocket, *Cenranthus ruber* - Red valerian, *Viola* ssp. - Violets
- **Plants used for flavoring or herbs:** *Sambucus canadensis* - American elder, *Myrica gale* - Bog myrtle, *Oreganium vulgare* - Oregano, *Mentha x piperita* - Peppermint
- **Mineral accumulating:** *Symphytum* ssp. - comfrets, *Pulmonaria officinalis* - Lungwort

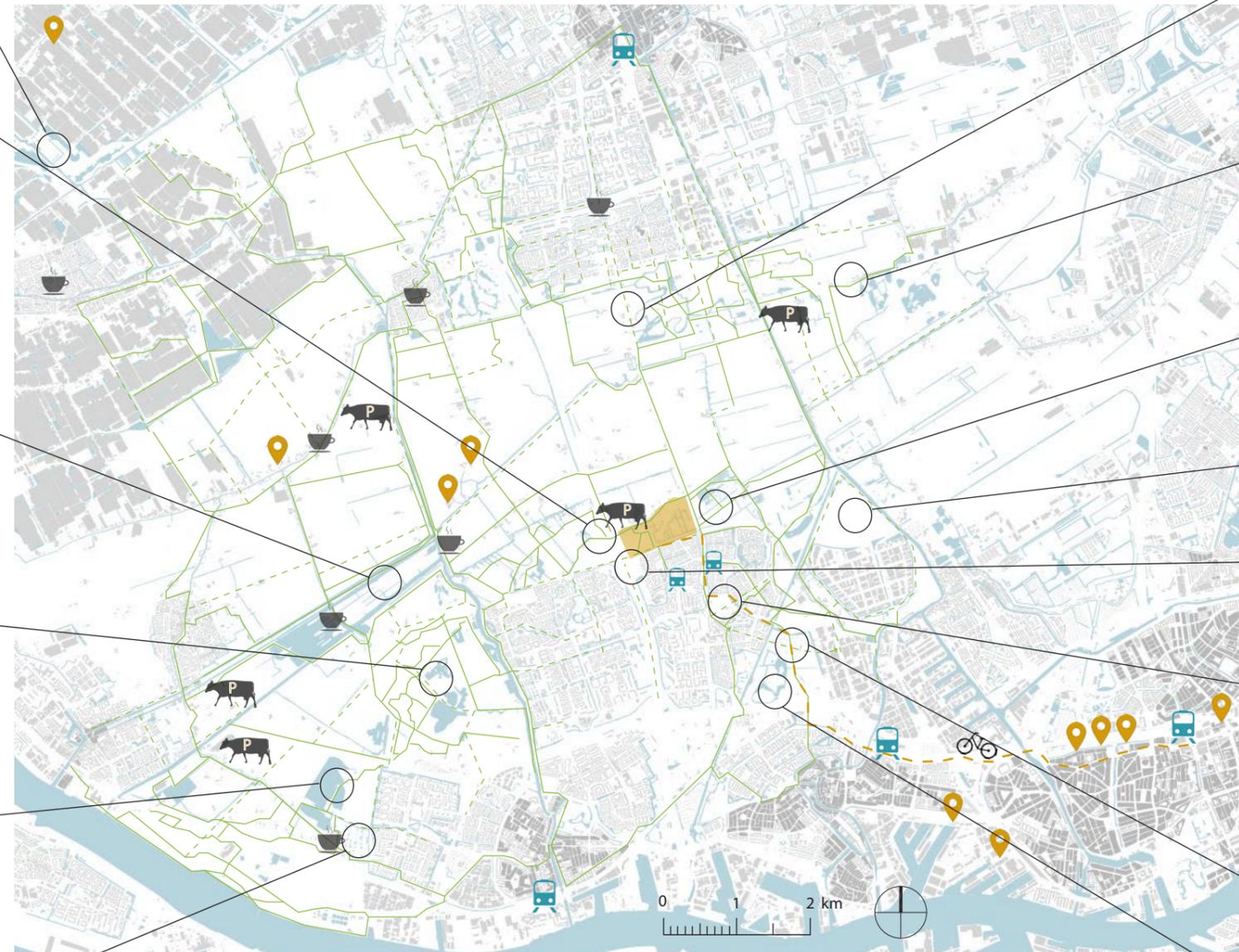


**VIEW EDIBLE FOREST GARDEN:** View over the picnic area in the Edible Forest Garden, a nature-like place with possibilities to pick your own meal to prepare in the outdoor kitchen.



## SITE CONNECTIONS TO THE SURROUNDING

This part presents the existing and awaited activities and nodes connected to the site in order to describe how Farmer's Garden relates to its surroundings. The connections are essential to achieve the integration of urban and rural. Recreational and educational activities as well as food production are widely spread in the surroundings of the site.



### De Wollebrand

Recreational area with a café and opportunities for wakeboarding and waterskiing.

### Vockestaert

The Agricultural Nature Association Vockestaert works with recreation and education together with farmers and children to strengthen urban-rural relationships. Grazing sheeps from Vockestaert Schaapskudde maintain the recreational areas of Zuidrand

### Vlietlanden

An old and preserved swampy area with rare orchids and water birds. Opportunities for water sports as well as biking and walking

### Broekpolder

Recreation - and nature area with a golf course and opportunities for canoeing, climbing and mountain biking

### Krabbeplass

Swimmig, surfing and fishing along with hiking opportunities, bike riding and horseback riding. Camping area and cafes

### Voedselbos Vlaardingen

Edible Forest Garden constructed on the initiative of inhabitants

### Abtswoudse Bos

A recreational, forested area for hiking, biking and sunbathing. Creeks with ecological values and a landart project, Moeder Aarde (Mother Earth), a hill side of a womans body

### Ackerdijkse Plassen/Ackerdijkse Bos

Preserved historical polder landscape with camping area and a bird-rich nature area. Some parts are not accessible due to protection of birds.

### Speelpolder

Nature-play area with swinging roaps, water toys and a mini-beach, an initiative by Vockestaert

### Awaited golf course

Dumping area under construction to become a golf course

### Awaited A4 Sports Park

Recreational sports park under construction on top of Ketheltunnel to highway A4

### Park Kethel

A piece of historical Dutch polder landscape, embedded in the residentials of Schiedam. An educational visitor center called Natuurcentrum De Boeshoek is situated here

### Allotments

West Abstpolder, an area with allotments and small cottage houses

### Beatrix Park

A city park for the inhabitants of Schiedam

**MAP:** Existing network of bicycle- and walking routes in the landscape of Midden-Delfland as well as suggestions for improvements of the routes (Municipality of Midden-Delfland, 2009, pp. 112 &114). Our suggested bicycle route, in orange, shows how to reach the Farmer's Garden from Rotterdam Central Station. The Farmers Path is an educational project organized by Vockestaert with five different paths passing farms (Vockestaert, n.d.). The remaining information in this part is based on information from the map *Stilte naast de Stad* (Agrarische Natuurvereniging Vockestaert, Midden-Delfland Vereniging & Recreatieschap Midden-Delfland, 2016). Scale 1:80 000 (A3).



## DISCUSSION

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This part presents a discussion of the results of this thesis, how it relates to the theory and concepts as well as a reflection over the working process.

# DISCUSSION

The purpose of this thesis was to create a design proposal for a multifunctional foodscape in a peri-urban area in Schiedam, in the Metropolitan region of Rotterdam-The Hague (MRDH), considering the aspects of education, recreation and food production. The area should function as a transition zone between the urban and rural landscapes in order to connect these and to improve the relation between producers and consumers. To achieve this, an empirical pre-study about three chosen foodscapes in the MRDH was conducted to contribute to the answer of our research question:

[What are the preconditions and potentials to design a multifunctional foodscape in a peri-urban area in Schiedam, in the Metropolitan region of Rotterdam - The Hague, in order to achieve urban and rural integration?](#)

As Jan Willem van der Schans mentioned in Urban Agriculture magazine (2010), there is a need for planners to acknowledge the multifunctional character of peri-urban areas and turn from single use to mixed use. The concept Farmer's Garden, part of the result of this thesis, is supposed to serve as an inspiration for future planning and development of peri-urban areas and for the integration of urban and rural landscapes. Farmer's Garden could be implemented on other site specific contexts. Our design proposal is one way of using the concept.

## METHODOLOGY

The preface was done in Sweden before traveling to the Netherlands. We made site visits in Sweden and gathered and read literature we thought would be relevant for our thesis. The preface gave us inspiration but some of the work turned out to be irrelevant since it changed quite a lot when we arrived in Rotterdam and started the working process in collaboration with LOLA.

As the project Metropolitan Foodscapes was supposed to continue throughout the year, our thesis was ahead of LOLA's planning process. Therefore, our working process was partly obstructed when defining the aim of the thesis, gathering information and doing site visits relevant for the project. To get an understanding of the site context and the production landscapes of MRDH we had to conduct

an empirical pre-study, consisting of semi-structured interviews, observations and municipal document research. The empirical pre-study more or less started as inspiring site visits and contextual background, but developed into a more structured empirical pre-study. Therefore, in the meantime of the pre-study we organized and analyzed the result as we realized the information could partly be used as applications for our design proposal. With this wide knowledge and spread aspects gathered from different stakeholders such as farmers, planners, entrepreneurs and documents, it was difficult to narrow our thesis to what was relevant for our aim and research question as well as keep to the time limit and the extent of the thesis. Since the thesis was conducted in a new country with different planning and landscape contexts, the pre-study was time-consuming and resulted in a larger extent than we first intended. This made our design emerge into a less detailed proposal than expected from the beginning. There are many programmed functions and concepts that we would like to explain even more and develop in detail. While conducting the semi-structured interviews during the site visits, we encountered both language obstacles and differences in profession vocabularies. While speaking to the farmers in Westland and Midden-Delfland, we found it difficult to explain some of the questions, which led to that we sometimes revealed our view on the topic and might have influenced their answers.

We had difficulties with finding detailed information about future planning in the peri-urban zone in the outskirts of Rotterdam and problems with getting in touch with people. This delayed the choice of site and the start of our design process. In the end, the site was discussed and chosen together with LOLA. Other reference examples on planning strategies for other peri-urban areas could have been studied to gain knowledge and inspiration for the design proposal, but we chose to focus on the site specific context and the integration of the foodscapes in MRDH due to time limits and extent of the thesis. The choice of literature was mostly made from tips from professionals and entrepreneurs involved in our working process. This has regulated our literature choices but also helped limit our thesis to a relevant knowledge extent since they were experienced in the field. The working process during the empirical study and the site visits in the Netherlands was all done together and when arriving at home, the

writing, maps and illustrations were produced alternated but in the end divided equally.

## RESULT

The empirical pre-study is mostly relevant for the Netherlands since it presents the very specific conditions of the country. Though, the information about current situation for farmers and the landscape picture of the foodscapes are material for preconditions and potentials in the foodscapes, which can be used as a tool and inspiration for municipalities, especially in the affected areas, when planning for multifunctional land use. Regarding production landscapes, planners tend to prioritize short-term, economic profitable solutions rather than the visual aspects and usage of the landscape. Planning towards a multifunctional land use would include more functions that in turn attract more people. Such planning would strengthen the relationship between consumers and producers and function as a step in improvements for a local market.

Westland mostly turns to the world market and there is an up-scaling going on in the horticulture business to keep it economically viable. The planning perspective put the farmers need for short-term economic profit in front of visual and experiential values of the landscape. According to us, the factors that encourage people to experience the landscape of Westland are scarce. The neglect of human scale and visual qualities of the landscape implies a risk of losing the potentials in turning to a local market. In contrast, Midden-Delfland wants to enhance the local trade and development of smaller cooperations in order to survive the current conditions for dairy farming. One way of improving the local market is to ensure the accessibility to the recreational landscape and encourage closer relationships between consumers and farmers. According to us, there is still a need for more farmers to work together with the municipality, since most of them continues to deliver their products to larger dairy cooperatives and do not have possibilities to run their own sale. Farmers should be more inspired to work as entrepreneurs, learn how to market their products and build relationships with consumers. To encourage farmers to adapt to the vision for a multifunctional use, there is need for more flexible planning regulations that enable a more mixed use of farmland situated close to cities.

# DISCUSSION

The fact that urban farming in Rotterdam has increased the latest years implies an increasing interest in food production among citizens. We believe urban farming could be used as a tool to increase the awareness of and to re-connect citizens to food. Though, urban farming still differs a lot to the modern conventional food production since most of them are more back to basic and hobby-farming, where the main profits stem from visitors and subsidies. The gap between consumers and producers remains since consumers have a totally different view from farmers, of what sustainable food production is. The empirical study showed that some farmers perceive high demands from consumers that require organic food while they are not aware of all the work behind. According to other farmers, the differences in organic and non-organic production methods are sometimes modest. To sum up, urban farming is not the only tool to connect urban and rural foodscapes, there is need for a better understanding of the industrial context of food production.

Midden-Delfland has become a recreational area for the residents of two large cities, Rotterdam and The Hague. Vice versa, inhabitants of Midden-Delfland should have the opportunity to benefit from the cities (Municipality of Midden-Delfland, 2011). The choice of site was aimed to strengthen the function of the design proposal as a transition zone in both directions, between urban and rural and consumers and producers. The location was based on the qualities and advantages of peri-urban areas such as the large spatial context and the many possibilities for multifunctional use. Multifunctional peri-urban areas are important for recreational leisure time and the quality of life for citizens (Zasada, 2010). According to Jan Willem van der Schans, 2010, it is also important to include farmland in the peri-urban zone and not only use these areas for recreational purpose, to re-integrate citizens with food production.

In addition, farmers in peri-urban areas often find ways for direct marketing and have close relationships with consumers, which is an important factor to shorten the food chain (Zasada, 2010). When looking at purchasing power and amount of consumer, that is higher in the city center, we could have chosen a more urban site. However, this would exclude other important aspects such as the experience of a natural landscape and closeness to the production landscape and farmers. As mentioned in the empirical pre-study, farmers's time

is scarce and they do not prioritize going to the city to market their products. Rotterdam citizens already tend to visit the peri-urban area for recreational activities. Therefore the big challenge in the design proposal was to design a place that encourages conventional farmers to come to the Farmer's Garden. The essential factor in bringing the farmers closer to the city is to include economic interests. This economic factor is beyond our expertise but crucial for the aim of our design proposal. As part of our design, the Food Hub is supposed to provide institutional-and retail market for small and mid-sized farmers. These important factors are taken into account, but the thesis had to be narrowed to experiential values and qualities of a foodscape that we, as landscape architects, can affect. Accordingly, our designed foodscape integrates elements that promote and encourage farmers to market and sell their products. The concept of foodscape used in the thesis is very wide and considers all that has to do with food. In the empirical study we also analyzed and considered a foodscape as a certain type of production in relation to the landscape's conditions, for example we mentioned dairy farming in relation to Midden-Delfland's swampy landscape. The definition of a foodscape can easily become intangible since it considers everything that has to do with food.

The concept Farmer's Garden is a new concept and contribution of this thesis to the field of landscape architecture and planning with food for a multifunctional land use. The development and use of peri-urban zones is of broad and current interest and we hope the concept Farmer's Garden could be used as an inspiration for urban planners and designers in creating foodscapes including food production, education and recreation in order to integrate urban and rural areas as well as citizens and farmers. The guiding principles are meant to strengthen the concept but still supposed to remain applicable on different landscape contexts. Therefore, the principles are flexible and generally formulated. However, this could also imply disadvantages in the definition since they might be difficult to implement. With this thesis, we would like to invite other students or researchers to develop the concept and definition further.

## FINAL CONCLUSIONS

Bringing agriculture and farmers closer to the city contributes to an improved communication which gains trust between citizens, consumers and farmers, producers and often lead to an improved quality of products (Petts, 2005 p. 71). Urban consumers increasingly prefer regional products. In addition, consumers purchasing directly from farmers enhance the urban and rural relationship (Zasada, 2010).

This thesis contributes to and inspires the use of peri-urban areas in a multifunctional way and how to reduce the barrier between urban and rural landscapes. Multifunctional land use, including food production, close to cities improves the local market and meetings between producers and consumers. Further, the thesis contributes with the concept Farmer's Garden, implemented on a peri-urban area in MRDH, and serves as an inspiration for what kind of functions and activities could be used in planning strategies for peri-urban zones. We hope farmers will continue to realize the benefits from transforming single-use farmland into mixed-use places. We also hope that multifunctional planning continues in cities, where landscape architects tend to exclude design with edible plants in order to keep low maintenance of urban areas.

We believe this thesis shows ways of how to design with food and how to make food production; educational, recreational and fun.

## FURTHER RESEARCH

The concept of Edible Forest Gardens in temperate climate is relatively new. We suggest further research questions such as are the existing examples on Edible Forest Gardens in Europe well-functioning? What are the advantages and disadvantages with the concept? How much maintenance is needed to keep a forest running? How could it be implemented in Sweden?

As a further research and complement to the field of multifunctional use in peri-urban areas we suggest questions such as how could a design proposal, based on the concept of Farmer's Garden be developed on another site?

In developing countries, urban agriculture is an essential activity in people's everyday life and less related to recreational purposes as today's situation in the developed world. Another research question could be what are the pre-conditions and potentials for a multifunctional foodscape in a developing country?



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**APPENDIX**

# APPENDIX

## APPENDIX 1

Appendix 1 shows the question used for the interviews. First it presents the questions for urban farming, than greenhouse horticulture and last dairy farming.

### QUESTIONS URBAN FARMING

Name of farm:  
Location:  
Homepage:  
Planting/crop diversity:  
Animals:  
Main purpose:  
Start year:  
Size:  
Personal use or sale/export:  
Staff: Volunteers/employees/students  
Opening times:  
Facilities:  
Urban context:  
Accessibility:  
Previous use/history of the place:  
Membership (informal or official):  
Plot owner (foundation, municipality, cooperative):  
Development of site:  
Other:

### QUESTIONS GREENHOUSE HORTICULTURE

Name of horticultural company:  
Address:  
Homepage:  
Produced crops:  
Production purpose:  
Start year:  
The production chain:  
Pollination:  
Production per year:  
Financing:  
Size of greenhouse:  
Sale countries:  
Staff: Employees/volunteers/interns/students  
What is your view on the relationship city-countryside, citizens-farmers?  
Is there a gap between producers and consumers?  
If you think it is, what do you think would be the solution to make the gap smaller?  
What is your view on making farmland/greenhouses more accessible for people?  
Is the greenhouse area of Westland suited for recreation or what should be changed to make it better for recreational purpose?  
Other:

### QUESTIONS DAIRY FARMING

Name of farm:  
Address:  
Homepage:  
Crops and animals:  
Produced products:  
Production purpose:  
Start year:  
The production chain:  
Production per year:  
Size of area (for animals and crops):  
Sale countries:  
Staff: Employees/volunteers/interns/students  
What is your view on the relationship city-countryside, citizens-farmers?  
Is there a gap between producers and consumers?  
If the answer is yes; what do you think would be the solution to make the gap smaller?  
What is your view on making farmland/production landscape more accessible for people?  
Is the farmland area of Midden-Delfland suited for recreation or what should be changed to make it better for recreational purpose?  
Other:

# APPENDIX

## APPENDIX 2

Appendix 2 shows the plant list used for the construction of the Forest Garden. All plants that are used is from the book *Creating a Forest garden* by Martin Crawford, 2010.

### PLANT LIST FOR EDIBLE FOREST GARDEN

#### Medium to large canopy trees (over 10 m):

*Alnus cordata* - Italian Alder (20 m)  
Sun-light shade  
Use: Nitrogen-fixing tree  
Secondary use: Edible sap. (p. 143)

*Juglans regia* - Walnut (20m)  
Sun  
Use: Nuts  
Secondary use: Edible sap. (p. 133)

#### Small trees and large shrubs (4-9 m):

*Malus domestica* - Apple (6-8 m)  
Sun-light shade  
Use: Edible fruit  
Secondary use: Good bee plant (p. 108)

*Prunus avium* - Sweet cherry (8-10 m)  
Sun-light shade  
Use: Edible fruit  
Secondary use: Good bee plant (p. 112)

*Hippophae rhamnoides* - Sea Buckthorns (3-4 m)  
Sun-light shade  
Use: Edible fruit  
Secondary use: Good bee plant and nitrogen fixer (s. 124)

*Morus* ssp. - Mulberries (5-10m)  
Sun-light shade

Use: Edible fruit  
Secondary use: Edible leaves - cooked (p. 124)

*Corylus avellana* - Hazel (5-6m)  
Sun-shade  
Use: Nuts (p. 130)

*Prunus dulcis*- Almond (5-6m)  
Sun  
Use: Nuts (p. 134)

*Tilia* ssp - Lime tree (coppiced 4 m)  
Sun-shade  
Use: Edible young leaves  
Secondary use: Bee plant. Leaves are rich in minerals and improves soil conditions rapidly. (p. 136)

*Myrica* ssp. - Northern bayberry (4-8 m)  
Sun-light shade  
Use: Nitrogen-fixing tree  
Secondary use: Bee plant, fruits and leaves for flavouring, wax (p. 145)

*Pyrus communis* - Pear (8-20 m)  
Sun-light shade  
Use: Edible fruit  
Secondary use: Good bee plant (p. 115)

*Crataegus* ssp. Hawthorns (4-6 m)  
Sun-moderate shade  
Use: Edible fruit  
Secondary use: Bee plant (p. 119)

#### Shrubs up to 3 m:

*Ribes nigrum* - Blackcurrant (2 m)  
Sun-light shade  
Use: Edible fruit

Secondary use: Bee plant, leaves used in teas (p. 158)

*Ribes rubrum* - Redcurrant (2m)  
Sun-light shade  
Use: Edible fruit  
Secondary use: Bee plant, leaves used in teas (p. 158)

*Rubus fruticosus* - Blackberry (2-4 m)  
Sun-light shade  
Use: Edible fruit  
Secondary use: Bee plant, the young shot tips are edible (p. 160)

*Vaccinium ashei* - Southern Blueberry (1-1,5 m)  
Sun-light shade  
Use: Edible fruit  
Secondary use: Very good bumblebee plant (p. 164)

*Sambucus canadensis* - American elder (2,5-3 m)  
Sun-light shade  
Use: Edible fruit and flowers for flavoring (p. 185)

*Myrica gale* - Bog myrtle (1-2 m)  
Sun-light shade  
Use: Leaves and fruits for flavoring  
Secondary use: Nitrogen-fixing , wax (p. 179)

#### Climber, perennials or shrubs:

*Gynostemma pentaphyllum* - Sweet tea vine  
Light shade-shade  
Use: Leaves are used medicinally  
Secondary use: Nitrogen-fixing , wax (p. 282)

*Vitis* ssp. - Grapes  
Sun - light shade  
Use: Edible fruits  
Secondary use: Edible sap. (p. 282)

# APPENDIX

## Herbaceous perennials and ground cover species:

*Fragaria* ssp. - Strawberries

Sun-moderate shade

Use: Fruiting in June and onwards

Secondary use: Bee plant (p. 203)

*Rubus pentalobus* - Creeping bramble

Sun-moderate shade

Use: Fruiting July/August

Secondary use: Bee plant (p. 205)

*Vaccinium vitis-idaea* - Lingonberry

Sun-light shade

Use: Fruiting August-October

Secondary use: Bee plant (p. 207)

*Allium ursinum* - Ramsons/ Wild garlic

Light shade - shade

Use: Edible leaves and flowers in February to May

Secondary use: Beeplant (p. 211)

*Symphytum* ssp. - Comfrees

Sun-moderate shade

Use: Mineral accumulating plant, good beneath and around fruiting trees and shrubs

Secondary use: Excellent beeplant (p. 246)

*Rubus nepalensis* - Nepalese raspberry/ Groundcover raspberry

Light shade-shade

Use: Fruiting in August/September

Secondary use: Bee plant (p. 205)

*Beta vulgaris* subsp. *maritima* - Sea beet

Sun-light shade

Use: Edible leaves and root (p. 214)

*Bunias orientalis* - Turkich rocket

Sun-light shade

Use: Edible leaves and flowerheads

Secondary use: Bee plant (p. 215)

*Cenranthus ruber* - Red valerian

Sun-light shade

Use: Edible young leaves

Secondary use: Good butterfly plant (p. 217)

*Oreganium vulgare* - Oregano

Sun-light shade

Use: herb

Secondary use: Bee and butterfly plant (p. 228)

*Mentha x piperita* - Peppermint

Sun-light shade

Use: Herb (p. 226)

*Viola* ssp. - Violets

Light shade- moderate shade

Use: Flower bulbs and leaves are edible

Secondary use: Bee plant (p. 236)

*Pulmonaria officinalis* - Lungwort

Light shade- shade

Use: Mineral accumulating plant (p. 245)

*Lotus corniculatus* - Bird's foot trefoil

sun-light shade

Use: Good nitrogen-fixing plant

Secondary use: Bee plant and attract beneficial insects (p. 244)

*Trifolium repens* - White clover

Sun-moderate shade

Use: Great nitrogen fixing plant

Secondary use: Young shoots can be eaten in spring, flowers can be used in herb tea (p. 247)