

REFLECTION

This project focuses on solving the problems of economically oriented intensive animal farming by building up sustainable and nature-inclusive animal farming systems through landscape design. Animal farming could be eco-friendly and sustainable foodscapes and thoughtscales, which can also connect people more with food animals and educate people to respect and appreciate other lives' sacrifices.

Relationship between Research and Design

The research and design interact with each other mutually in this project. Overall, it can be concluded into 3 aspects: Research on design; Research for design; Research through design.

Research on design

Based on the literature and documentaries review of the problems of current intensive animal farming, also the database from the government of Noord Brabant and Den Bosch, four main problems of current intensive animal farming in Den Bosch were got: Environmental issues including damage of rain forests, water& soil pollution caused by nitrogen overload; Bad animal welfare; Insufficient recreational landscapes work as foodscapes and thoughtscales in Den Bosch; Flooding risks, urban heat effects... related to climate issues in Den Bosch. Therefore, four main design assignments were concluded to help solve the problems: 1. Increase ecological value which includes nitrogen circulation, establish sustainable animal farming, and increase biodiversity. 2. Improve animal welfare which includes improving animal behaviors of food animals, allowing natural behaviors of food animals, also providing natural supplementary diets for food animals instead of artificial fodders. 3. Create recreational foodscapes which include showing the heritage& historical characteristics of local farmlands, and connect people with food animals more. 4. Create climate-adaptive animal farming landscapes which include improving water retention ability, reducing urban heat effect, improve the livability of the neighborhood.

Then the related case studies and literature review were executed in order to get out good design principles and toolboxes to answer these four main design assignments.

Research for design

From the city-scale perspective, the green planning of Den Bosch from the government has been researched, also the current green structure of Den Bosch has been analyzed in order to find out the strategies to improve the current green structure by improving current animal farming and creating recreational animal farming landscapes. Then based on the vision of the city scale, three areas are selected to explore how animal farming could work in natural, suburban, and urban contexts. The specific conditions such as geology, historical resources, flora and fauna, and agriculture conditions of the selected sites are analyzed to find out the good ways of applying the design principles and toolboxes in the local context.

Research through design

The design itself is also a good way to check and supplement the implementation of the research. Three frameworks are established in three areas selected: Animal farming in Nature; Animal farming with Nature; Animal farming through Nature. In order to find out the best solution for improving animal farming in a specific context, different situations have been tested. For instance, in site 1 'Animal farming in Nature', the local specific vegetation 'Glanshaver' is intended to be enlarged and combined with natural livestock farming. How much area should 'Glanshaver' take up in a dairy farm has been tested in order to find a balance between production and ecology. If the whole dairy farm is combined with

'Glanshaver', the density would be kept at a very low level but has the most beneficial for the local nature. While if no 'Glanshaver' is brought back, the stock density could be higher but the ecological value would be lower. Therefore, in order to achieve a balance between production and ecology, 'Glanshaver' is brought back partly along the edges of the farm while other parts of the farm are herb-rich grassland. In this way, the ecological value can be ensured but high-quality animal proteins can still be provided. By considering different extreme conditions, a more balanced solution can be found.

Relationship of Graduation Topic to Studio Topic, MLA and Msc AUBS

The graduation topic 'Animal Farming in Evolving Foodscapes and Thoughtscapes' concerns the welfare of food animals and building up sustainable animal farming systems through landscape design. The studio topic 'Urban Ecology and Ecocities' intends to improve the ecology of environments and improve the life quality of people. The graduation project commits to improving urban ecology from the perspective of animal farming. As mentioned before, a series of problems caused by current intensive animal farming in Den Bosch has damaged the urban ecology as well. Therefore, the graduation projects focus on improving current animal farming to reduce the environmental and social issues that could help to improve urban ecology.

The graduation project explores the topic 'Animal Farming in Evolving Foodscapes and Thoughtscapes' through landscape architecture perspective and strategies. It dedicates to solving the environmental, social, and spatial issues of current animal farming in Den Bosch through spatial design, including strengthening the connection of local natural areas, increasing biodiversity, bringing back historical farmlands elements, creating ideal living environments for food animals... to improve current animal farming and make it have recreational value to enhance the connection between people and food animals.

As for the relation between graduation topic and Msc AUBS, the graduation project explores the topic through research and design in the field of AUBS. Besides the research within the AUBS, other fields such as ecology, husbandry, and agriculture have also been explored and a set of strategies got out from that are then transformed to fit in the AUBS context.

Methodology

The whole project includes eight main actions: Introduction; Figure out research questions; Site analysis; Vision exploration; Design principles formation; Design explorations; Conclusions making; Discussion, Recommendations & Reflection.

In the very beginning, the problem statement is explained from environmental, spatial, and social aspects through literature review, data visualization, mapping, site visiting... Then the research questions and design objectives are followed: Increasing ecological value, improving animal welfare, creating recreational animal farming landscapes, and creating climate-adaptive animal farming landscapes. A set of site analyses and diagnoses is conducted to get out main design assignments related to four main design objectives. A vision map is then achieved through synthesizing the analyses. A set of design principles related to four main design objectives are achieved through case study, literature review, site visit... Three pilots in the Den Bosch region are then selected to explore 'Animal farming in Nature' 'Animal farming with Nature' and 'Animal farming through Nature'. During the application of design principles, the design principles are adjusted to make the design explorations more suitable for the local context. The design explorations are evaluated and adjusted by looking back and considering their relationship with multiple scales. In the end part of this project, the conclusion is made to provide an entrance for people who are interested in such a topic. Also discussion, recommendations and reflection are proposed to show future possibilities of exploring this topic more broadly and deeply. These actions are not conducted in a linear way, some actions need to look back at and then be adjusted. For example, when doing the 'Site Analysis', the research questions need to be considered to make sure the analyses of the

area are related to the research questions; Also the 'design principles' need to be adjusted to make sure they can really answer the research questions.

Throughout the whole project, 'Multilayers Analysis' helps a lot in understanding the site from different aspects. With the group of different related analyses, relationships between different layers can be studied and synthesized, then the vision could be formulated in this way, and the vision could then be the basis of further design explorations. 'Multiscale research and design' from local scale, mesoscale and regional scale can help understand the relationship between the site and its larger context. 'Multiphase design' integrates time thinking in the projects and it helps to realize the design objectives and vision for the region step by step. 'Multidisciplinary research' helps to integrate different disciplines into the project and also helps to expand the current scope of landscape architecture. These methodologies are recommended in other projects as well.

Beyond Den Bosch

The result of this project is a regional plan for improving animal farming and creating animal farming foodscapes and thoughtscales in Den Bosch. The three design explorations show how sustainable, nature-inclusive animal farming landscapes could work within natural, suburban, and urban contexts. With the increasing environmental, social and spatial issues caused by animal farming worldwide, the result of research and design principles could be applied in other areas where the environments and ecologies are damaged by intensive animal farming. The principles are similar or can be slightly adjusted to be more suitable for the local context. The vegetation can be replaced by the local vegetation types based on the hydrology, geology, climate..... Consider improving animal farming through four different aspects: increasing ecological value, improving animal welfare, creating recreational animal farming landscapes, and creating climate-adaptive environments to address the environmental, social, and spatial issues of animal farming systematically.

Dilemmas

Because of the current Nitrogen excretion and deposition pressure of animal farming in the Netherlands, nationally, the government proposed to halve the country's livestock in an attempt to limit agricultural pollution in the Netherlands. This proposal has caused anger from farmers. For example, from 2019 till now, there are a series of protests from Dutch livestock farmers (Figure1) to resist the proposal mentioned above.



Figure1. Farmer protest in the Netherlands, 1 October 2019 (source: Vincent Jannink/ANP/AFP/Getty Images, 2019)

In the Den Bosch region, the local government also wants to shut down a lot of animal farmlands and factories, especially near natural areas, animal farming is forbidden and many animal factories have been removed. However, animal farming is a historical tradition and culture of Den Bosch and Noord Brabant. Farmers also rely the living on it. Rudely stopping animal farming directly will cause a lot of social issues for farmers and local history. Therefore, this project provides a suggestion that instead of shutting down animal farms directly or transforming the animal farms drastically, good proposals are figured out to improve the current animal farming step by step, make animal farming be more eco-friendly to nature gradually, and also help reduce the recreational pressure of some natural areas by creating recreational animal farming landscapes... What is more, if animal farming is directed and utilized in the right way such as working as natural mowers by grazing, improving water retention ability by rooting, reducing the use of artificial fertilizer through utilizing animal manures, etc. They can even bring many benefits to the environment.

Besides, although parts of the farmlands or food animals are taken out from farmers for nature purposes, farmers are still benefited a lot from it. Nature will increase the biodiversity which will attract more natural pollinators which can help increase the yields. Various supplementary income from tourism can be realized through planting some agroforestry and increasing the recreational value of the farmlands. The high-quality proteins from food animals can increase the selling price. Natural supplementary diets such as nuts and fruits from agroforestry can be provided for food animals. Bio-fertilizer which are made from animal manure and green wastes can replace artificial fertilizers. Therefore, the costs of buying artificial fodders and fertilizers can also be reduced. If farmers are supported or guided to start some actions such as adding some agroforestry to their animal farms, they will have some benefits, and gradually the transformation from current intensive animal farming to nature-inclusive and eco-friendly animal farming can be realized in the future.