

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Personal Information

Name: Daan van Dortmund
Student Number: 4841034

Studio

Name / Theme: Architectural Engineering
Main mentor: Mo Smits Architecture
Second mentor: Pierre Jennen Research
Third mentor: Paddy Tomesen Research

Argumentation of choice of the studio: Architectural engineering offers a wide range of topics with a focus on sustainable and innovative design. The studio allows you to discover more of your own fascinations. My interest to dive into the technical facets of the design to find innovative solutions on a detailed scale that can result in a more sustainable design on a bigger scale, meets with the focus of the studio.

Graduation Project

Title of graduation project: Revitalizing Rural Heritage

Location: Country Estate Nederrijk, Berg en Dal, Nijmegen, Netherlands.

Problem Statement: This project delves into the complex issues of rural depopulation in the Netherlands. While urban migration brought economic growth, it also led to the decline of rural areas. In response, recent efforts aim to revitalize rural landscapes, recognizing the negative consequences such as the loss of cultural heritage. A renewed interest in rural areas has evolved, creating opportunities for architects and engineers to innovate the interaction between construction, agriculture and nature.

Current construction and agricultural practices contribute significantly to greenhouse gas emissions, underscoring the urgent need for a sustainable transition in land use. The predominant industrial agriculture, a result of mechanization and industrialization, has led to large monocultures, resulting in biodiversity loss. The conventional construction sector's environmental impact contradicts climate agreements, leading to construction project halts.

This project seeks to explore innovative solutions for transforming rural areas, emphasizing the importance of nature-inclusive agriculture, and addressing sustainable construction practices in the Netherlands.

Overall design question: How can Dutch rural countryside areas be revitalised and transformed into multifunctional, ecological sustainable and community-oriented spaces, while preserving cultural heritage and addressing contemporary challenges?

Thematic research question: To what extent can the local and nature inclusive cultivation of crops and tree varieties be utilized as a sustainable and viable source of biobased building materials for the construction of an estate house at the country estate Nederrijk?

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Project

Design assignment:

The overall objective of the graduation project is to develop a methodology for the revitalisation of Dutch rural heritage by making a design for the redevelopment of country estate Nederrijk in Nijmegen through adaptive reuse of rural heritage and the use of innovative biobased material practices to accommodate a viable, self-sufficient, multifunctional, sustainable and community oriented project.

Process

Methods:

To address the overall design objective and the thematic research, a multifaceted approach using various research methods is proposed. Multiple literature studies will provide a theoretical foundation for a range of topics, including sustainable agriculture practises, background information on the design location, extensive soil and vegetation research and challenges concerning construction, agricultural and ecological practices.

To deepen the understanding beyond theoretical frameworks, qualitative case-study analyses and field trials will be essential to delve into undiscovered information that require a different approach. Interviews with local stakeholders, policy making architects, construction professionals and residents will further enrich the understanding of the involved actors of the design location.

Through the graduation project there is a constant dynamic interplay between theoretical research and a more anthropological approach, like research by design. By doing so, the research findings are closely linked to the design choices made for the graduation project.

Reflection

Relation graduation project, studio and master track:

The graduation project explores local resource management and building methods through innovative practices. It delves into the studio's outlined innovative design strategies, which are then elaborated into technical frameworks. The fascination for building technology coupled with adaptive reuse, set against the backdrop of the rural area of Nijmegen necessitates a multifaceted architectural approach. It requires transitioning through various scales, zooming from ecological tissues to precise construction details. This indicates the broad problem-solving approach characteristic of the Faculty of Architecture, Urbanism, and Building Sciences.

Relevance of the project:

This project holds significant relevance in the broader context. Socially, it addresses the critical issue of rural depopulation, contributing to efforts aimed at revitalizing communities and preserving cultural heritage. Professionally, it encourages architects and engineers to innovate by exploring the connection between construction, agriculture and nature through the farming and processing of locally sourced biobased building materials, setting a benchmark for sustainable rural development practices. Scientifically, the project uses an interdisciplinary approach, contributing to the understanding of complex issues that are present in contemporary Dutch society. Thereby emphasizing the necessity for sustainable land use to oppose climate change and biodiversity loss.

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Literature

Andreychouk, V. (2015). Cultural landscape functions. In Springer geography. https://doi.org/10.1007/978-3-319-13527-4_1

Bourke, P. M., Evers, J. B., Bijma, P., Van Apeldoorn, D., Smulders, M., Kuyper, T. W., Mommer, L., & Bonnema, G. (2021). Breeding beyond monoculture: putting the "Intercrop" into crops. *Frontiers in Plant Science*, 12. <https://doi.org/10.3389/fpls.2021.734167>

Bresser-Pereira, L. C. (2020). The Golden Age of Capitalism. *Rentiers Capitalism*.

Chiffolleau, Y., Gamboa, G., Maffezzoli, C., Di Masso, M., & Mingorria, S. (2015). Chains performances cross-countries comparison: France and Spain local and global tomato supply chains.

During, R., Bock, B., Frissel, J., Walther, C., & Wegman, R. (2023). Leefbaarheid op het platteland: uiteenlopen van idylles en werkelijkheden: Een literatuuronderzoek naar wat we denken te begrijpen van leefbaarheid op het platteland. (Rapport / Wageningen Environmental Research; No. 3231). Wageningen Environmental Research. <https://doi.org/10.18174/586532>

Ekamper, Peter. (2010). De verstedelijking van Nederland; groei en spreiding van de Nederlandse bevolking sinds 1900.. *Demos, Bulletin over Bevolking en Samenleving*. 26. 15-17.

Farbotko, C., & Kitara, T. (2021). Urban-rural re-relocation as a response to the COVID-19 pandemic: the case of Tuvalu. *Policy Brief*, 106(10).

Hans, L., Lamberink, J., Prins, L., Plegt, M., de Vries, P., van Buren, N., Dorenbos, R., Reus, N., Wassenberg, F. (2022). Van stad naar platteland: Wordt wonen op het platteland populairder voor kopers uit stedelijke gebieden? (2022). Platform31. <https://www.rijksoverheid.nl/documenten/rapporten/2022/03/31/van-stad-naar-platteland---wordt-wonen-op-het-platteland-populairder-voor-kopers-uit-stedelijke-gebieden>

Koolhaas, R., & Amo. (2020). *Countryside: A Report*.

Ministerie van Landbouw, Natuur en Voedselkwaliteit. (2023, 23 maart). Sterke duurzame landbouwsector 2040. Nieuwsbericht | Rijksoverheid.nl. <https://www.rijksoverheid.nl/actueel/nieuws/2022/11/25/sterke-duurzame-landbouwsector-2040>

Nieuwe Oogst. (2022, 1 april). Boer kan telen voor de bouw. Nieuwe Oogst. <https://www.nieuweoogst.nl/nieuws/2022/04/01/boer-kan-telen-voor-de-bouw#:~:text=%20Boeren%20die%20niet%20alleen%20gewassen,goed%20worden%20verwerkt%20in%20bouwmaterialen.&text=Dat%20brengt%20voordelen%20met%20zich%20mee%20voor%20boer%2C%20bouw%20en%20milieu.>

NOS. (2019, 4 april). "Na 2025 moet weer buiten de stad gebouwd worden". NOS. <https://nos.nl/nieuwsuur/artikel/2279009-na-2025-moet-weer-buiten-de-stad-gebouwd-worden>

R. Rutte, J.E. Abrahamse (2014) *Atlas van de verstedelijking in Nederland; 1000 jaar ruimtelijke ontwikkeling*.

Rijksdienst voor het Cultureel Erfgoed (2022). Ruilverkaveling. <https://kennis.cultureelerfgoed.nl/index.php/Ruilverkaveling>

Schmitt, E., Galli, F., Menozzi, D., Maye, D., Touzard, J. M., Marescotti, A., ... & Brunori, G. (2017). Comparing the sustainability of local and global food products in Europe. *Journal of Cleaner production*, 165, 346-359. <https://doi.org/10.1016/j.jclepro.2017.07.039>

Sinka, M., Korjakins, A., Bajare, D., Zimele, Z., & Sahmenko, G. (2018). Bio-based construction panels for low carbon development. *Energy Procedia*, 147, 220-226.

Traanman, T. (2021). *Rural Tourism during COVID-19: a sustainable alternative?-a case study at the Sallandse Heuvelrug National Park, the Netherlands (Doctoral dissertation)*