CITY TO FIELDS

Redefining the Peri-Urban Interface of the Dutch city Assen through Regenerative Self-build Architecture

---

Personal Information

Luka Brandsma

Studio

Name of studio:
Architectural Engineering
Design tutor:
Yannick Warmerdam
Research tutor:
Mo Smit

Content Research Plan

Choice of the studio

The natural system is treated as a vast resource mine, leading to shortages of materials and pollution. Architecture's role in material flows and waste underscores our need to rethink our relationship with nature. My passion for biology and natural processes drives me to explore how buildings can emulate mushrooms, seamlessly integrating with and returning to nature. This aligns with the Architectural Engineering Studio's themes, aiming to shift the narrative from exploiting nature to symbiotic coexistence. I aim to make this mindset not only simple and logical but also conventional, fitting within the studio's flexible, holistic approach.

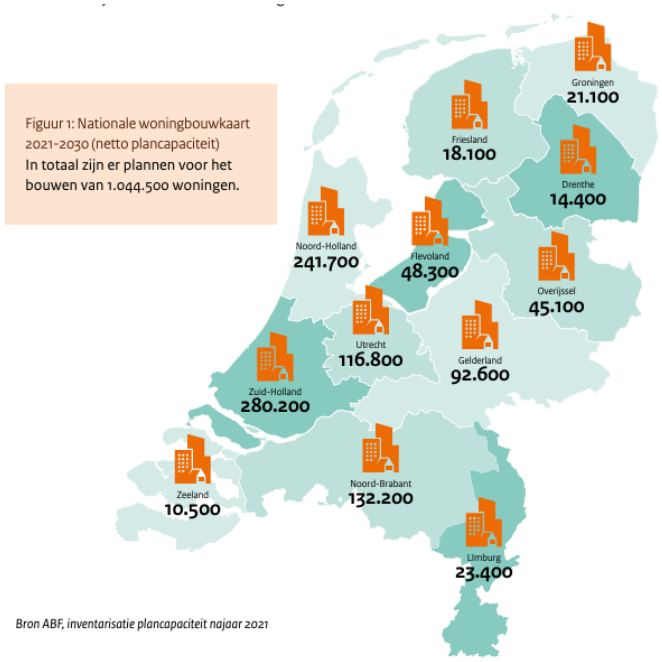
Keywords

Context:	Technology:	Use:
peri-urban interface, housing	regenerative architecture, vernacular, local building materials	Self-building, material farm

General Problem Statement

Context: Housing

The Netherlands faces a housing shortage of 900,000 new homes by 2040, initially necessitating 100,000 new constructions annually (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022a). Urban densification is the primary strategy, with 60% of housing addressed in seven regions, see figure 1a (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022b). However, city expansion or new settlements become inevitable due to eventual liveability concerns of densification (UN-HABITAT, 2017). That first option seems to be the preferred strategy, based on the 'straatje erbij' [an extra street] proposal by the ministry, who suggests 35 to 40 % of the housing plans will be built outside the existing built environment (De Jonge, 2022).



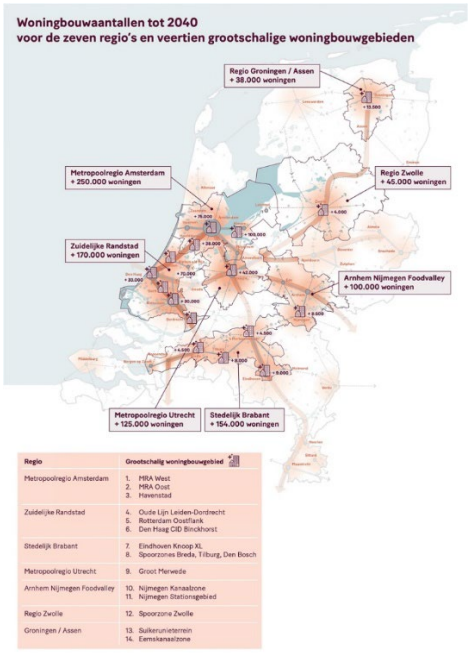


Figure 1a (left): Plan capacity housing before 2030. Adopted from (Inventarisatie plancapaciteit najaar 2021 Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022b, p. 9).

Figure 1b (right): Housing need for the seven most urbanised areas in the Netherlands. Adopted from (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2021, fig. Woningbouwaantallen tot 2040).

Context: Edge city

New constructions at the urban-rural interface (PUI) raise questions about architectural integration (Avermaete & Schoonderbeek, 2010; McGregor et al., 2012). Bouwyer-Bower (2012) defines the PUI as the conceptual understanding where rural and urban land uses co-exist. The 'witte schimmel' [white fungi] phenomenon of the 1990s, criticized for its contrast with rural identity, exemplifies this issue with the architectural border (Joustra, 1996; Swieringa, 2022). An issue that still exists years later (Hulsman, 2011). With a quarter of the densely planned land in the Netherlands being used for grazing livestock, an eventual city expansion into these area's is a plausible scenario (Raven-Ellison, 2019).

Figure 2: Voordorp, one of the neighbourhoods defined as 'witte schimmel' (Swieringa, 2022, fig. De smetteloos witte nieuwbouw in 1993).

Technology: Regenerative Approach

The linear construction and agriculture sectors contribute to global emissions and material depletion (*Sand Wars*, 2014). The building phase notably affects project sustainability (Kushnir, 2020). Land conversion for urbanisation and agriculture cause biodiversity loss (Rafferty, 2024). High levels of ammonia and nitrogen oxides from agriculture, industries, and transport threaten ecosystems and human health (Ministerie van Algemene Zaken, 2023).

To address these issues, a shift beyond short-term thinking is imperative. Academics advocate for a regenerative approach in the design industry (Armstrong, 2023; Du Plessis, 2012; Hes & Du Plessis, 2014; Konietzko et al., 2023; Koreman, 2024; Littman, 2009; Lyle, 1994; Mang & Reed, 2013). Sustainable models prioritize socio-technical systems and the triple bottom line, while circular models focus on economic and material productivity (Geissdoerfer et al., 2017). Following *The Limits to growth* in the 1970s, holistic views on land use and landscapes continued to inspire works of landscape architects such as *Design with nature* by Ian L. McHarg (1969), a book on ecological design, and Regenerative *Design for Sustainable Development* by John T Lyle (1994) on regenerative design. The regenerative approach aims to halt natural system degeneration and foster coevolution with human system (Mang & Reed, 2013). Eric T. Freyfogle's *The New Agrarianism* (2001) underscores this approach within the agricultural field. Recent studies emphasize the need to move beyond sustainability towards a regenerative paradigm (Konietzko et al., 2023). A shift from a mechanistic to an ecological worldview (Du Plessis, 2012; Mang & Reed, 2012).

Use: Self-builders

Besides the quantitative lack of housing Netherlands there is a shortage of qualitative diverse and adaptable homes (Delft University of Technology, 2024). A promising part of the solution could be self-building. A self-building revolution would lead to less inequality on the housing market, diverse and customisable housing and more participation and sense of belonging (Maarhuis, 2023). As a rule, the nature of this building method invites the development of collective living projects or at least an active and concerned attitude of users, which is another aim in the current housing crisis (Delft University of Technology, 2024). There is however a lack of knowledge and understanding of the role that users can play in the building phase of their home. Knowledge that, in the Netherlands too, was widespread and passed on through generations of builders before the industrialisation of the building industry took over this network. Costs, unclarity, lack of freedom of choice and not knowing the first steps of making homes more sustainable are additional barriers for the Dutch to live more sustainably (Koolen, 2022). These gaps call for updated knowledge on building processes for renewable local materials, knowledge of vernacular craftmanship and practices that has faded to the background in modern building industry.

Context: Drenthe

In Netherlands self-building is no innovative practice. For centuries Dutch families built their own farms from the materials found in the surrounding landscape. Especially in the Dutch provinces Groningen and Drenthe these farms, called 'hallenhuisboerderij' [Low German House], are still visible in one of the oldest cultural landscapes of Europe (Kleijn, 1984). Although the north of the Netherlands has a lower population density and the 38.000 homes that need to be built before 2040 are significantly lower compared to the provinces in the West (see figure 1b), the two province capitals Groningen (Groningen) and Assen (Drenthe) are fast growing. Primarily the focus for new construction lies on industrial terrains in Groningen, but since these cities have a partnership on living, working, mobility and greenery, over time this trend will likely extend to Assen (Regio Groningen-Assen et al., 2021). Currently building projects are already facing pushback from nature organisations (Benak, 2023). Furthermore laws on protected village views and a wish to conserve the agricultural landscape are hindering self-build initiatives, see figure 3 (Guit, 2024; RTV Drenthe, 2023).

The cultural and natural landscape seem to limit the construction assignment ahead in that sense, while the region claims to strive for a complementary relationship between rural and urban areas. Additionally the region report states the landscape and ecological quality need to grow with urban development (Regio Groningen-Assen et al., 2021).

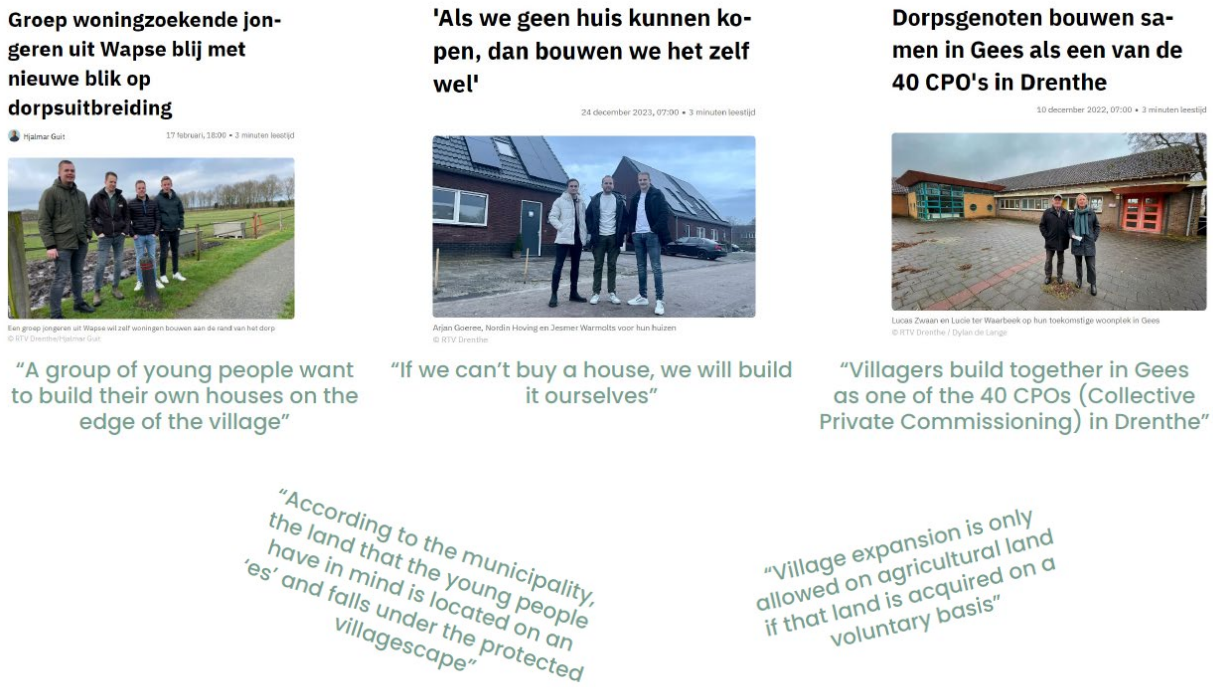


Figure 3: Collection of recent articles on self-build initiatives in Drenthe, adapted from (de Lange, 2022; Guit, 2024; RTV Drenthe, 2023).

The combination of recent issues concerning housing development versus a call for the conservation of diverse ecosystems, the discussion on the peri-urban and architectural edge conditions, a present incentive for self-building and a need for small households makes Drenthe an excellent case study for further exploration of themes discussed in the problem statement. Naturally, being the biggest city in Drenthe, Assen is chosen as a location for the research and preliminary design. I was born and raised in Annen myself, a village half an hour drive from Assen. This project seems to become a personal reflection on my own cultural heritage and has already started to shift my perspective on the value of my rural roots.

Figure 5 brings down the problem statement to six main issues within the overarching area of research of regenerative architecture. The knowledge then comes down to how self-build architecture can regenerate agricultural land in the PUI in the Netherlands.

Figure 4: The Es village Balloo with Assen in the background. Adopted from (Haartsen & Brand, 2009, p. 57).

Figure 5: Summary problem statement. Own work.

Overall Design Objective

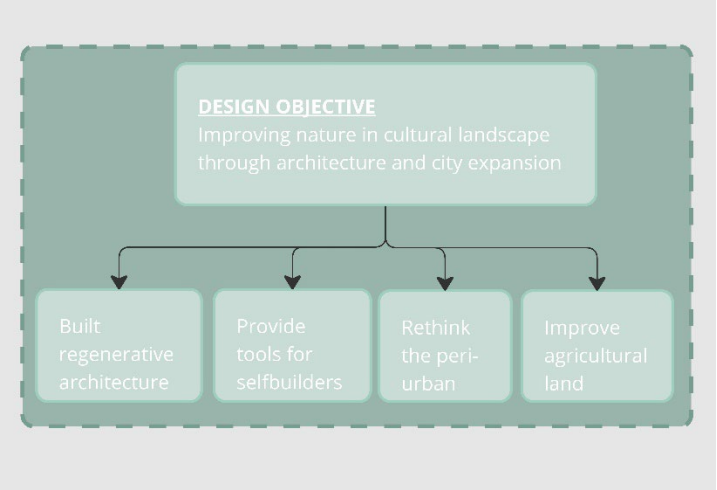


Figure 6: Overall Design Objective. Own work.

This graduation project showcases how applying regenerative principles can enhance the relationship between architecture and the ecosystem. It also rethinks peri-urban development. Additionally, the project provides self-builders with tangible knowledge and tools for regenerative construction. Finally, it explores regenerating agricultural land through holistic production, highlighting architecture's role in land regeneration. The design envisions a network of self-builders integrated in the urban plan, with a central hub facilitating the connection between parties and material flows (Figure 7 and 8).

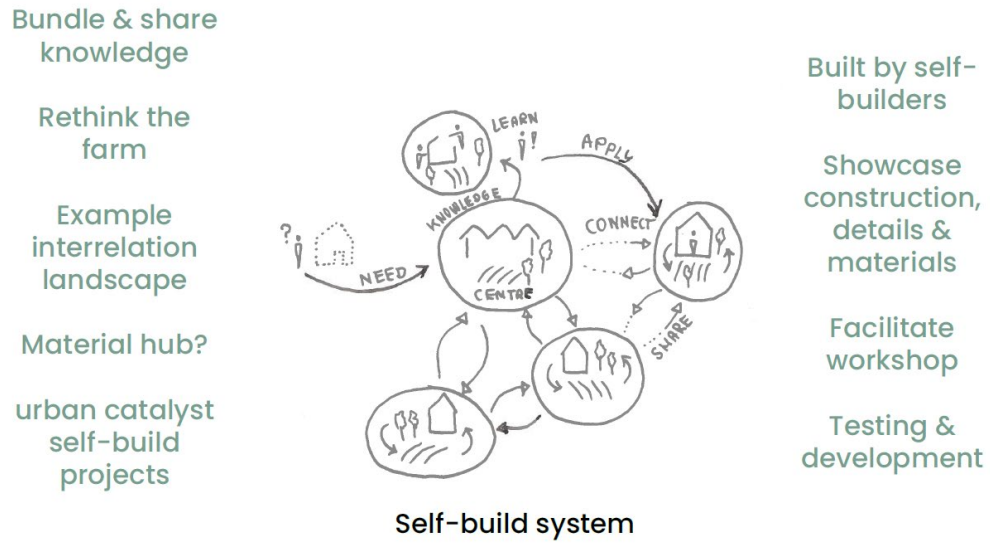


Figure 7: Self-build system design objectives. Own work.

Architect Walter Segal's work illustrates the potential of self-build systems, demonstrating that even inexperienced individuals can successfully construct ambitious projects (McKean & Segal, 1989). he came to realise that he was not inventing a system but rather his design was a design of assemblies (McKean & Segal, 1989).

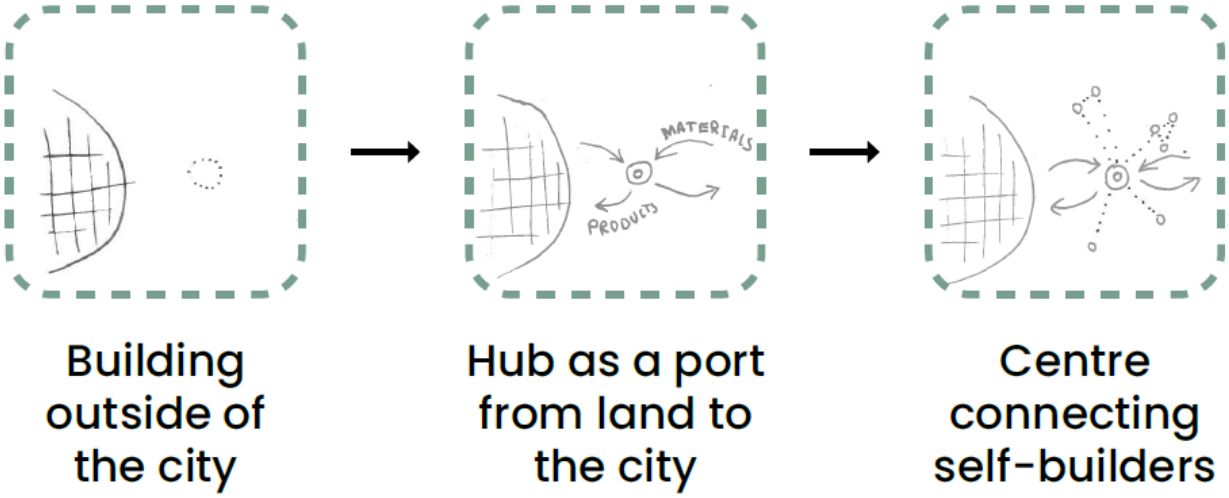
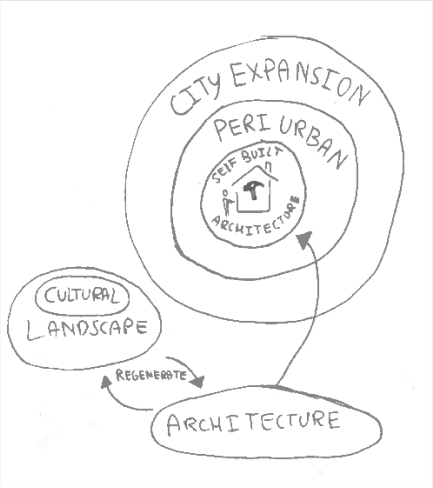


Figure 8: Centre as a catalyst for city expansion. Instead of extending from the city edge, extending a new hub, the connecting factor. Own work.

The proposed centre embodies the urban vision of regenerative city expansion and draws on the designer's experience with self-build projects, culminating in a design brief (appendix 2.) for the hub's interaction with the surrounding landscape. In short, the graduation project aims to emphasise the interrelatedness of ecosystems and the built environment and finally to make the approach of regenerative architecture tangible for self-builders.

Overall Design Question



How to design for **self-build architecture** in the **peri-urban border condition** of the Dutch City Assen, as part of an **alternative solution for city expansion**, by establishing a **regenerative relationship of the building and the landscape**?

Reflection on the Relevance of the Design

This project aims to inspire both individuals within and beyond the building industry to embrace regenerative principles. By demonstrating the societal benefits of reconnecting with nature, it encourages practical application. The project introduces self-builders to an alternative, potentially transformative choice for sustainable living amidst urban expansion and housing challenges. The urban execution of a regenerative approach to housing might not seem as tangible currently, but can have potential in the long run. While not yet mainstream, interest in regenerative approaches and sustainable community living is growing. Though rooted in the context of Drenthe and the Netherlands, the design's focus on self-builders using regenerative materials can spark broader industry reconsideration. This suggests a need for systemic evolution alongside architectural change, where this design can contribute to catalysing a truly sustainable future.

Thematic Research Objective

My technical interest lies with the possible appliances of renewable local materials. Especially how we can simplify local craftmanship and adapt vernacular building practices to the modern context. Also I'm interested in seeing how renewable building materials can integrate or even improve the regeneration of land. Therefore I want to understand the relationship of materials and the landscape of vernacular building practices in Drenthe and translate this to the modern context. Secondly, I want to learn from the material application of vernacular building practices in Drenthe and explore applicability to modern context of self-building. Finally, I aim to understand the scale and quantity of the production capacity of a local ecosystem.

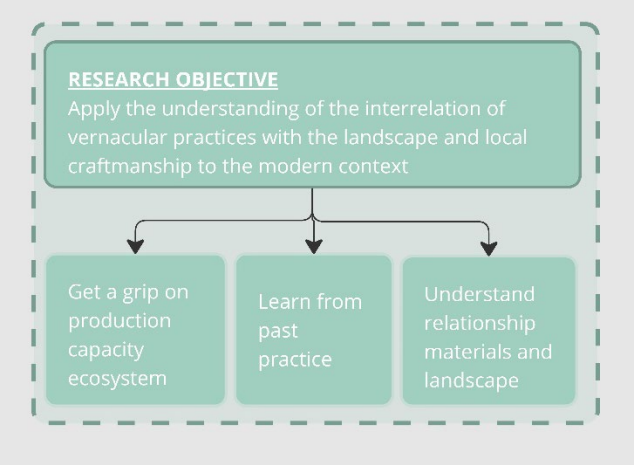
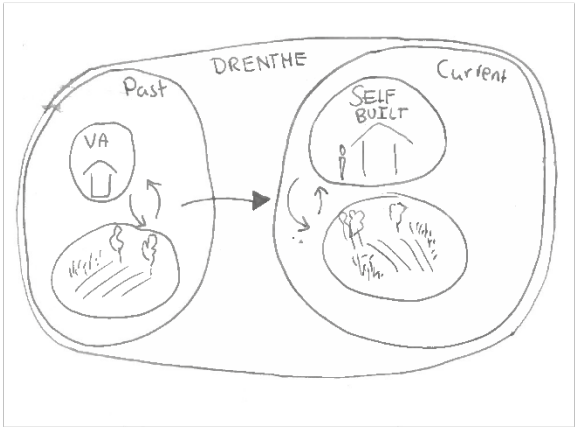


Figure 9: Research Objective (own work).

The research investigates regenerative architecture as an alternative approach for linear construction. It aims to partly solve future housing needs through self-building and establishing a more nurturing and participatory connection between user and its environment. The research will mainly give insight into how the regenerative approach in architecture and self-building practices can amplify each other throughout the scales of a project. The research also translates past practices to tangible knowledge concerning materials, connections and tools that set the technical framework for the design.

Thematic Research Question



How can we **translate** the **relationship** of **vernacular architecture in Drenthe** with its **landscape** to applicable knowledge for **regenerative self-building** in the modern context?

Thematic Research Sub Questions

1. *What role did vernacular farms play in the social-economical context of Drenthe?*
2. *What was the relationship of the tectonics of vernacular farms in Drenthe and their surrounding landscape?*
3. *What are the environmental implications of introducing production in the ecosystem to meet the demand for regenerative building materials?*
4. *How can a regenerative relationship between landscape and the production of building materials be quantified?*
5. *How can the opportunities and potential barriers of the vernacular architecture of farms in Drenthe inspire modern self-building techniques?*

Reflection on the Relevance of the Research

The research aspect of this graduation project is mainly an example on how to learn from past and apply this knowledge to propose modernised approach for a regenerative relationship of buildings and the landscape. The research is relevant to self-builders, architects interested in biobased and sustainable design, planning departments of municipalities and governments, farmers and any concerned citizen interested in learning about sustainable efforts in the building industry.

As the research is set in Drenthe this province will find this information the most relevant. However, other regions with similar soil types and ecosystems can still benefit from the information. Researchers looking at other biotopes can take a more general look and use the applied methodology of the research as an example for their own research. As soon as Dutch institutions are genuinely interested in adopting a similar approach to their city expansion this study can be seen as a starting point. With this research being solely a master thesis, a bigger scale research with more data collection is advised before implementation.

Thematic Research Methodology

This master thesis transitions from theoretical exploration of city expansion through self-building and human-nature relationships to practical architectural application. Starting with a reflection of a vernacular example and concluding with lessons for application (figure 11), a case study analyses the function and farmyard elements, tectonics and origin of building materials of the *hallenhuis* on Asserstraat 78 in Norg, a representative farm in Drenthe (figure 10). Additionally, the ecosystems related to the farm and life cycle duration of the building materials are mapped to understand the interrelation with the landscape. Secondly, the implementation of growing regenerative building materials in the modern context is evaluated according to regenerative principles. Both vernacular materials from the case study and other state of the art regenerative materials are assessed and their production capacity then quantified in a theoretical ecosystem through material flow analysis. The needed land use and grow time for standard building elements is then calculated. The research phase concludes with a SWOT analysis on the applicability of technical results from the case study to modern self-building practices.

In the design phase, the SWOT findings inform detail and connection prototyping for self-builders, while the self-build network design evolves and influences the urban and landscape design for the education centre. The lifecycle of the building is explored through conceptualising the ownership and stakeholder involvement and accompanied site analysis and field work.

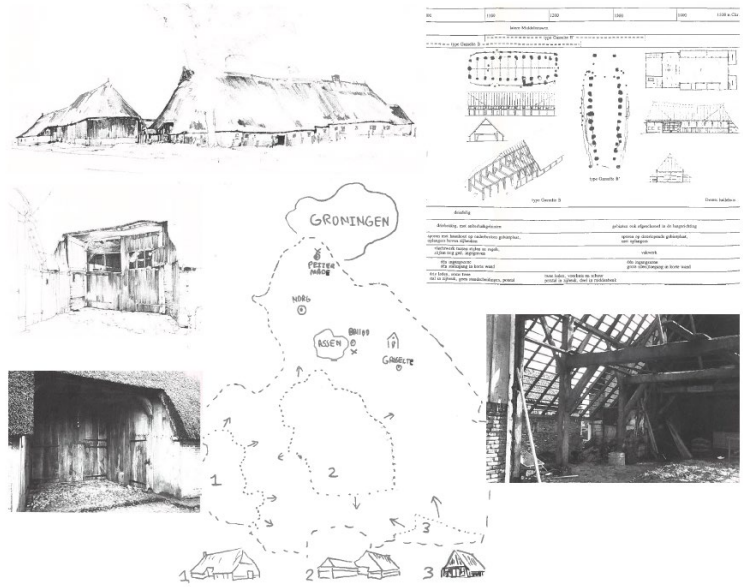


Figure 10: Collage of Asserstraat 78 (left), the distribution of the typologies (middle) and the archaeological origin (topright). Adopted from (Huijts, 1992; Jans et al., 1980; Kleijn, 1984).

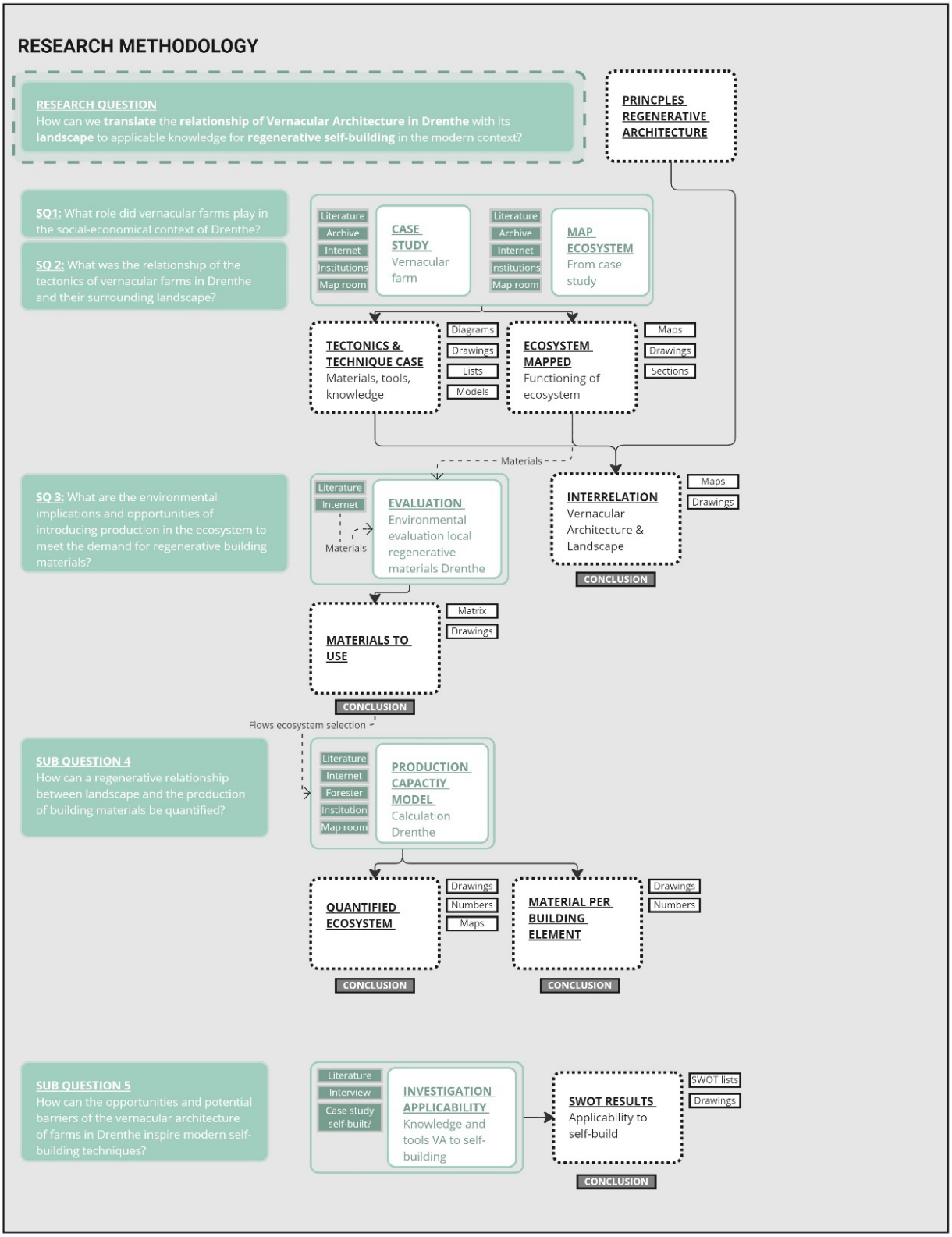


Figure 11: Research Methodology diagram including outcomes (own work).

Expected Results and Design Implementation

Outcomes and Deliverables

The outcomes from the research methodology, see figure 11, are finally bundled in a set of three deliverables: a research paper, a handbook and the design brief (figure 12). The paper functions as the academic backbone for the handbook. It introduces a literature review on regenerative architecture and briefly discusses the results from the different methods. The handbook is written as an example on how to translate the interaction of vernacular farms to regenerative self-build practices. For a more detailed description, see appendix 1. The design brief continuously develops as the program is dependent not only on the research results, but also on the self-build system design. The draft of the design brief will then take its final form right before the preliminary design when a concept of the system design has been made.

Knowledge & Insights Research to Overall Design Approach

The handbook is a bundle of all the conclusions from the thematic research. This product can then be taken as a guideline for the design process. Figure 12 shows some of the most important insights coming as arrows from the handbook into parts of the design phase. This is where the knowledge from the thematic research feeds the design. This information ranges from design principles to qualitative data in drawings, maps and diagrams to the quantitative data that resulted from the calculation model. The visual formats of research products, such as a section of the ecosystem, can be adopted into the design proposal as a template. In this way, the design proposal can not only be informed by, but also build on the narrative of the research phase.

Wordcount: 2681 (including titles and figure descriptions)

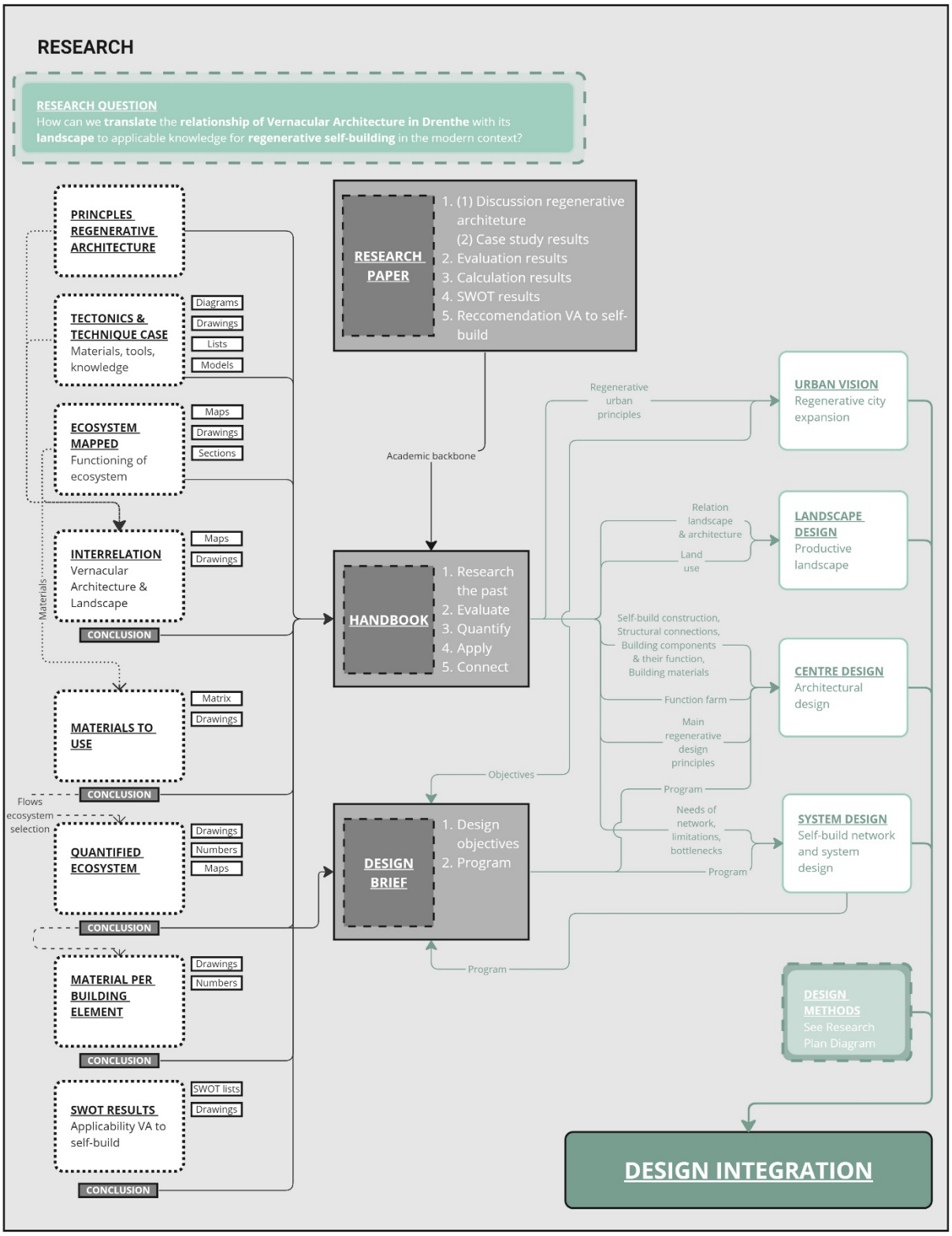


Figure 12: Research outcomes and deliverable. Own work.

Literature References

Included in this Document

Armstrong, R. (2023). Introducing Regenerative Architecture. *Journal of Chinese Architecture and Urbanism*, 1882. https://doi.org/10.36922/jcau.1882

Avermaete, T., & Schoonderbeek, M. (2010). *Border conditions* (P. Avidar, Ed.). Architectura & Natura Press ; TU Delft.

Benak, M. (2023, September 12). *Assen kiest vanwege natuur en stikstof voor duizend huizen bij Kloosterveen tot 2035*. https://www.rtvdrenthe.nl/nieuws/15874090/assen-kiest-vanwege-natuur-en-stikstof-voor-duizend-huizen-bij-kloosterveen-tot-2035

Bouwyer-Bower, T. A. S. (2012). The Inevitable Illusiveness of 'Sustainability' in the Peri-Urban Interface: The Case of Harare. In *The Peri-Urban Interface: Approaches to Sustainable Natural and Human Resource Use*. Routledge.

De Jonge, H. (2022, November 16). *Beantwoording kamervragen Peter de Groot straatje erbij in elk dorp*. https://open.overheid.nl/repository/ronl-914a984fb02556209b74a5a0789c7ccf01898390/1/pdf/antwoorden-op-kamervragen-over-straatje-erbij-in-elk-dorp.pdf

de Lange, D. (2022, December 10). *Dorpsgenoten bouwen samen in Gees als een van de 40 CPO's in Drenthe*. RTV Drenthe. https://www.rtvdrenthe.nl/nieuws/15171947/dorpsgenoten-bouwen-samen-in-gees-als-een-van-de-40-cpos-in-drenthe

Delft University of Technology. (2024). *A vision of the future of housing in the Netherlands*. TU Delft. https://www.tudelft.nl/en/2024/bk/a-vision-of-the-future-of-housing-in-the-netherlands

Du Plessis, C. (2012). Towards a regenerative paradigm for the built environment. *Building Research & Information*, *40*(1), 7–22. https://doi.org/10.1080/09613218.2012.628548

Freyfogle, E. T. (2001). *The new agrarianism: Land, culture, and the community of life*. Washington [D.C.] : Island Press/SHEARWATER BOOKS. http://archive.org/details/newagrarianismla0000unse

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, *143*, 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048

Guit, H. (2024, February 17). Groep woningzoekende jongeren uit Wapse blij met nieuwe blik op dorpsuitbreiding. *RTV Drenthe*. https://www.rtvdrenthe.nl/nieuws/16285998/groep-woningzoekende-jongeren-uit-wapse-blij-met-nieuwe-blik-op-dorpsuitbreiding

Haartsen, A., & Brand, N. (2009). *Ontgonnen verleden: Regiobeschrijvingen provincie Drenthe* (2009/dk116-C; p. 96). Directie Kennis, Ministerie van Landbouw, Natuur en Voedselkwaliteit. https://edepot.wur.nl/144246#:~:text=Ontgonnen%20Verleden%20beantwoordt%20uw%20vragen,hoe%20zij%20hun%20omgeving%20vormgaven.

Hes, D., & Du Plessis, C. (2014). *Designing for hope: Pathways to regenerative sustainability*. Routledge.

Huijts, C. S. (1992). *De voor-historische boerderijbouw in Drenthe: Reconstructiemodellen van 1300 vóór tot 1300 na Chr.* Stichting Historisch Boerderij-onderzoek.

Hulsman, B. (2011, April 7). De witte schimmel wijkt voor de zwarte zwam. *NRC*. https://www.nrc.nl/nieuws/2011/04/07/de-witte-schimmel-wijkt-voor-de-zwarte-zwam-12009507-a803036

Jans, J., Jans, E., & Jong, L. de. (1980). *Langs oude Drentse boerderijen*. Van Gorcum.

Joustra, W. (1996, May 29). De witte schimmel verziekt het platteland. *de Volkskrant*. https://www.volkskrant.nl/home/de-witte-schimmel-verziekt-het-platteland~bf3c4995/

Kleijn, A. (1984). *Dorpen in Drenthe*. Terra.

Konietzko, J., Das, A., & Bocken, N. (2023). Towards regenerative business models: A necessary shift? *Sustainable Production and Consumption*, *38*, 372–388. https://doi.org/10.1016/j.spc.2023.04.014

Koolen, R. (2022, December 21). Barrières om je huis te verduurzamen | OSJ [Blog]. *Our Sustainable Journey*. https://www.oursustainablejourney.nl/blog/barrieres-om-je-huis-te-verduurzamen/

Koreman, M. C. J. (2024). *Rural futures for young adults: Rural development and regeneration in the Netherlands* [Dissertation (TU Delft), A+BE | Architecture and the Built Environment]. https://doi.org/10.7480/abe.2024.07

Kushnir, D. (2020, September 2). *Sustainability: From physical foundations to socio-technical challenges* [Live lecture]. https://chalmers.instructure.com

Littman, J. (2009). Regenerative Architecture: A Pathway Beyond Sustainability. *Masters Theses 1911 - February 2014*. https://doi.org/10.7275/856703

Lyle, J. T. (1994). *Regenerative design for sustainable development*. John Wiley.

Mang, P., & Reed, B. (2012). Designing from place: A regenerative framework and methodology. *Building Research & Information*, *40*, 23–38. https://doi.org/10.1080/09613218.2012.621341

Mang, P., & Reed, B. (2013). Regenerative Development and Design. In V. Loftness & D. Haase (Eds.), *Sustainable Built Environments* (pp. 478–501). Springer. https://doi.org/10.1007/978-1-4614-5828-9_303

McGregor, D., Simon, D., & Thompson, D. (2012). *The Peri-Urban Interface: Approaches to Sustainable Natural and Human Resource Use*. Routledge.

McHarg, I. L. (1969). *Design with nature* (Scan paperback 1971). John Wiley & Sons, Inc. https://archive.org/details/designwithnature00mcha/page/14/mode/2up

McKean, J., & Segal, W. (1989). *Learning from Segal: Walter Segal's life, work and influence: Walter Segals Leben, Werk u. Wirkung = Von Segal lernen*. Birkhäuser.

Ministerie van Algemene Zaken. (2023, January 5). *The nitrogen strategy and the transformation of the rural areas—Nature and biodiversity—Government.nl* [Onderwerp]. Government of the Netherlands; Ministerie van Algemene Zaken. https://www.government.nl/topics/nature-and-biodiversity/the-nitrogen-strategy-and-the-transformation-of-the-rural-areas

Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2021, July 2). *Verstedelijkingsstrategieen*. De Nationale Omgevingsvisie. https://www.denationaleomgevingsvisie.nl/oud/verstedelijkingsstrategieen/default.aspx

Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2022a). *Nationale Woon- en Bouwagenda* (p. 58) [Publicatie]. Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. https://www.volkshuisvestingnederland.nl/documenten/publicaties/2022/03/11/nationale-woon--en-bouwagenda

Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2022b). *Programma Woningbouw—Publicatie—Rijksoverheid.nl* [Publicatie]. Ministerie van Algemene Zaken. https://www.rijksoverheid.nl/documenten/publicaties/2022/03/11/programma-woningbouw

Rafferty, J. P. (2024, February 21). *Biodiversity loss | Causes, Effects, & Facts | Britannica*. Britannica. https://www.britannica.com/science/biodiversity-loss

Raven-Ellison, D. (Director). (2019, October 23). *The Netherlands in 100 Seconds* [Online]. 100 seconds films. https://www.youtube.com/watch?v=v0AP18DjLA0

Regio Groningen-Assen, Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, & Ministerie van Infrastructuur en Waterstaat. (2021). *Verstedelijkingsstrategie Regio Groningen-Assen*. https://www.denationaleomgevingsvisie.nl/PageByID.aspx?sectionID=191954&contentPageID=2103881

RTV Drenthe. (2023, December 24). *'Als we geen huis kunnen kopen, dan bouwen we het zelf wel'*. RTV Drenthe. https://www.rtvdrenthe.nl/nieuws/16142194/als-we-geen-huis-kunnen-kopen-dan-bouwen-we-het-zelf-wel

Sand wars. (2014). [Documentary films]. PBS Distribution. https://search.worldcat.org/nl/title/sand-wars/oclc/893687409?page=citation

Swieringa, P. (2022, June 8). Wijken als Voordorp schoten als witte schimmel uit de grond (maar nu staan er gelukkig bomen). *AD.nl*. https://www.ad.nl/utrecht/wijken-als-voordorp-schoten-als-witte-schimmel-uit-de-grond-maar-nu-staan-er-gelukkig-bomen~a510615a/

UN-HABITAT. (2017). *Planning Compact Cities: Exploring the possibilities and limits of densification | UN-Habitat* (p. 68). https://unhabitat.org/planning-compact-cities-exploring-the-possibilities-and-limits-of-densification

Other References

Armstrong, R. (2023). Introducing Regenerative Architecture. *Journal of Chinese Architecture and Urbanism*, 1882. https://doi.org/10.36922/jcau.1882

Avermaete, T., & Schoonderbeek, M. (2010). *Border conditions* (P. Avidar, Ed.). Architectura & Natura Press ; TU Delft.

Benak, M. (2023, September 12). *Assen kiest vanwege natuur en stikstof voor duizend huizen bij Kloosterveen tot 2035*. https://www.rtvdrenthe.nl/nieuws/15874090/assen-kiest-vanwege-natuur-en-stikstof-voor-duizend-huizen-bij-kloosterveen-tot-2035

Bergmann, L., Chaves, L. F., Betz, C. R., Stein, S., Wiedenfeld, B., Wolf, A., & Wallace, R. G. (2022). Mapping Agricultural Lands: From Conventional to Regenerative. *Land*, *11*(3), Article 3. https://doi.org/10.3390/land11030437

Brock, A. (2017). *Change here now: Permaculture solutions for personal and community transformation*. North Atlantic Books.

De Jonge, H. (2022, November 16). *Beantwoording kamervragen Peter de Groot straatje erbij in elk dorp*. https://open.overheid.nl/repository/ronl-914a984fb02556209b74a5a0789c7ccf01898390/1/pdf/antwoorden-op-kamervragen-over-straatje-erbij-in-elk-dorp.pdf

de Lange, D. (2022, December 10). *Dorpsgenoten bouwen samen in Gees als een van de 40 CPO's in Drenthe*. RTV Drenthe. https://www.rtvdrenthe.nl/nieuws/15171947/dorpsgenoten-bouwen-samen-in-gees-als-een-van-de-40-cpos-in-drenthe

Du Plessis, C. (2012). Towards a regenerative paradigm for the built environment. *Building Research & Information*, *40*(1), 7–22. https://doi.org/10.1080/09613218.2012.628548

Dubbeling, M. (2006, October 6). Proeftuin Drenthe. *Connecting Cities NL*. https://www.connectingcities.eu/nl/proeftuin-drenthe/

Ebbers, R. (2018, May 4). *Floris Alkemade: 'Het platteland is een broeinest van innovatie'*. VNO-NCW. https://www.vno-ncw.nl/forum/floris-alkemade-het-platteland-een-broeinest-van-innovatie

Farmin for a Better Climate. (n.d.). *Regenerative Agriculture: Maximising crop diversity - Farming For a Better Climate*. Farmin for a Better Climate. Retrieved 1 March 2024, from https://www.farmingforabetterclimate.org/resource/maximising-crop-diversity/

Fleming, R., & Roberts, S. (2019). *Sustainable design for the built environment*. Routledge, Taylor & Francis Group.

Freyfogle, E. T. (2001). *The new agrarianism: Land, culture, and the community of life*. Washington [D.C.] : Island Press/SHEARWATER BOOKS. http://archive.org/details/newagrarianismla0000unse

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? *Journal of Cleaner Production*, *143*, 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048

Goodman, A., & Byun, S. A. (2017). Review: Landscape Urbanism and Its Discontents: Dissimulating the Sustainable City Edited by Andrés Duany and Emily Talen. *Journal of Planning Education and Research*, *37*(4), 506–508. https://doi.org/10.1177/0739456X16674782

Gordon, E., Davila, F., & Riedy, C. (2022). Transforming landscapes and mindscapes through regenerative agriculture. *Agriculture and Human Values*, *39*(2), 809–826. https://doi.org/10.1007/s10460-021-10276-0

Gosselink, R. J. A. (2023, July 18). *The latest building materials come from the farm*. WUR. https://www.wur.nl/en/show-longread/the-latest-building-materials-come-from-the-farm.htm

Grahame, A., Wilkhu, T., & Segal, W. (Eds.). (2017). *Walters Way & Segal Close: The architect Walter Segal and London's self-build communities: a look at two of London's most unusual streets*. Park Books.

Grievink, J. (2024, December 14). *Bruntingerhof in Orvelte: De oudste boerderij van Drenthe*. Naober Magazine. https://www.naober.nl/platteland/vroeger/bruntingerhof-in-orvelte-de-oudste-boerderij-van-drenthe/

Guit, H. (2024, February 17). Groep woningzoekende jongeren uit Wapse blij met nieuwe blik op dorpsuitbreiding. *RTV Drenthe*. https://www.rtvdrenthe.nl/nieuws/16285998/groep-woningzoekende-jongeren-uit-wapse-blij-met-nieuwe-blik-op-dorpsuitbreiding

Haartsen, A., & Brand, N. (2009). *Ontgonnen verleden: Regiobeschrijvingen provincie Drenthe* (2009/dk116-C; p. 96). Directie Kennis, Ministerie van Landbouw, Natuur en Voedselkwaliteit. https://edepot.wur.nl/144246#:~:text=Ontgonnen%20Verleden%20beantwoordt%20uw%20vragen,hoe%20zij%20hun%20omgeving%20vormgaven.

Hes, D., & Du Plessis, C. (2014). *Designing for hope: Pathways to regenerative sustainability*. Routledge.
Huijts, C. S. (1992). *De voor-historische boerderijbouw in Drenthe: Reconstructiemodellen van 1300 vóór tot 1300 na Chr.* Stichting Historisch Boerderij-onderzoek.
Janine M. Benyus. (2009). *Biomimicry: Innovation Inspired by Nature*. Mariner Books.
Jans, J., Jans, E., & Jong, L. de. (1980). *Langs oude Drentse boerderijen*. Van Gorcum.
KAW architects. (2020, June). Onderzoek Ruimte Zat | Bezit van corporatievastgoed. *KAW*. https://www.kaw.nl/projecten/onderzoek-ruimte-zat-corporatievastgoed/
Kleijn, A. (1984). *Dorpen in Drenthe*. Terra.
Konietzko, J., Das, A., & Bocken, N. (2023a). Towards regenerative business models: A necessary shift? *Sustainable Production and Consumption*, *38*, 372–388. https://doi.org/10.1016/j.spc.2023.04.014
Konietzko, J., Das, A., & Bocken, N. (2023b). Towards regenerative business models: A necessary shift? *Sustainable Production and Consumption*, *38*, 372–388. https://doi.org/10.1016/j.spc.2023.04.014
Liao, Y. (2022, November 7). *Regenerating the ground:Using regenerative agricultural practices to increase urban food production by Yuxiao Liao—Issuu*. ISUU. https://issuu.com/yliao-risd/docs/thesis_book_final
Littman, J. (2009). Regenerative Architecture: A Pathway Beyond Sustainability. *Masters Theses 1911 - February 2014*. https://doi.org/10.7275/856703
Lyle, J. T. (1994). *Regenerative design for sustainable development*. John Wiley.
McCurry, C. (2020, February 18). *Considering the Principles of Regenerative Design for Your Project*. Bark House®. https://barkhouse.com/2020/02/18/considering-the-principles-of-regenerative-design-for-your-project/
McDonough, W., & Braungart, M. (2009). *Cradle to cradle: Remaking the way we make things*. Vintage.
McGregor, D., Simon, D., & Thompson, D. (2012). *The Peri-Urban Interface: Approaches to Sustainable Natural and Human Resource Use*. Routledge.
McHarg, I. L. (1969). *Design with nature* (Scan paperback 1971). John Wiley & Sons, Inc. https://archive.org/details/designwithnature00mcha/page/14/mode/2up
McKean, J., & Segal, W. (1989). *Learning from Segal: Walter Segal's life, work and influence: Walter Segals Leben, Werk u. Wirkung = Von Segal lernen*. Birkhäuser.
Ministerie van Algemene Zaken. (2023, January 5). *The nitrogen strategy and the transformation of the rural areas—Nature and biodiversity—Government.nl* [Onderwerp]. Government of the Netherlands; Ministerie van Algemene Zaken. https://www.government.nl/topics/nature-and-biodiversity/the-nitrogen-strategy-and-the-transformation-of-the-rural-areas
Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2022). *Programma Woningbouw—Publicatie—Rijksoverheid.nl* [Publicatie]. Ministerie van Algemene Zaken. https://www.rijksoverheid.nl/documenten/publicaties/2022/03/11/programma-woningbouw
Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2023, February 21). *Volkshuisvesting Nederland*. Volkshuisvesting Nederland. https://www.volkshuisvestingnederland.nl/
Ministerie van Volksgezondheid, W. en S. (2019, June 26). *Denkend aan Nederland—Monitor—Sociaal en Cultureel Planbureau* [Publicatie]. Ministerie van Volksgezondheid, Welzijn en Sport. https://www.scp.nl/publicaties/monitors/2019/06/26/denkend-aan-nederland
Muir, C. (n.d.). *Re-designing farming*. Naomi Milgrom Foundation. Retrieved 4 March 2024, from https://www.naomimilgromfoundation.org/stories/redesigningfarming
Pedersen Zari, M. (2023). Understanding and designing nature experiences in cities: A framework for biophilic urbanism. *Cities & Health*, *7*(2), 201–212. https://doi.org/10.1080/23748834.2019.1695511
Pedersen Zari, M., & Hecht, K. (2020). Biomimicry for Regenerative Built Environments: Mapping Design Strategies for Producing Ecosystem Services. *Biomimetics*, *5*(2), Article 2. https://doi.org/10.3390/biomimetics5020018
Redwood, M. (2012). *Agriculture in Urban Planning: Generating Livelihoods and Food Security*. Routledge.
Regio Groningen-Assen, Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, & Ministerie van Infrastructuur en Waterstaat. (2021). *Verstedelijkingsstrategie Regio Groningen-Assen*. https://www.denationaleomgevingsvisie.nl/PageByID.aspx?sectionID=191954&contentPageID=2103881
RTV Drenthe. (2023, December 24). *'Als we geen huis kunnen kopen, dan bouwen we het zelf wel'*. RTV Drenthe. https://www.rtvdrenthe.nl/nieuws/16142194/als-we-geen-huis-kunnen-kopen-dan-bouwen-we-het-zelf-wel
Shekar, K., Nguyen, N., van der Steen, R., Saridou, S., & Hoogland, W. (2023). *Back to the Commons: Introducing Regenerative Agricultural Networks in Northwestern Europe*. https://repository.tudelft.nl/islandora/object/uuid%3Ae1cc7094-9d4f-41b1-8a3d-bb68cf7a6fae

TU Delft. (2024, March). *'The future dreams of young people from the countryside deserve a higher priority'*. TU Delft. https://www.tudelft.nl/en/architecture-and-the-built-environment/research/research-stories/the-future-dreams-of-young-people-from-the-countryside-deserve-a-higher-priority

Ungard-Benne, B., & Mang, P. (2015). Working Regeneratively Across Scales—Insights From Nature Applied to the Built Environment. *Journal of Cleaner Production*, *109*. https://doi.org/10.1016/j.jclepro.2015.02.037

van Bommel, M. (2011, June 6). *1.0 Gebinten—Agriwiki*. 1.0 Gebinten. https://www.agriwiki.nl/wiki/1.0_Gebinten

Van der Ryn, S., & Cowan, S. (2007). *Ecological Design, Tenth Anniversary Edition*. Island Press. http://ebookcentral.proquest.com/lib/delft/detail.action?docID=3317637

Vinkenvleugel, S. (2024, February 13). *'Provincie moet uitbreiding dorpen toestaan voor leefbaarheid en jongeren'*. https://www.rtvdrenthe.nl/nieuws/16275864/provincie-moet-uitbreiding-dorpen-toestaan-voor-leefbaarheid-en-jongeren

Vision Team Wonen. (2024). *Rapport Ruimte voor wonen: Naar een integrale aanpak van de Nederlandse woonopgave* (p. 68). https://www.tudelft.nl/en/about-tu-delft/strategy/vision-teams/wonen

Watson, J., & Davis, W. (2020). *Lo-TEK: Design by radical indigenism*. Taschen.

Watson, J., Linaraki, D., & Robertson, A. (2021). Lo-TEK: Underwater and Intertidal Nature-Based Technologies. In J. Baumeister, E. Bertone, & P. Burton (Eds.), *SeaCities: Urban Tactics for Sea-Level Rise* (pp. 59–105). Springer. https://doi.org/10.1007/978-981-15-8748-1_4

Yang, F. (2023). Symbiotic Peri-Urban Agricultural Interfaces: Applying Biophilic Design Principles to Facilitate Peri-Urban Agricultural Areas into Ecology, Foodscape, and Metropolitan Transition. In A. Timmeren & N. Tillie (Eds.), *The Coming of Age of Urban Agriculture* (pp. 93–136). https://doi.org/10.1007/978-3-031-37861-4_6

Relevant Master Theses

Kasperski, M. (2022). *Reviving the Rural: Exploring the new models of regenerative communal living and the potential of regional forestry paired with advancements in timber construction for economic and social revival of the European countryside*. https://repository.tudelft.nl/islandora/object/uuid%3A205f0bcc-c381-4b8c-8696-37b6031c6a4c

Köbben, R. (2021). *Farm of the Future: A possible solution to the contemporary urgent issues in het Groene Hart, The Netherlands*. https://repository.tudelft.nl/islandora/object/uuid%3A20f019f6-0a50-4d44-8dc1-3c83b8743fad

Plink, F. (2017). *Timber Housing in Indonesia: A combination of traditional and new techniques*. https://repository.tudelft.nl/islandora/object/uuid%3A94ca130d-e95c-48fb-9a07-e32929a33b8b

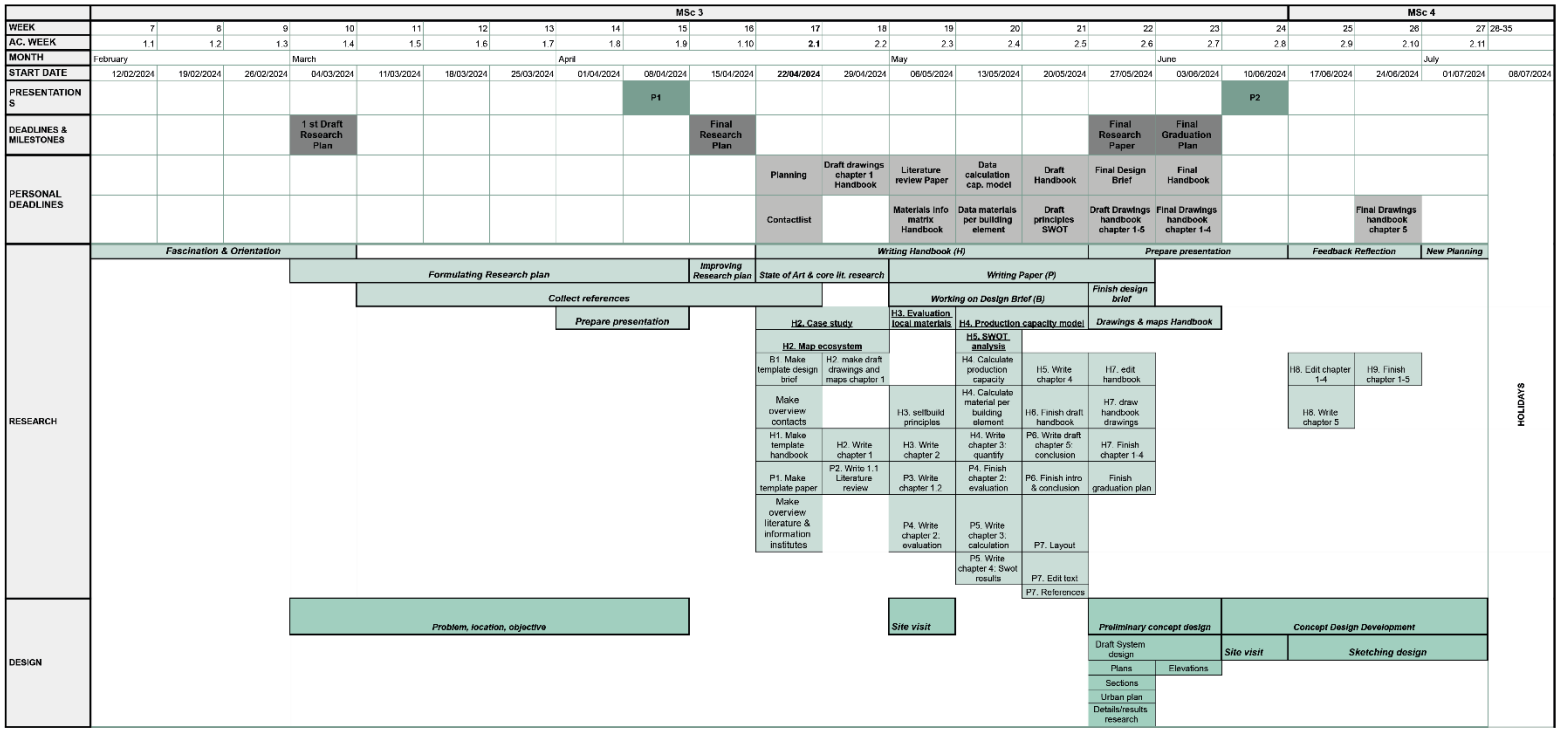
Ravensbergen, J. (2023). *Bloemkoolwijken—The new vernacular?: Exploring the potentials of regional bio-based materials for the facade renovation of Bloemkoolwijken in the Netherlands*. https://repository.tudelft.nl/islandora/object/uuid%3A066bff9c-4f70-434b-8989-1be89b3d3fae

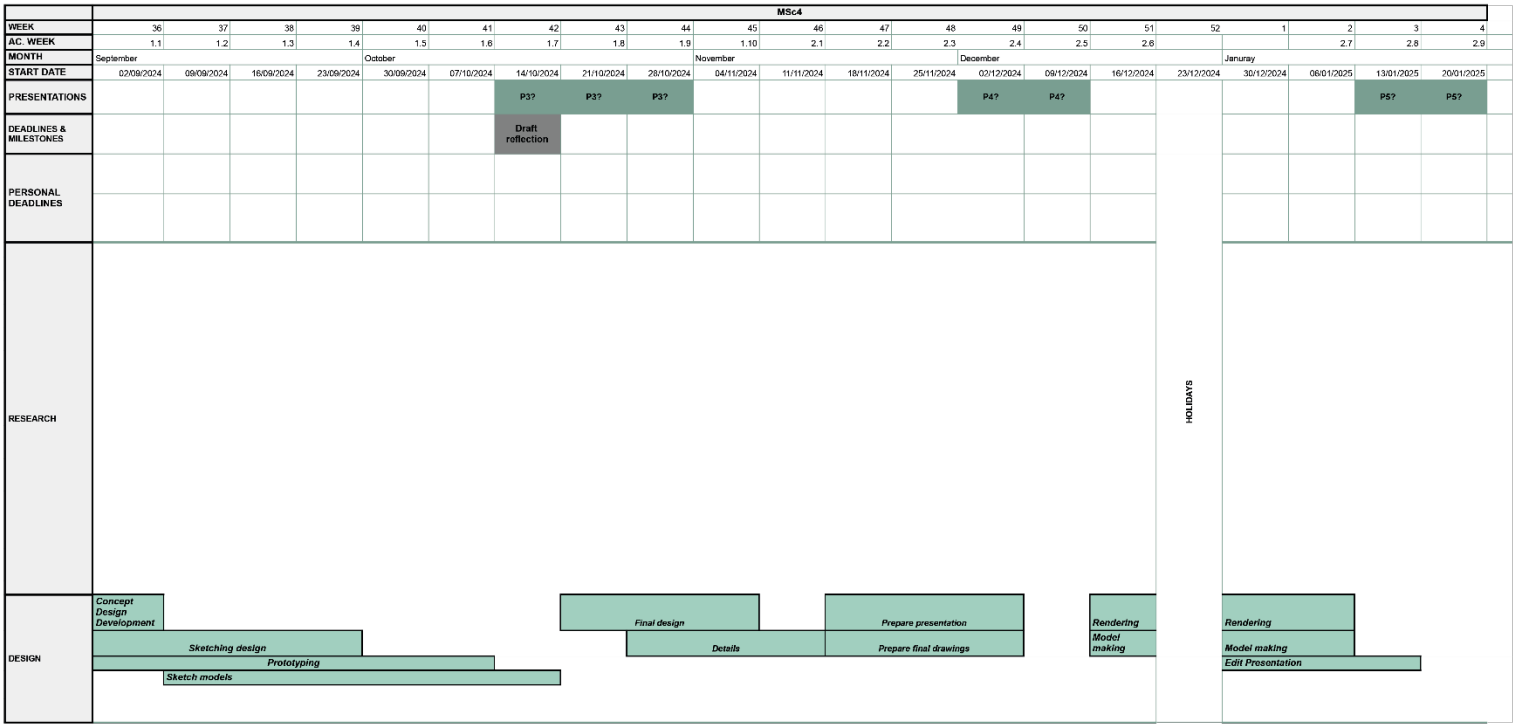
Shekar, K., Nguyen, N., van der Steen, R., Saridou, S., & Hoogland, W. (2023). *Back to the Commons: Introducing Regenerative Agricultural Networks in Northwestern Europe*. https://repository.tudelft.nl/islandora/object/uuid%3Ae1cc7094-9d4f-41b1-8a3d-bb68cf7a6fae

Yang, F. (2022). *Redesigning a Dutch polder: A Biophilic Foodscape that Facilitates the Symbiotic Development of Metropolis and Nature in Almere Oosterwold Area*. https://repository.tudelft.nl/islandora/object/uuid%3Aa1371ef6-7862-4d7f-9402-352c13c97ed2

Planning

(next page)


MSc 3
MSc 4
WEEK
AC. WEEK
MONTH
START DATE
PRESENTATIONS
DEADLINES & MILESTONES
PERSONAL DEADLINES
RESEARCH
DESIGN
February
March
April
May
June
July
P1
P2
1 st Draft Research Plan
Final Research Plan
Final Research Paper
Final Graduation Plan
Planning
Draft drawings chapter 1 Handbook
Literature review Paper
Data calculation cap. model
Draft Handbook
Final Design Brief
Final Handbook
Contactlist
Materials info matrix Handbook
Data materials per building element
Draft principles SWOT
Draft Drawings handbook chapter 1-5
Final Drawings handbook chapter 1-4
Final Drawings handbook chapter 5
Fascination & Orientation
Writing Handbook (H)
Prepare presentation
Feedback Reflection
New Planning
Formulating Research plan
Improving Research plan
State of Art & core lit. research
Writing Paper (P)
Collect references
Working on Design Brief (B)
Finish design brief
Prepare presentation
H2. Case study
H3. Evaluation local materials
H4. Production capacity model
Drawings & maps Handbook
H2. Map ecosystem
H5. SWOT analysis
B1. Make template design brief
H2. make draft drawings and maps chapter 1
H4. Calculate production capacity
H5. Write chapter 4
H7. edit handbook
H8. Edit chapter 1-4
H9. Finish chapter 1-5
Make overview contacts
H3. sellbuild principles
H4. Calculate material per building element
H6. Finish draft handbook
H7. draw handbook drawings
H8. Write chapter 5
H1. Make template handbook
H2. Write chapter 1
H3. Write chapter 2
H4. Write chapter 3: quantify
P6. Write draft chapter 5: conclusion
H7. Finish chapter 1-4
P1. Make template paper
P2. Write 1.1 Literature review
P3. Write chapter 1.2
P4. Finish chapter 2: evaluation
P6. Finish intro & conclusion
Finish graduation plan
Make overview literature & information institutes
P4. Write chapter 2. evaluation
P5. Write chapter 3. calculation
P7. Layout
P5. Write chapter 4: Swot results
P7. Edit text
P7. References
HOLIDAYS
Problem, location, objective
Site visit
Preliminary concept design
Concept Design Development
Draft System design
Site visit
Sketching design
Plans
Elevations
Sections
Urban plan
Details/results research


MSc4
WEEK
AC. WEEK
MONTH
START DATE
PRESENTATIONS
DEADLINES & MILESTONES
PERSONAL DEADLINES
RESEARCH
DESIGN
September
October
November
December
Januray
P3?
P3?
P3?
P4?
P4?
P5?
P5?
Draft reflection
HOLIDAYS
Concept Design Development
Sketching design
Prototyping
Sketch models
Final design
Details
Prepare presentation
Prepare final drawings
Rendering
Model making
Rendering
Model making
Edit Presentation

Appendices

Appendix 1: Deliverables detailed description

Title: Handbook for Regenerative Self-building: from vernacular farm to modern self-building
Descriptive title: An example on ….

Literature review: Regenerative architecture

- *Summary of literature review on regenerative architecture, urbanism and landscape design*

1) Research the past: local conditions and relationship of buildings with the landscape

- *Collection of analytic drawings of the tectonics and building techniques of the case study analysis*
- *Maps and section drawing(s) of the vernacular farm's biotope analysis in Drenthe*
- *Combined map or drawing as an overview of the interrelation between the vernacular farm and the landscape*

2) Evaluate: what is feasible in the present and future?

- *Implications and limits to the use of regenerative materials for self-building in Drenthe*
- *Vision biotope selection and description in text and maps (lifecycle duration)*

3) Quantify: regenerative production capacity

- *Maps and sections of vision biotope (material flows)*
- *Example calculation based on production capacity chosen biotope Drenthe*
- *Matrix of amount of materials per architectural element*
- *Map needed land use and time for growing housing and centre in maps and drawings*

4) Apply: knowledge of vernacular practice to modern context

- *Description Dutch context self-building*
- *Comparison matrix of selected tectonics and building techniques of the case study to self-building techniques in sketches*
- *Recommendations on translation vernacular practice to modern self-building in text and drawings (tools, details, process)*

5) Connect: self-build network design

- *Proposal for network of self-builders*
- *Proposal regenerative material production system*

The booklet will be complemented with results from the prototyping and building phase mapping in the design phase

Research Paper

- *Collection of principles of regenerative architecture and guidelines*
- *Case study analysis results (handbook as appendix)*
- *Evaluation results ((handbook as appendix)*
- *Calculation results (handbook as appendix)*
- *Comparison Dutch Self-building and VA results (handbook as appendix)*
- *Recommendations translation VA to modern self-building (handbook as appendix)*

Appendix 2: Design brief

Self-build architecture demands participation of its users throughout the stages of ideation, to designing, to building. Where self-builders partly take on the role of the architect, the task of an architect is not to design a complete house. An architect can solely help to sketch out the system as such that the wishes of users are translated into the desired physical result by their own hands.

During my own self-build experience through Workaway (volunteering website) in the south of France and north of Spain, I experienced knowledge on self-building is spread is by a rotating system where aspiring self-builders help each other to gain experience. This knowledge is spread through word although there are organisations to tie them together.

This binding factor might be the most important characteristic of self-build projects. Helping other projects is part of developing your own toolset as a self-builder. The centre can have a function for both construction and agriculture. It rethinks the farm, not just for food but also for building materials.

Role centrum:

- *Test if the self-build system works. The centre will be built by self-builders*
- *Showcase self-builders techniques, details, materials*
- *Showcase relation landscape and building*
- *Practice skills (workshop)*
- *Share knowledge (education)*
- *Testing and development (research)*
- *Material hub (supplier)*
- *Catalyst for self-built projects and connecting factor (stakeholder city expansion), figure*

Figure 13 : Workaway experiences close to Toulouse and Barcelona in 2023. Own work.