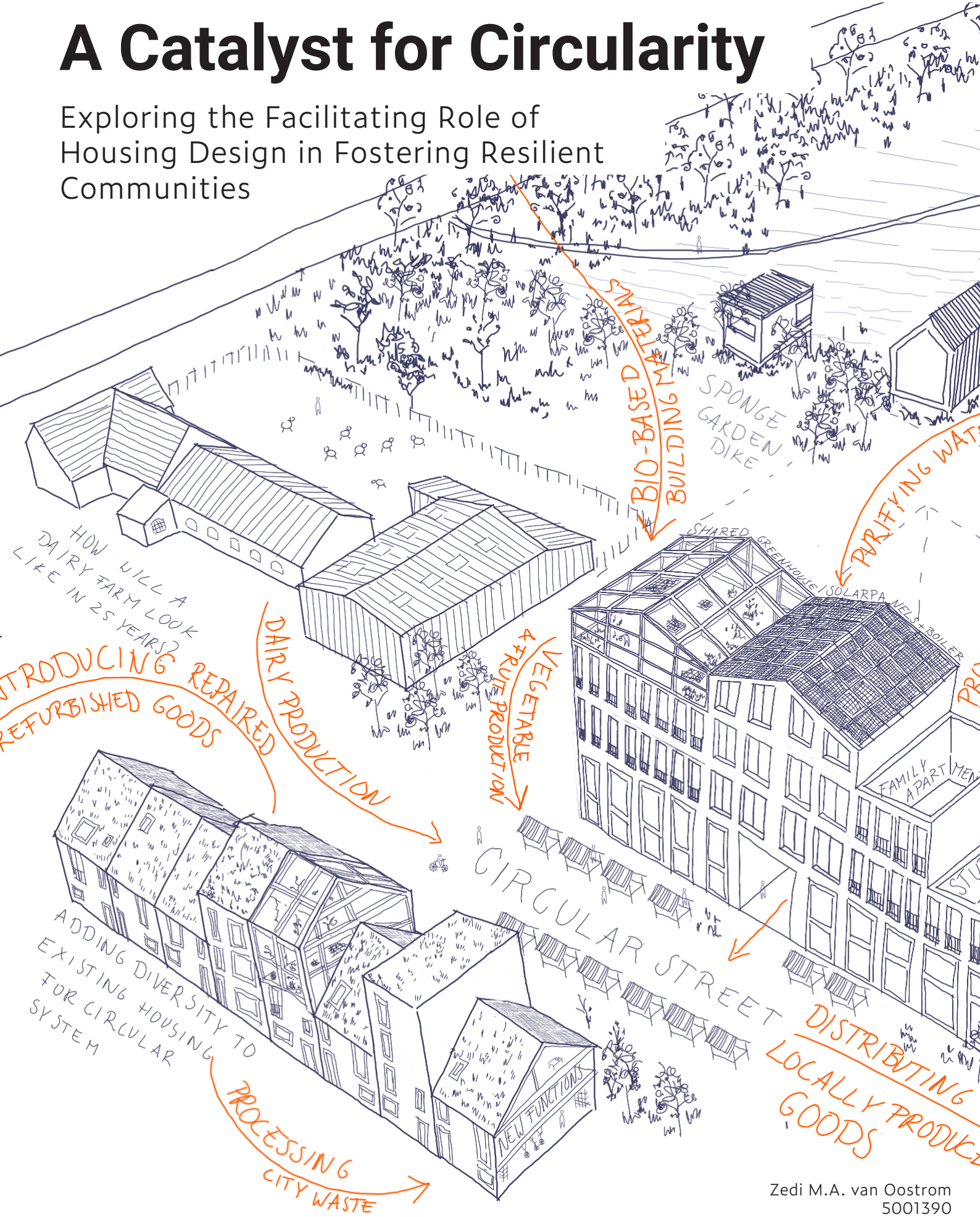
A Catalyst for Circularity

Exploring the Facilitating Role of Housing Design in Fostering Resilient Communities



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08-11-2024
Advanced Housing Design
Ecologies of Inclusion

personal motivation

'It was either the four of you or five Bulgarians,' the landlord said, as he handed us the keys, like we were the lesser of two evils. We were four students in the midst of the pandemic in 2020, living in an 89 sqm four-bedroom apartment with lead pipes, mould, draft and single glazing and using our laptops and blankets for warmth. Meanwhile, next door immigrant workers lived in a similar apartment with ten to twenty residents -we could never tell-, and logically but tragically, some preferred sleeping in our shared staircase. My experience in that neighbourhood refuelled my interest in housing on the outskirts of cities, where many reside, yet stories remain untold and the people invisible.

It might seem like a horrible place to live, but I truly loved my time there. The crises that the neighbourhood faced, instigated the resilience of its inhabitants. An amazingly strong community of volunteers organised everything from yoga classes and gardening to financial advice and shared dinners. And everything was free. I became a volunteer too, giving free advice on sustainable living: energy coaching. As an energy coach, I had the unique position of visiting different people at home. Unfortunately, many of my neighbours were suffering from energy poverty. Just like me, they were renters who did not have any agency over their homes, and we were subjugated to the poor maintenance of landlords. The autocracy of landlords like these eventually led to the eviction of my roommates in June of this year.

I want to emphasize that we are in a time of crises, not just of housing but also of the climate. Both subjects are close to my heart, and I am not alone in this; I have met many people who want to work towards a sustainable future. Yet for people who are not homeowners and have a low income, like everyone in my immediate environment, it is incredibly difficult to gain agency over our built environment.

I am fully aware that architecture will not be the answer to the issues illustrated in this anecdote. However, I am confident that if we can foster resilient communities through different lenses (e.g., politics, economics, urban planning, and architecture) and different scales (e.g., regions, cities, neighbourhoods, streets, and buildings), we are one step closer to fixing the tidal wave of crises we now find ourselves in.

1. problem statement

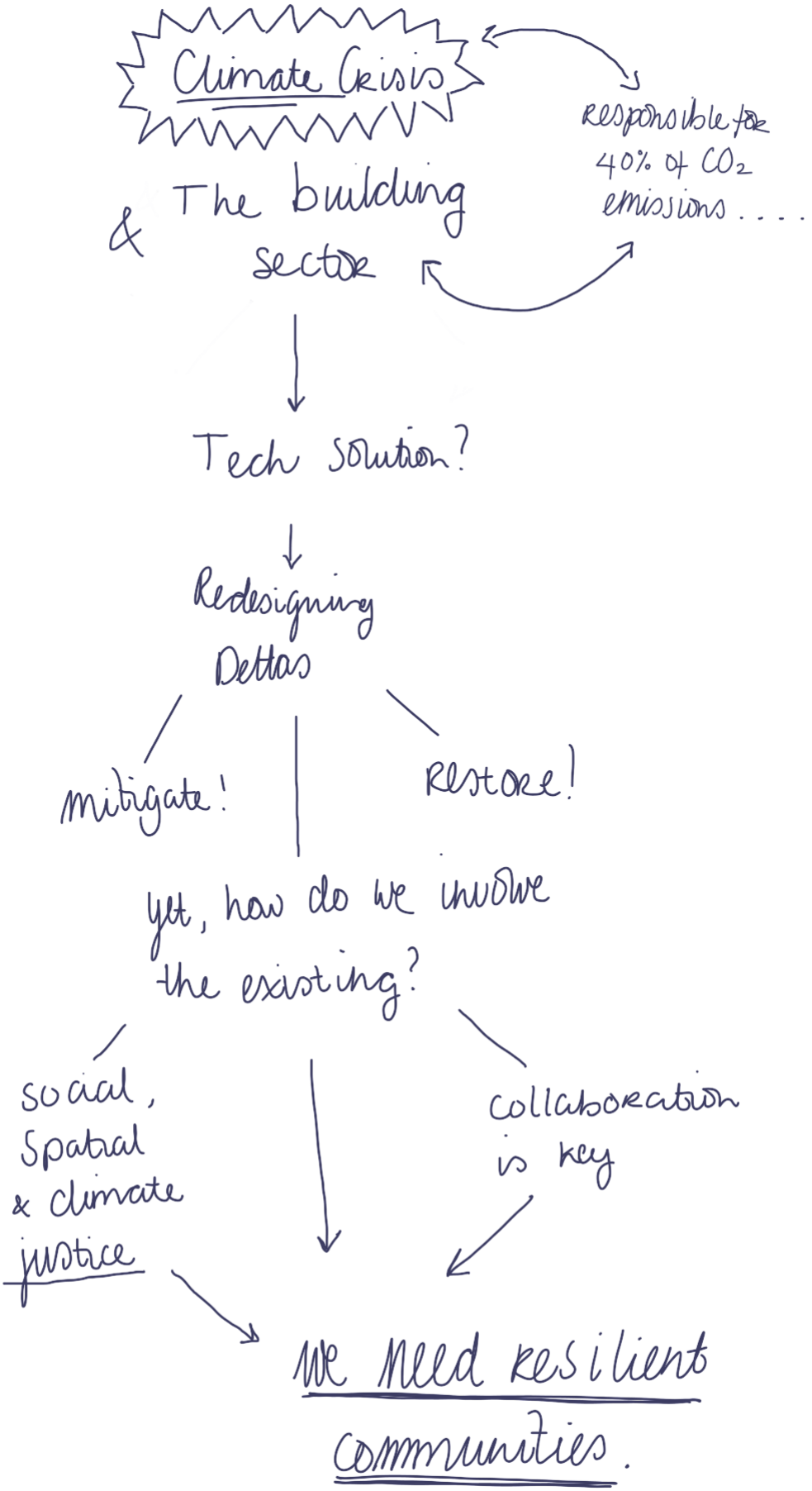


Figure 1.1 Problem Statement. (Work by author, 2024)

There is an urgent need to rethink the way we build and design our living environment because of the climate crisis. For over half a century, humanity has demanded more ecological resources and services than the Earth can produce. The building sector holds a great responsibility in this depletion (WWF, 2022; UN, 2023). Transitioning to a circular economy could be a means to restore our built environment. The European Union, including The Netherlands, also aims to become a circular economy, which they describe as ''a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible.'' (European Parlement, 2023).

The situation in Midden-Delfland, a polder area in the Netherlands, is an illustrative example of the effects of human depletion and manipulation on the landscape. This has led to risks of subsidence, salinisation and flooding. That is why Redesigning Deltas, a research group spearheaded by the TU Delft, is developing a more natural and climate-mitigating plan as a positive and restorative force for Midden-Delfland and the surrounding urban area, the metropolitan region Rotterdam-The Hague. Redesigning Deltas proposes to transform Midden-Delfland into a National Productive Park, serving as a green lung and sponge for the metropolitan area as well as a production site for biobased building materials, such as wood and bulrush (Redesigning Deltas, 2022).

However, the transition towards a sustainable future is not just a technological issue, it is a social-economic concern too. In particular, concerning the outskirt urban neighbourhoods that lay at the border of Midden-Delfland, which are relatively densely populated and have a diverse variety of socio-economic households, such as Tanthof in Delft (Gemeente Delft, n.d.). Besides including diverse households, their housing should also be taken into account. 75% to 90% per cent of the existing housing stock in the northern hemisphere is presumed still to be standing in 2050, so these buildings are part of the circular transition too (Pomponi & Moncaster, 2017). More importantly, this project argues that the usage of the existing should always be a starting point in circular architecture. It is important to include peripheral neighbourhoods, including their buildings and residents, towards a sustainable transition and strengthen and adapt their existing socio-spatial infrastructure, with consideration of the most vulnerable residents, human and non-human alike. In other words, resilient communities are essential for tackling the climate crisis (IIED, 2023).

Socio-spatial justice and the climate and housing crises are not solvable solely through architecture. Nevertheless, it is necessary that the architectural field contributes toward an inclusive sustainable future. This project argues that this contribution is more than opting for bio-based building materials, it also requires a socio-spatial approach. Therefore, the intention of this research is to learn how architects can design to facilitate and strengthen existing communities in a time of climate urgency. This project explores the local effects of a circular economy, zooming into the street level. More specifically, the collection of houses that form a street. What if we imagine that our streets are completely circular? How does that tie into our existing plans for mitigating the climate crisis, such as the plan of Redesigning Deltas for Midden-Delfland? What does this mean for the existing community and how can we ensure a resilient community for the future?

2. theoretical framework

Figure 2.1 Theoretical Framework and Research Gap. (Work by author, 2024)

This project requires an understanding of socio-economic and -spatial factors at play when redeveloping neighbourhoods, and an understanding of circular communities. In the last 30 years, theories and models have been developed for reorganization of our society and economy, starting with Governing the Commons by Elinor Ostrom (1990), An Economic Ethics for the Anthropocene by Gibson-Graham and Roelvink (2010) on the community economy, Towards the Circular Economy by the Ellen MacArthur Foundation (2013), Staying with the Trouble by Donna Haraway (2016) and the latest Doughnut Economics by Kate Raworth (2018).

Some models and theories offer a new perspective on how we could reorganize our society from an anthropological and economic perspective. Elinor Ostrom makes a strong case for collective action after examining several cases of communities that share common resources. Her research gives an insight in successes and failures in human cooperation to share resources (Ostrom, 1991). Gibson-Graham & Roelvink extend on this view arguing for cooperation not merely between human actors, but other species and resources too. In addition, the authors argue that we should 'learn to be affected', creating an intrinsic motivation for change (Gibson-Graham & Roelvink, 2010). Haraway expands on this idea of affection as she explains her theory of the Chthulucene and the cultivation of "respons-ability: ... collective knowing and doing, an ecology of practices" (Haraway, 2016, p. 34). Haraway mentions that the Anthropocene is a time of urgency for all species, in which we are faced with mass death and extinction, yet we refuse to be response-able, and we refuse to be present. Instead Haraway pleads that we should face the trouble and collectively think about rehabilitation and sustainability on our planet (Haraway, 2016).

The Ellen MacArthur foundation on the other hand has a practical approach to circularity, formulating five principles for circular design: 1) design out waste, 2) building resilience through diversity, 3) rely on renewable energy, 4) think in systems, 5) waste is food (2013). However, researchers Pomponi and Moncaster correctly remark that this model is not applicable for the buildings which are grounded in their context and due to their long-lasting nature hold an aspect of inflexibility. Instead, they argue that circularity for the build environment, is mainly a social issue (Pomponi & Moncaster, 2017). Which corresponds with the positions of Gibson-Graham, Ostrom and Haraway.

TU Delft researchers Leclerq and Smit have researched the social aspect of a circular built environment in their book Circular Communities. They analysed local circular co-operations between citizens. They argue that organising circularity on a neighbourhood scale can provide an alternative to the central systems for waste, water and energy, which can lead to a more independent and resilient community (Leclerq & Smit, 2022). The examples studied by Leclerq and Smit are all led by so-called pioneers. Now, it is necessary for the entire society to make the transition to a circular economy. So, how do we make circularity affordable and inclusive? How do we ensure intrinsic motivation among the population to care about their environment?

Fitz and Krasny plead that we must learn to care to save the environment. They argue that architects and urban planners are at a midst of this network of caring (2019). The message is hopeful, yet how do we ensure care and rehabilitation? In what ways can designers practically foster a circular community?

3. research questions

The questions of the last paragraph have led to the following research question:

Which urban and housing factors can contribute to promote or hinder inclusive circular community living?

Fostering circular communities is primarily a social question; understanding the intrinsic motivation of its residents to care for the environment. This is a people-based challenge and therefore differs depending on the specific community. So different approaches towards circular living should be studied to understand how these approaches emerge and perhaps find a common ground or pattern between different communities. The people-based aspect of circular communities has led to the first sub-question: **How do different existing communities approach circular living?**

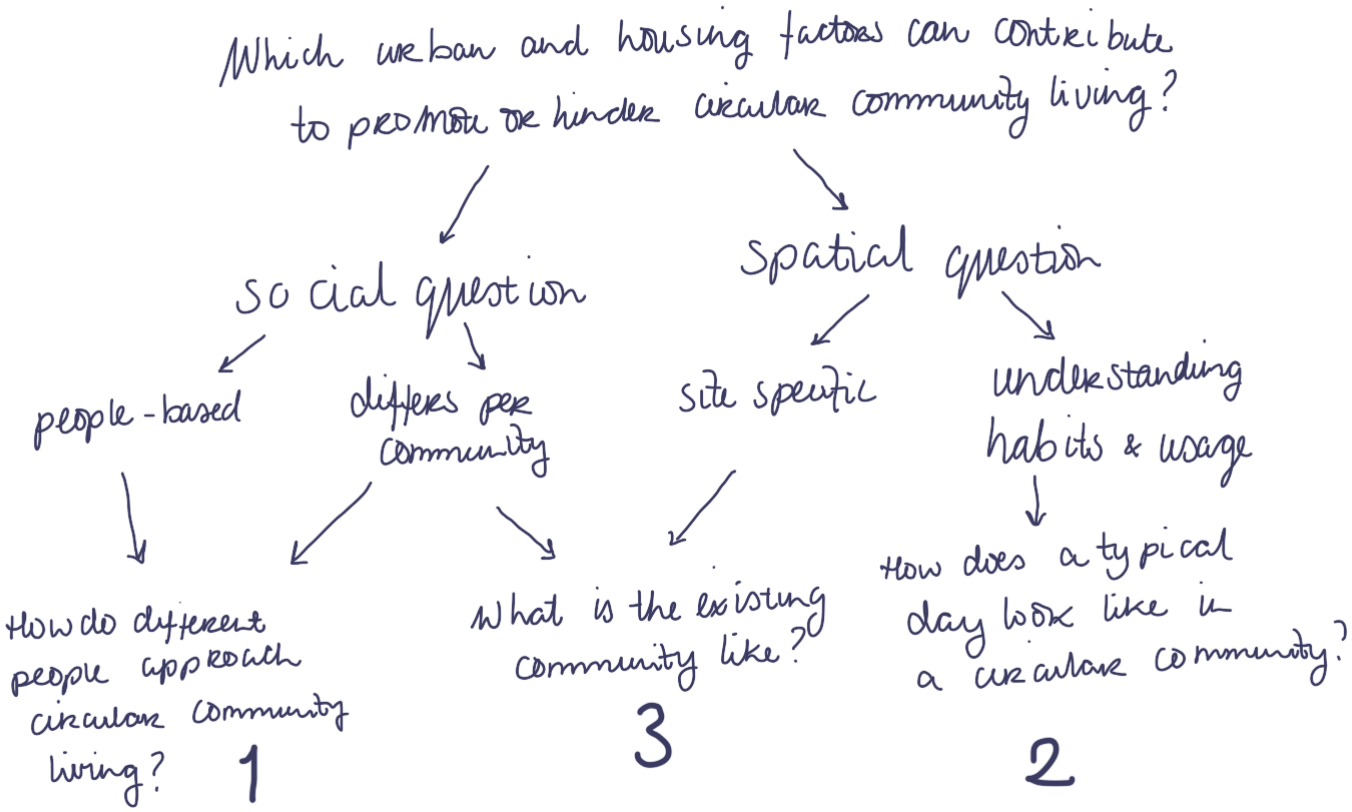
Yet, even though architecture has social implications, it is primarily a spatial field. To understand the fostering role architecture can have, it is key to understand habits and customs of circular communities, the day-to-day life. That is why the second sub-research question is: **What does a typical day look like in a circular community?**

Both community and architecture hold an element of specificity; as community is always based on its people and architecture is grounded within its site. The role of architecture in community living changes depending on the existing situation. This project has Tanthof as a case study. Therefore, the developed methodology can be extended into practise. So as a practise, the existing community of Tanthof should be studied to build upon their existing sustainability network and other habits and customs. Therefore, the third sub-question of this research is: **What is the existing community of Tanthof like regarding sustainability and socio-economic inclusion and justice?**

The initial research question 'Which urban and housing factors can contribute to promote or hinder inclusive circular community living?' is thus divided into three sub-questions:

1. How do different existing communities approach circular living?
2. What does a typical day look like in a circular community?
3. What is the existing community of Tanthof like regarding sustainability and socio-economic inclusion and justice?

research questions + methodology



1+2 = Case study analysis through ethnographic research into daily lives and usage of circular community buildings

1+3 = Ethnographic research into existing community to understand their needs and habits & build upon existing social / circular infrastructure.

2+3 = Design project

Figure 3.1 Alignment Research Questions and Methodology. (Work by author, 2024)

4. methodology

This research plan gives three methods of analysis to answer the sub-questions, but these methods are not linearly aligned with the given questions. Instead, the three methods are used to provide partial answers to two of the three sub-questions (See Figure 3.1).

1 + 2: Ethnographic research into the daily lives of circular communities

''Anthropology offers the potential for an architecture of broader ecologies, where skills and practices provide insights into the ways people understand the world in a broad range of mutually inclusive ways'' (Lucas, 2020, p. 2). When researching community and a rather novel form of living, i.e. circular living, anthropological knowledge is indispensable. That is why, observant participation will be the primary method of research. The understanding of how and when people use spaces for circular inhabitation and practice, might help uncover spatial patterns that stimulate or hinder circular community living.
Therefore, an analysis will be conducted of several circular community projectsThe plan is to follow around a participant of each community for a day.*

The following criteria are used to select the case studies. The case must be:
- Circular co-operative initiative
- Available for low-income groups
- Including housing

The case preferably is:
- An intervention within an existing neighbourhood

The findings of the observant participation study will be visually compared to understand the effects of the architecture on the daily practice of a circular resident. See Figures 4.1 to 4.3 for references for this visual interpretation.

	Circular Co-operative	Available for Low-income Households	Includes Housing	Part of an Existing Neighbourhood
Ecowijk Mandora (Houten, NL)	√	√	√	X
CLT-H Buurt (Amsterdam, NL)	√	√	√	X
Aardehuis (Olst, NL)	√	√	√	X
Bosschgaart ('s Hertogenbosch, NL)	√	√	√	X

Tabel 4.1 Selected case studies for observant participation. (Work by author, 2024)

*This part of the research will be conducted in collaboration with Anna Lugard and Joaquim Boendemaker

1 + 3: Ethnographic research into the existing community in Tanthof

This research is conducted to support a design proposal for a housing project in Tanthof, Delft. The aim of the method 1+2 is to find a pattern or principles by examining multiple communities. However, it should not be assumed that these principles can be simplified into solutions for another context, in this case Tanthof. Similarly, it cannot be presumed that properties accredited to a certain type of neighbourhood, building or demographic are indeed present in the particular case. Thus, it is important to examine the case of Tanthof extensively to understand the underlying social infrastructure.

In addition, as Gibson-Graham and Roelvink argue architectural designers and researchers should build upon ''what is already being done'', instead of ''what is to be done'' (2010). There are indeed some collective and circular initiatives active in Tanthof. These projects could be valuable sources of insight, and building upon existing circular initiatives could strengthen that infrastructure.

Moreover, most architecture projects for collective communities, include participatory design elements. Since the design proposal is not going to be executed, I find it immoral to consume a great amount of the existing residents' time without being able to offer any real-life developments in return.

Therefore, my plan is to conduct an ethnographic study through fieldwork as a volunteer. There is an energy community active in Delft called Duurzaam 015, that is committed to a fair social energy transition. I joined their network of volunteer energy coaches, so I can become in contact with residents and their living environment. In that way, I can conduct ethnographic research, yet also give something back. Preferably, the plan is to find participants within Tanthof to shadow for a day and gain insights on their habits, customs and perspective on sustainability. In execution, 1+3 will be similar to 1+2, using drawings as a way to inventorize, order and compare knowlegde.

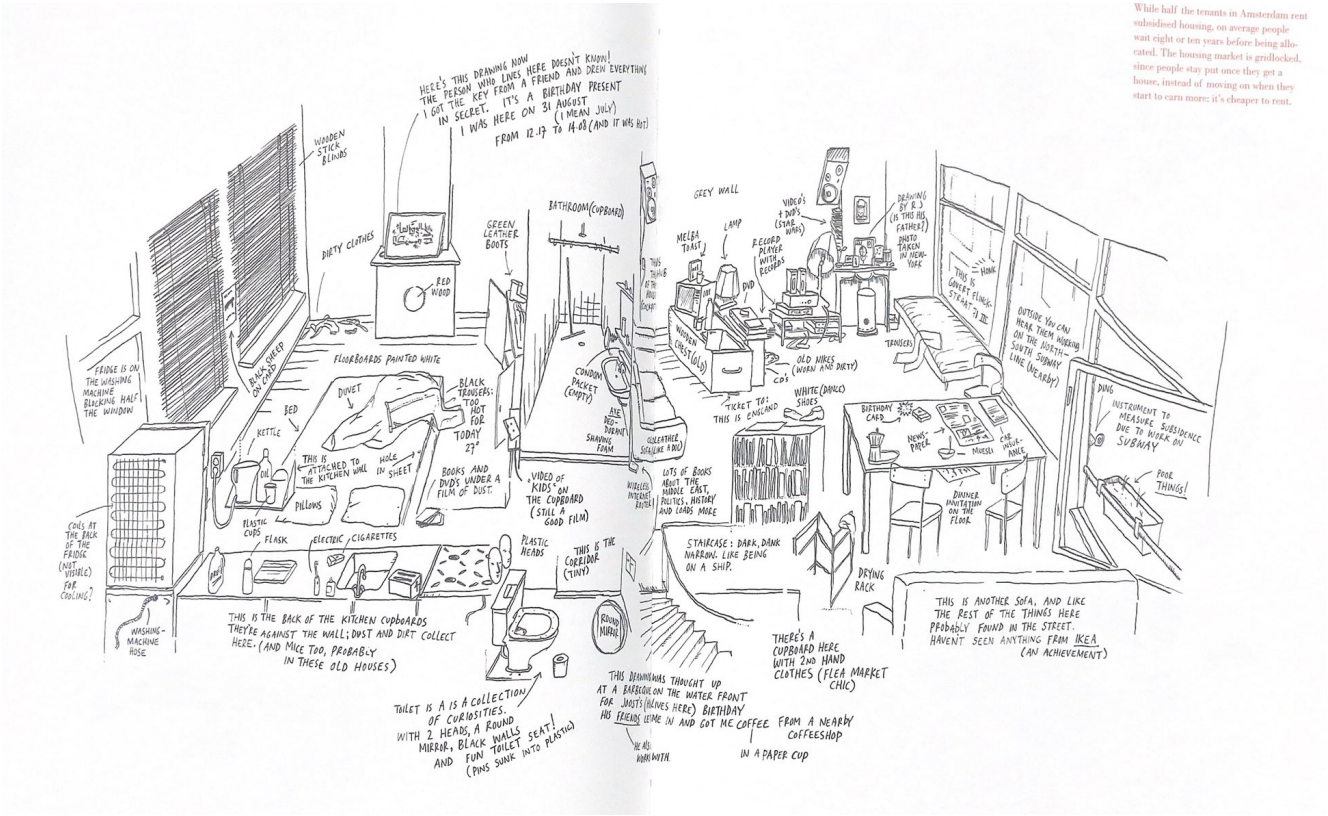


Figure 4.1 Example for visualizing observations from the observant participation. (Rothuizen, 2009)

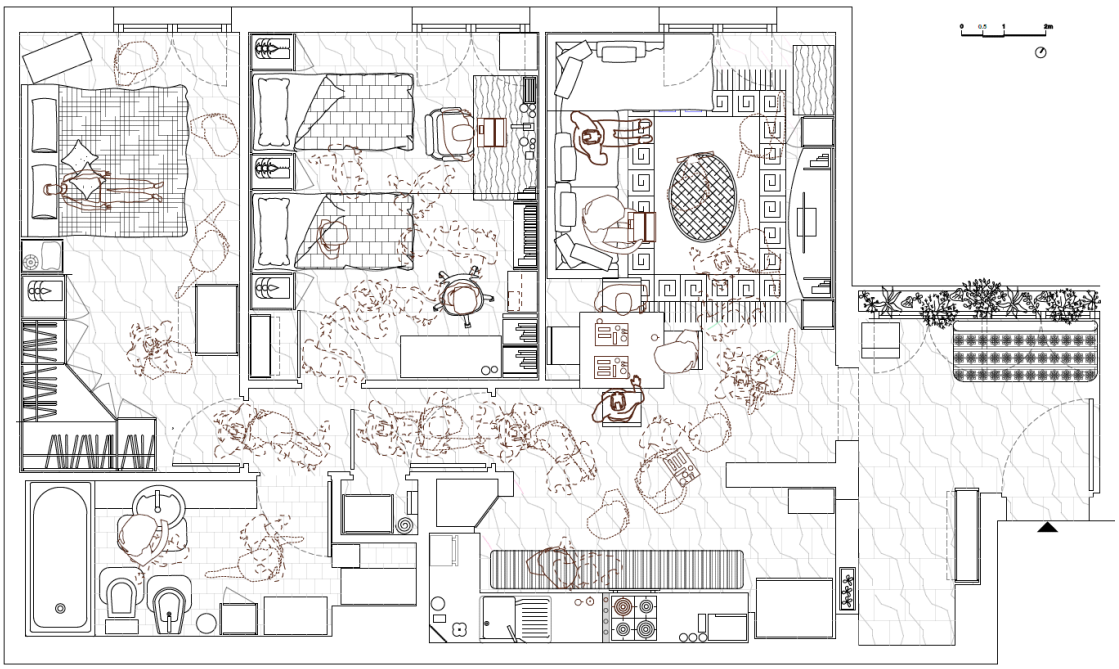


Figure 4.2 Example for visualizing observations from the observant participation. (Virtual Ampere, 2020)

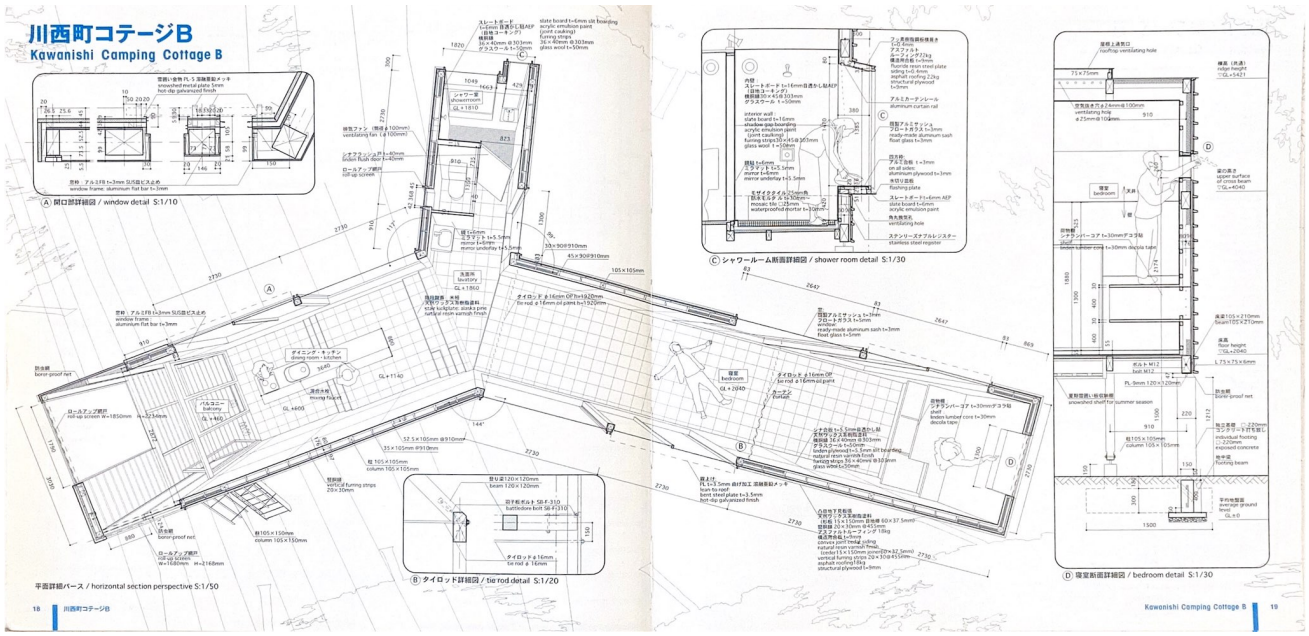


Figure 4.3 Example for visualizing observations from the observant participation. (Tsukamoto et al., 2009)

Additionally, to gain a better understanding into the hindering and stimulating factors in including the residents of existing neighbourhood like Tanthof, the plan is to conduct in-depth expert interviews with researchers that study the energy and circular transition. The aim is that the findings from the fieldwork with the results from the interviews will give a greater and more objective understanding. Furthermore, I argue that acknowledging the state-of-the-art research that is being conducted at this faculty will contribute to the relevance and accuracy of this project.

2 + 3: Research through design

Lastly, the research is extended through a design exercise. In this exercise, knowledge gathered from literature and the participant observation studies will be combined to synthesize a design proposal of circular architecture that is grounded in its context.
The aim is to create an optimal system of circularity, seeing the street and the adjacent housing as a circular machine. Leclerq & Smit (2022) have developed a method for creating circular communities, called the Value Flower. They have identified five values and five resource loops that are relevant on a neighbourhood level. I consider the Value Flower as a Program of Requirements for circular architecture. Whether it is possible and desirable to fulfil all ten conditions at the level of a street, needs to be further investigated. The Value Flower therefore only serves as a starting point that needs to be further elaborated for the local context and supplemented with findings from this research.

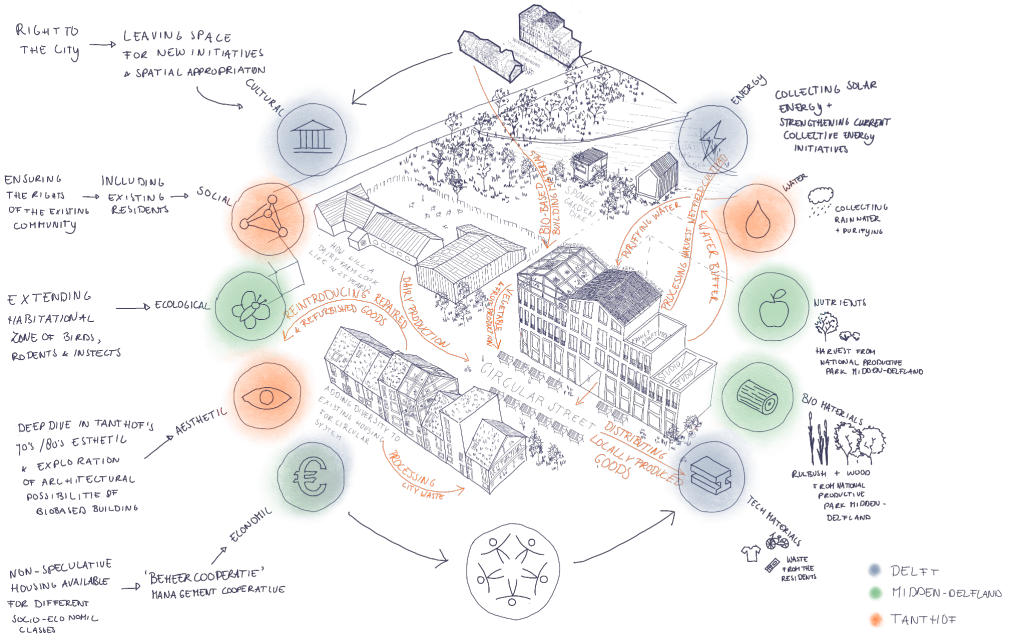


Figure 4.4 Using The Value Flower as Programme of Requirements. (Image by author, based on Leclerq & Smit, 2022)

5. relevance

This project is on circularity, a current topic. The circular economy is seen as a possible solution to the climate crisis. The EU and the Netherlands support this position, as is evident from their goal to transition to a circular economy by 2050 (European Parlement, 2023). That is why all facets of our society must think about how the implementation of the circular economy looks from their field of expertise. This also applies to Architecture and the Built Environment. This research aims to contribute to the implementation of circularity in that field.

In addition, it is important that circularity in architecture is no longer seen as pioneering and innovative but as the new normal, accessible to a broader socio-economic target group.

Finally, this research uses architectural ethnography as a method of analysis of circular community life. The hope is to be able to discover behavioural patterns that relate to architecture. Ethnography can be valuable for understanding and hopefully promoting a certain type of community. Within architecture, this research method is underused in practice. By applying the results of this research in a design assignment, the aim is to increase awareness of the importance of social research in design.

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