‘HOW CAN WE GREEN THIS UP?’

Bottom-Up Initiatives for Identifying, Improving, and Maintaining Green Space Developments in Groningen

ABSTRACT

In order to mitigate climate change impacts, short-term action and societal resilience are required for successful adaptation to drastically changing environments (IPCC, 2022). The effect of urban heat islands is one of the many adverse consequences we must mitigate to sustain and improve urban habitats. However, this issue of socio-environmental change remains complex and requires simultaneous action on multiple levels of the governance spectrum (Homsy et al., 2018). Bottom-up solutions may provide valuable insights for improved place understandings, resulting in enhanced green space solutions. Two semi-structured interviews were conducted together with secondary data collection in order to investigate whether this premise holds true. Resultantly, this paper presents a spectrum of involvement and responsibilities at different levels of action, portraying the bottom-linked governance approach utilised in Groningen to mitigate urban heat island effects.

Victor Budinic s4048199

Bachelor’s Project: Engaging with Bottom-Up Approaches to Sustainability
Supervisor: Dr. Stephen Leitheiser
Word count: 6,064

Table of Contents

List of Figures

1. Background and Relevance

The Anthropocene - Earth's most recent geologic time period - has made drastic changes to land, environment, water, organisms and the atmosphere of this planet (Syvitski et al., 2020). In a collective effort to concentrate resources, dense urban environments were established. Resultantly, these places are traditionally built with large quantities of concrete, stone and asphalt to provide long-lasting infrastructure needed for withstanding (Figure 1). Such materials, however, tend to heat up much quicker due to their high density, whereas shielding layers of green infrastructure and ecosystem services reduce this so-called "urban heat island" effect (Rakoto et al., 2021). If neglected, associated mortality rates rise as a consequence of additional urban heat, particularly affecting vulnerable population groups (Heaviside et al., 2016).

Climate change is predicted to exacerbate heatwaves in the future, which is why, in their recent report, the IPCC (2022) highlights the need for short-term actions aiming to mitigate impacts in an increasingly complex environment of climate risks, with necessary societal resilience. Consequently, urgent calls for society to become more sustainable are getting louder. In this regard, problem-solving is moving towards bottom-up initiatives for more sustainable lifestyles and solutions, as traditional top-down approaches have historically failed to implement sustainable environmental management (Fraser et al., 2006). A large part of the problem can be identified as the governance of socio-environmental change, which is an immensely complex issue that exceeds resource capacity of top-down authorities. It therefore requires simultaneous action on multiple levels, with collaboration between, and the full inclusion of key actors - especially on a neighbourhood scale (Homsy & Hart, 2019). On this local scale, Homsy and Hart (2019) call attention to engage civic society in the policymaking process for improved knowledge capacity. Civic engagement is therefore a crucial component for successful spatial governance.

In their paper, Homsy et al. (2018) laid out the fundamental areas of action in order to operationalise multi-level governance (MLG). Thereby proposing possible integrative solutions of top-down and bottom-up policymaking, which are, as the authors demonstrate, universally applicable even in disparate cases of political and institutional situations. Almost three decades ago, however, a synthesis of governance approaches was already suggested for more efficient policy-making (Sabatier, 1986). This narrative has been developed further and finds particular suitable application on the mentioned neighbourhood level due to a scale that values citizen's place-specific knowledge (Spijker & Parra, 2017). The co-production of knowledge therefore finds particular importance here.

Moreover, apart from a governance structure with numerous dimensions, innovation of niche technologies is urgently needed to cope with ever-increasing demands of energy, food and housing (Geels, 2011). The strong contribution capabilities of grassroot innovations, to this end of creating a more sustainable society, are highlighted by Smith and Stirling (2018). The authors particularly focus on grassroots' democratic nature and identify main variables, by which such innovation democracy is facilitated. Democracy is understood as the possibility to steer societal developments collectively and actively, challenge existing structures and regimes, which results in ameliorated innovation. This consequently reflects in improved socio-technological as well as socio-environmental situations that continue the desire to achieve ever more sustainable characteristics (Smith & Stirling, 2018).

Further, Moulaert et al. (2013) identify social innovation as a collective product originating from the feeling of shared responsibility for environmental problems. This consequently reflects in a governance structure with *bottom-linked* characteristics, since civil society increases their respective impact and links with decision-making processes. In this approach, the distinct roles and power differences between bottom-up and top-down actors are diffusing to enable optimal solutions (Spijker & Parra, 2017).

The contributions of bottom-up initiatives that engage with sustainability solutions has become the central theme of this thesis in order to develop a deeper understanding of the multi-dimensional governance of green space developments. The aim of this paper is therefore to explore the observed bottom-linked governance dynamics around urban heat island mitigation in Groningen, the Netherlands. Maps illustrating the magnitude of an apparent urban heat island effect in proximity to the dense urban centre of Groningen are shown on the following pages (Figure 2 & 3). This leads to the following research question:

- To what extent may bottom-linked governance be observed in green space developments attempting to mitigate the urban heat island effect in Groningen?

More specifically:

- To which extent are bottom-up and top-down actors involved and responsible in the utilised governance strategies?
- How do bottom-up actors and initiatives improve knowledge co-production to this end of mitigation?
- Which forms of civic engagement are observed that facilitate solutions?

Figure 1: Map depicting the average sealed space in Groningen.

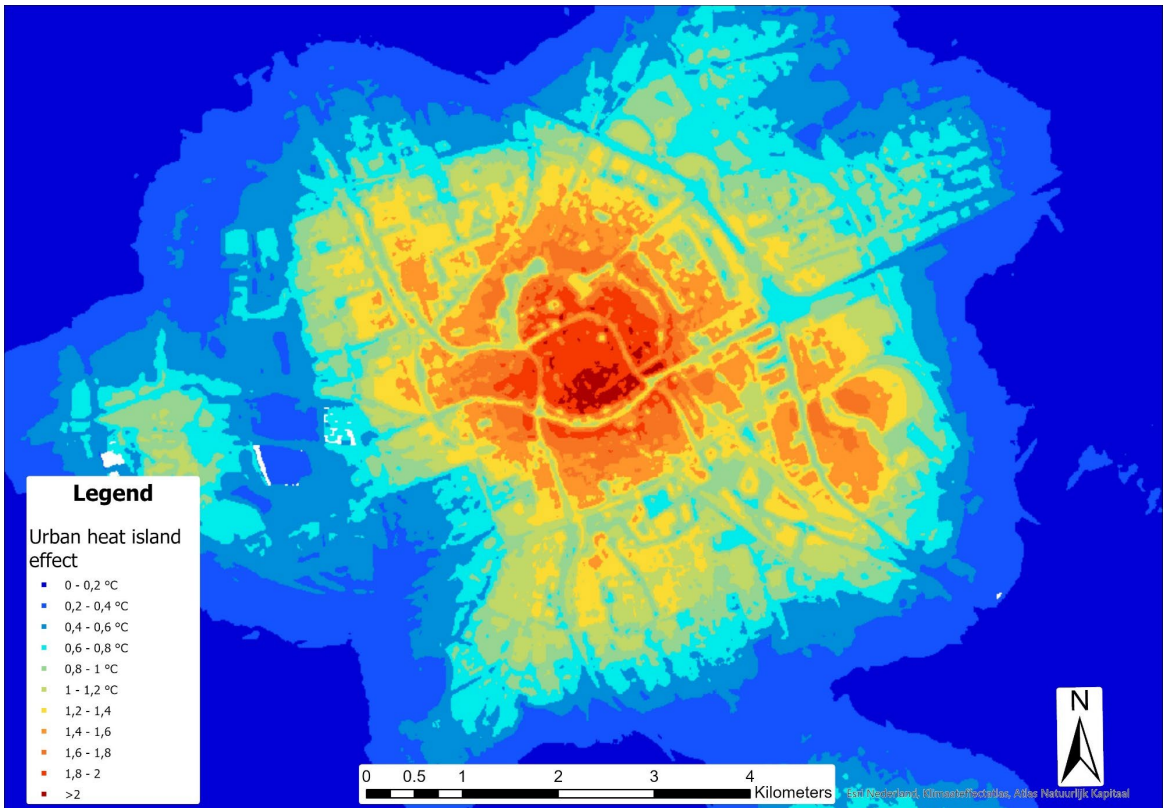


Figure 2: Map depicting the urban heat island effect in Groningen.

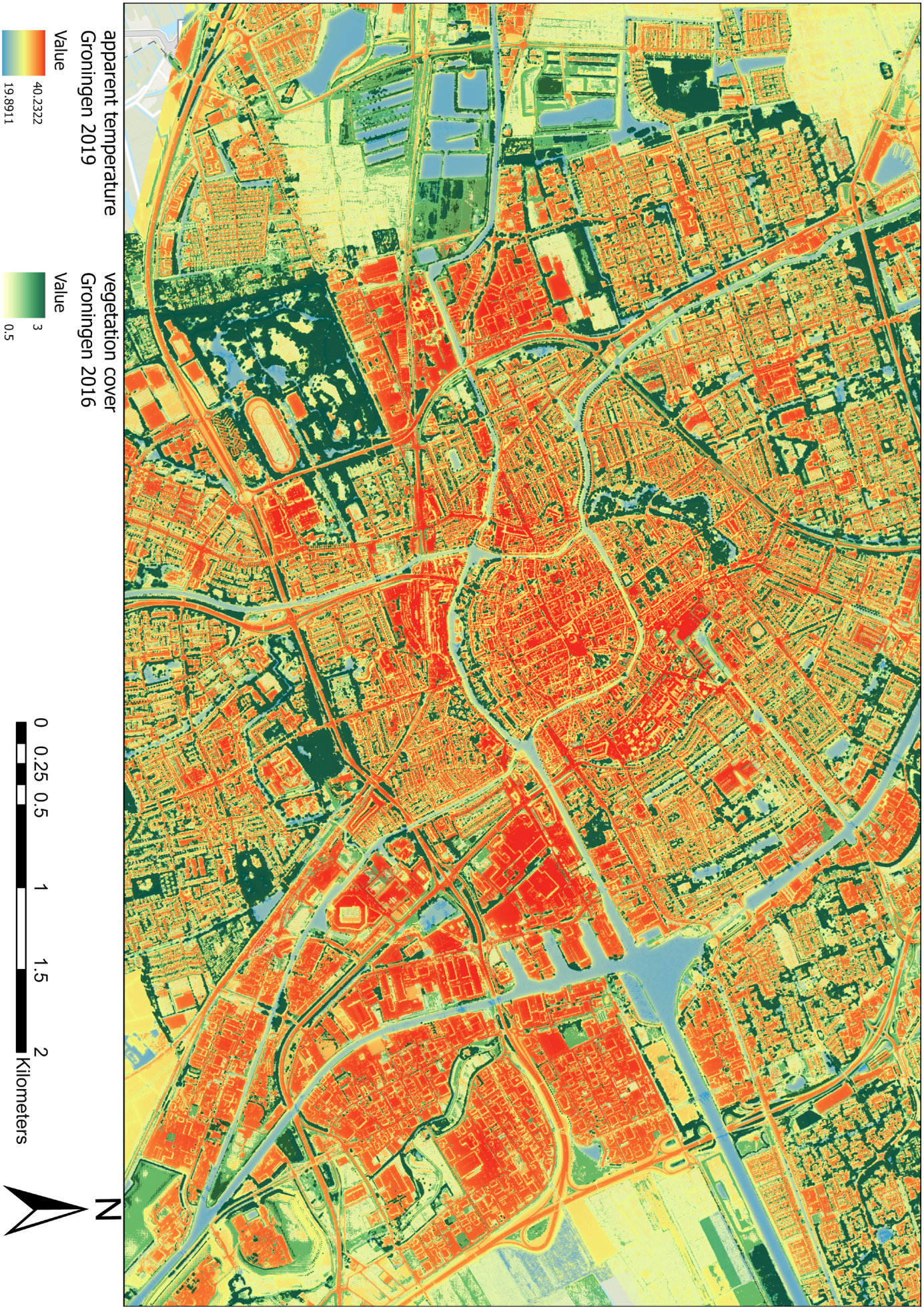


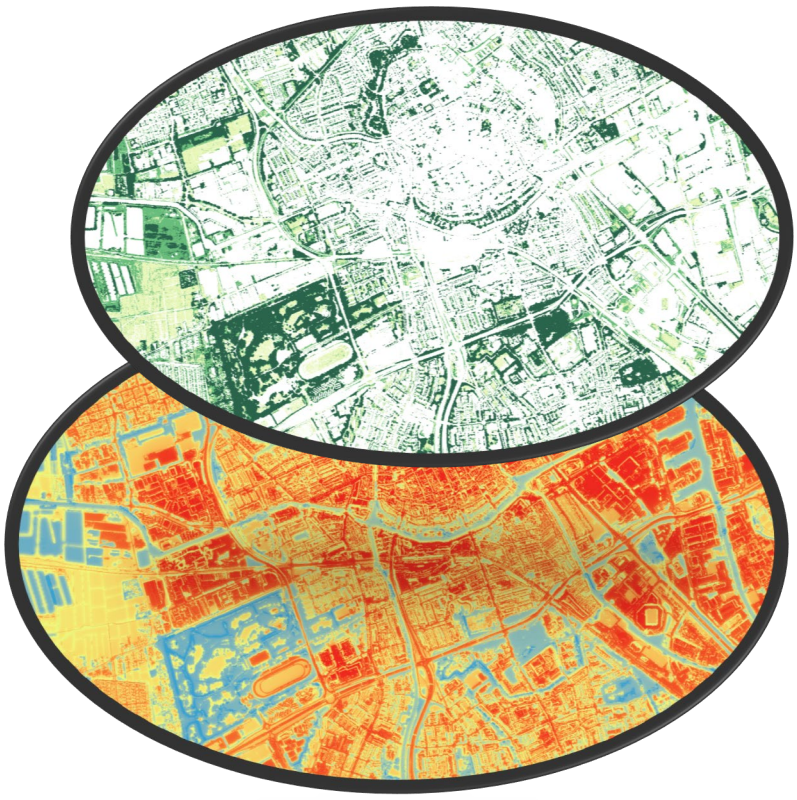
Figure 3: Map depicting apparent temperature and NDVI green spaces.

1.1 Putting Groningen into Perspective

For the further context of this thesis, the setting and place in which its scope has taken place is important to be described. Groningen represents a historic Dutch city in the northern part of the Netherlands. With its vibrant, highly concentrated city centre, Groningen is seen as one of the prime examples of the "compact city" concept (de Roo, 1998). Its traffic regulation plan, developed in the 70s & 80s against strong opposition, has changed the city's character, and allowed for first innovative, decisive action against the dominance of the car on our streets (Wallage, 1977). This resulted in vastly present slow and active transportation modes such as walking and cycling, giving its inhabitants a chance of interaction.

However, the concept of compact cities is often associated with the lack of green space coverage due to the large quantity and concentration of public life - traditionally built from stone (Haaland & van den Bosch, 2015). Buildings tend to be around three to four stories high in the centre, making streets narrow and decreasing ventilation with a coupled increase in concrete materials. So, whilst green spaces exist nevertheless, they are often found in small, scattered locations that are intensively used (Figure 4), consequently leading to a notable urban heat island effect during summer months. Such an effect is accurately depicted in the average national temperature dataset in Figure 2. Often, this results in microclimates that not only provoke a feeling of discomfort for many, but pose actual harm for vulnerable population groups during summer months (Heaviside et al., 2016).

Figure 4: Dissecting apparent temperature from green spaces.



2. Theoretical Framework

In the following, the two concepts of MLG and grassroot's contributions to innovation democracy are compared, and a possible synthesis between given variables is explained in order to establish a holistic framework for socio-environmental change that may be applied to the defined scope of green space policymaking in Groningen. Smith and Stirling (2018) deduced variables of grassroot's contributions from the literature at the time - also including own previous work that used inductive case-studies to form their conclusions - which will be further discussed in the following paragraphs. Five suggestive enablers for these contributions are proposed: *training & skills, investment, infrastructure, culture,* and *openness* (Smith & Stirling, 2018). Moreover, Homsy et al. (2018) used a slightly different approach of inducing and exemplifying the multiple fields of governance in their analyses of two contrary case-studies. The fields of action to operationalise MLG are: *sanctioning and coordinating authority, provision of capacity, framing of co-benefits, co-production of knowledge vertically and horizontally, and the engagement of civil society* (Homsy et al., 2018).

2.1 Multi-level & Bottom-linked Governance

For the further development of this theoretical framework, these fields of action developed by Homsy et al. (2018) are grouped into the three main concepts encompassing bottom-linked governance - namely governance strategies**,** civic engagement**,** and co-production of knowledge **–** and will structure the following paragraphs:

2.1.1 Governance Strategies

First and foremost, a valuable contribution is the *cultivation of democratic innovation practices* through grassroot initiatives (Smith & Stirling, 2018). These bottom-up processes entail "explicitly value-based, voluntary, and socially-oriented approach[es] to their collective problems" (Smith & Stirling, 2018, p. 76). Meaning they are place and situation specific, with a linear progression the more they are practiced. Such cultivation is achieved through *training & skills* of the participants, as well as the required *infrastructure* for collaboration through which an increasing number of participants may be reached in order to contribute their ideas and opinions. Only through these enablers, with a suitable environment as well as complementary knowledge and expertise, are individuals capable to find creative solutions to problems. To ensure these factors are sufficiently met, *sanctioning and coordinating* top-down *authorities* in the MLG perspective are required to *provide* the needed *capacity* (Homsy et al., 2018). This may happen through several stages of planning, where public *infrastructure* achieves multi-faceted use, specifically targeted to enrich and facilitate collaboration with grassroot initiatives. Whether this collaboration truly results in optimised governance strategies for urban green space developments, and how it needs to be structured, will be further investigated and become the central theme of this paper.

2.1.2 Co-Production of Knowledge

One of the most important contributions of grassroot initiatives is arguably the *empowerment of niche innovations*. Such niche innovations emerge in the grassroots' supportive milieu with the necessary space and time to flourish and eventually compete against established traditional solutions (Smith & Stirling, 2018). In the chosen scope, one of the investigated cases developed green space solutions which were discussed independently of top-down actors, providing for the mentioned space necessary to flourish and further develop ideas until these are sophisticated enough to compete (see Appendix A). Enabling such empowering environment, *openness* of *sanctioning and coordinating authorities* is crucial, since the final stage of successful opposing implementation could otherwise not come into fruition. The *provision of capacity* may further increase the capability of individuals, in order to learn and acquire deepened knowledge in their fields of interest. Consequently, this may result in increased *horizontal co-production of knowledge*, since more innovation practices become available. Collaboration with top-down actors hereby ensures the horizontal stretch of such *knowledge co-production* across the spectrum.

2.1.3 Civic Engagement

Another way in which grassroots are contributing to innovation democracy is the acquired *innovation citizenship* (Smith & Stirling, 2018) – creating a sense of belonging. Citizens create attachments, associations, and connections through participating in, or even simply being surrounded by, grassroot initiatives. This may result in the *framing of co-benefits* by several actors which is experienced by citizens involved and engaged in the initiatives, on several levels of commitment, and may even create a *culture* around bottom-up approaches, which views active involvement in decision-making processes as a societal norm. Citizens talk and share their experiences and interrelated positive associations connected to the encountered benefits. This process is facilitated through appropriate *investments*, so that wider activities around grassroot initiatives may take place and increase their respective outreach. Again, such is enacted by top-down *provision of capacity* (Homsy et al., 2018). Further, *framing of co-benefits* due to these made *investments* is likely to happen in the documented policy packages and their respective goals, which then represents a variable that may actively be altered and targeted by top-down actors. Such *framing of co-benefits* establishes an engrossing environment, where the focal point of societal behaviour tries to move from consumption towards production. When aiming to create a socio-ecological system around "shared values, symbols, rituals, and practices grounded in sustainability principles leading to individual and societal choices that promote environmental protection, social justice, and well-being, and a supportive economy" one may speak of cultures of sustainability (Dreyer et al., 2021, p. 5). This attempts to integrate wider societal activities into sustainability practices (Reimer-Watts et al., 2022), where the acquired awareness of *innovation citizenship* plays a crucial role for motivation, and the felt belonging facilitates action. A spiritual belonging towards nature may further complement and strengthen this behavioural change (Taylor, 2010). Furthermore, *social diversity* is identified as another contribution of grassroot initiatives to innovation democracy (Smith & Stirling, 2018). Hereby, the authors describe the diverse set of possible socio-technical solutions through the democratic inclusion of individuals. It is enabled through a *culture* that invites and understands the advantages of individual opinions and ideas. Enacted by the *framing of co-benefits*, top-down and bottom-up actors need to work together in order to facilitate such outcome. Constructive discussions are encouraged, and the word-of-mouth travels through an ever-increasing set of societal norms which are continuously questioned, challenged, and adapted if the democratic majority decides so. The resulting *engagement of civil society* (Homsy et al., 2018) is amplified through the magnitude of different solutions in which every individual can find an identification.

2.2 Conceptual model

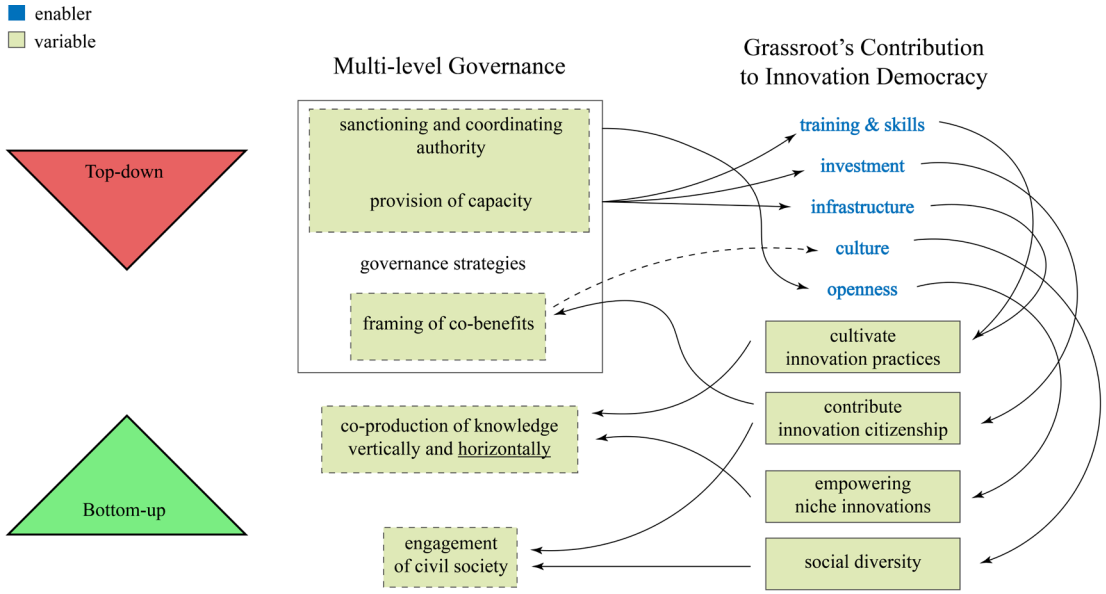


Figure 5: Conceptual model depicting the bottom-up & top-down spectrum with described variables.

2.3 Hypothesis

It is assumed that agency lies with residents to make democratic changes to their neighbourhoods. Shared responsibility plays a crucial role for the realisation of ambitions in a collective, bottom-up effort to advance green space developments. Various angles from which these projects can be approached may be observed and share the common narrative of bottom-linked governance throughout the city of Groningen in order to mitigate the urban heat island effect.

3. Methodology

The established theories of multi-level governance (Homsy et al., 2018) and grassroot's contributions to innovation democracy (Smith & Stirling, 2018) explained in the second chapter are used in a deductive approach to analyse the collected data in order to link empirical observations to the mentioned variables and indicators. To this end of data collection, three cases were investigated that contain bottom-up solutions for green space development. The sampling strategy hereby aimed for a notable difference of involved actors, whilst retaining bottom-up characteristics. The collected data is a cross-sectional sample of the current developments appearing in Groningen in 2022 and is limited to this point in time. Due to the explorative nature of this research, the main information source are two semi-structured interviews with an employee of the municipality of Groningen and an environmental activist, further detailed below. An interview guide was established, with room for follow-up questions. This facilitates consideration of other details and memories of respondents and may allow for a holistic overview of the studied topic; potentially unpacking unconsidered variables. Such qualitative data collection captures the meaning and associations of involved participants in a deep sense, with a subsequent interpretation resulting in a thorough analysis of the presented cases (Leavy, 2017).

In the consecutive data processing phase, full transcription of the interviews was carried out, and can be found in Appendix A & B. After such transcription, coding was applied to the data with the help of the Atlas.ti Web Application. Most of these codes correlated to the afore described variables in the theoretical framework and are then referenced in italics. Some clusters of quotations are presented in the results section and subsequently further discussed in the fourth chapter of this paper.

The Maps displayed in Figure 1-4 were made with ArcGIS Pro and used datasets which could be acquired on request from the municipality as well as averaged national temperature measurements. Furthermore, supplementary information was gathered via screenshots of the public website steenbreek.nl, found in Appendix C. Appendix D contains planned interventions under the centralised Vitamine G campaign (Gemeente Groningen & Strootman, 2020).

3.1 Cases

3.1.1 Foundation Steenbreek – Façade Gardens

Earlier this year, a semi-structured interview has been conducted with an employee of the municipality of Groningen. The objective of this interview has been more general than the scope of this thesis, aimed at creating a deeper understanding of the policy environment of green space governance of the city, as well as decision making processes. Many useful aspects regarding the involvement of bottom-up contributions were mentioned, which made the interview, despite originating from a different cause, the most abundant data source of this paper. Particularly regarding the involvement of top-down authority in the investigated cases, the interview has provided a holistic overview, with thorough explanations of structures and mechanisms. The interviewee described four bottom-up initiatives, out of which two were selected for more thorough research. One distinctly articulated initiative was "Stichting Steenbreek". This initiative - translating to "Foundation Stonebreaking" - represents a subsidised programme, that aims at "co-creatively building living environments that are greener, show improved biodiversity, and climate resiliency" (Appendix C). The name is suiting its objective, since the foundation aims to "break away" from stone and concrete materials, consequently replacing those areas with vegetation. Whilst E-Mail correspondence with the foundation was successful, answers to the asked questions were not improving the discussed results, so that, supplementary to the other interview data, screenshots of their website have been translated and utilised for an overview of taken action instead.

3.1.2 Buurkracht - Photovoice

The neighbourhood organisation "Buurkracht" - translating to "Neighbour's Strength" – is another case originating from the same hour-long interview. Also here, the organisation's name already indicates its objective, providing a platform for local residents to collectively, "strongly" develop ideas. Buurkracht has been contacted as a subsequent step after mentioned in a central quote in the interview with the municipality. At the time, a thesis proposal was submitted with the central theme aiming to investigate the collaboration dynamics between Buurkracht and the municipality. Particularly the utilised photovoice approach was hoped to be further investigated. The word photovoice suggests a synthesis of imagery combined with verbal expression. It entails photos that represent voices of citizens and may therefore be used for facilitated and thorough discussion of environmental problems. Since the voice is captured visually, it serves as a supplement to the initiated discussion in such bottom-up setting; with a GPS tag that provides further utility for effortlessly identifying the captured location. In such a context of co-production of knowledge, this method may amplify citizen's contributions to a great extent (Reimer-Watts et al., 2022). However, unfortunately no interview could be arranged. These processes appear to be rather decentral, with citizens using Buurkracht as a platform for collaboration and outreach. This resulted in the fact that information about such case remains to be solely supplied from the earlier interview. Another employee of the municipality was contacted, apparently working together with the citizen initiative. This employee was hoped to be willing to share more information about the collaboration with Buurkracht, however, without success. Such situation has eventually shifted the focus of this research project to a more holistic comparison between the three investigated cases, and their actor's role and responsibility distribution when mitigating the urban heat island effect.

3.1.3 Environmental Activist – Guerrilla Gardening

An attempt was made to gather a different perspective with less involvement of authorities. Consequently, an individual who was reported last summer in a newspaper article about undertaking environmental activism in the city was contacted. This self-governing bottom-up approach entailed action taken on a very individual basis. The interviewed environmental activist, performing guerrilla gardening, presents the most unconventional and uncoordinated case of green space action taken. The characteristics of "guerrilla" are generally understood as independent, smaller groups or individuals acting against larger forces and regimes. In this case, this means positioning plants and materials without prior consultation of the owner of that space, which is usually happening on publicly owned ground, and would therefore legally require a permit issued by the local government (Cambridge University, 2008; Spijker & Parra, 2017). Due to this person's travel itinerary at the moment of data collection, a live and online interview was difficult to be arranged. Nevertheless, key questions could be forwarded via private messages, and have been thoroughly answered in recorded voice memos, of which a transcription can be found in Appendix B.

3.2 Ethics

Informed consent was sent out to the participants before any data collection. Still, a formal signature on the form was difficult to be acquired. Both participants have commenced the arranged interview after they received the consent form, even without signing it, creating a situation where verbal consent is given. Participants are well informed about the collection and processing of their data, as well as the possibility of participation withdrawal and data request & edit - and agreed to the procedures.

In the data processing stage of transcription, anonymisation was applied to any personal references. The participant's pseudonym is consequently linked to their respective case in order to classify their data with the according function and position within the researched governance dynamics. After completed transcription, the interview recordings were deleted.

4. Results and Discussion

4.1 Bottom-linked Governance: A Way to Move Forward

Answers to the research questions may be formulated as follows: Whilst agency for initiation of the discussed case studies remains with Groningen's inhabitants in true bottom-up fashion, the consecutive implementation phase displays a high degree of bottom-linked governance solutions. Citizens may choose their role from a wide array of democratic initiatives - on a voluntary basis. Bottom-up initiatives enhance spatial knowledge capacity to extents that would otherwise not be accessible and are therefore a crucially important inclusion factor at all stages of the planning process. Especially, the strongly observed level of *openness* by the municipality appears to be pivotal for socio-environmental innovation, helping with the subsequent realisation of innovative, bottom-up ideas. Nevertheless, the continued economic incentives provided by regional and municipal funds, particularly observed in the Steenbreek case, are increasing the impact of such initiatives for people who have felt only moderate responsibility before. These are therefore necessary as a complementary measure, with a strong responsibility of the municipality to ensure this situation. A wider policy environment that supports these greening efforts is observed in Groningen, further integrating its sustainability narrative into the urban realm and *culture*. Additional to the planned interventions under the centralised greening vision of Groningen in Appendix D, bottom-up actors are found to be involved in more decentral solutions, which adds another layer of powerful small-scale interventions to the already established greening vision. The presented case studies prove in the following how the co-operation and collaboration between bottom-up and top-down actors across continuously varying degrees of involvement are key for successful and sustainable urban greening governance.

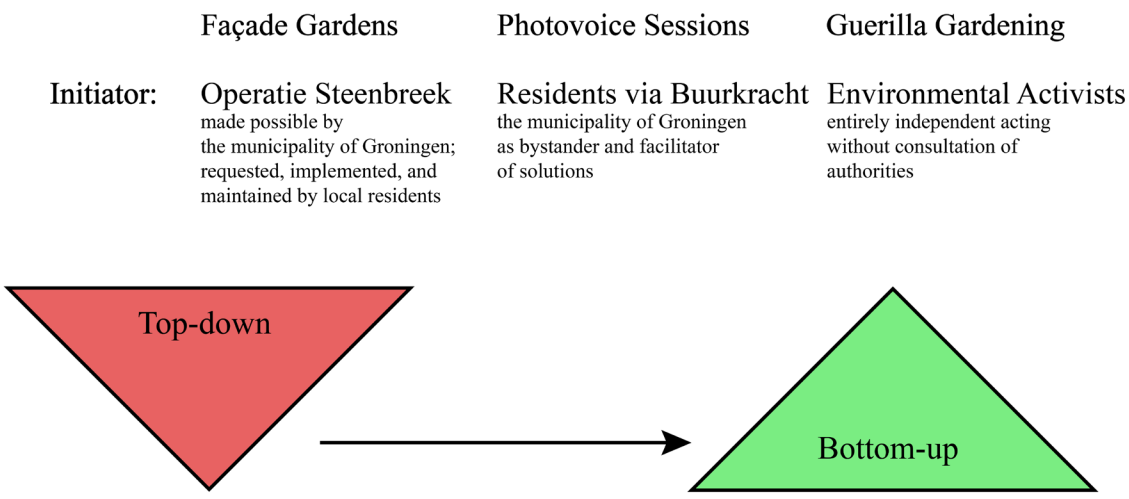


Figure 6: Spectrum of actor's involvement in investigated cases.

4.2 Dissecting the Governance Spectrum

Already in the selection process of the researched cases, it became clear that simultaneous action is undertaken on different degrees of involvement. Therefore, Figure 6 is purposefully at the beginning of the results section. Serving a visual and illustrative function to place and differentiate the investigated bottom-up cases, which contain observed varying degrees of involvement of top-down enablers and other actors. Since the sample size of this investigation is very small, and many more fields of action and initiatives exist beyond the scope of this analysis, a spectrum of involvement is assumed. For the further analysis of the data, MLG variables (Homsy et al., 2018) are clustering the observed similarities, further grouped into: governance strategies, co-production of knowledge, and civic engagement; whilst variables & enablers by Smith and Stirling (2018) are highlighted in italics:

4.2.1. Governance Strategies

1. Sanctioning and Coordinating Authority:

This variable inversely correlates to *openness* as developed by Smith and Stirling (2018) in order to *cultivate democratic innovation practices* and *socio-technical diversity*. Due to the open attitude in coordination, bottom-up actors have various opportunities for democratic involvement, as well as creating their own set of solutions. Observed in seemingly all cases, the authorities serve crucial coordinating functions such as granting development permissions. This is particularly observed in the Steenbreek case, where inhabitants may simply "go to the website of the municipality of Groningen, and then you can click on 'I would like to have a façade garden', and then someone will call you and visit you" (Appendix A). As this is nevertheless publicly owned ground, a permit for removing the sidewalk's tiles will be issued once the façade garden has been requested and processed. In the language used by the municipality's employee, one may interpret the ease of access to this service, since "then the municipality or someone who works for municipality is going to realize this garden." (Appendix A). This realisation is undertaken by partners of the foundation (Appendix C) that correlate to the *training & skills* as well as *infrastructure* and *investment* enablers developed by Smith and Stirling (2018).

In the case of the Buurkracht online sessions, the *coordinating* role of authorities was dismissed, and the municipality took a by-standing role, since "they just participated in these sessions, but they did not organize it […] and now together with the people we are continuing this and putting it into practice" (Appendix A). This means that for the process of idea development, the municipality was solely passively involved, whilst in the later stage of implementation some degree of coordination was certainly necessary in co-operation with its inhabitants. Also here, the *openness* of top-down actors towards innovative ideas is observed, leading to the *empowerment of niche innovations*.

However, even when moving away from these legal grounds, the municipality of Groningen appears to be open for contributions. The environmental activist "also had contact with the municipality, and […] wanted to have permission, but they didn't give permission, but they will accept it, allowed it because it's Guerrilla Gardening" (Appendix B). While exact reasons for this behaviour remain undiscussed, it seems as if the gardening approach of such illegal activity provides reasons for acceptance. In this respect, the authorities are therefore not *sanctioning* the bottom-up actor in a penalising manner, despite unlawful behaviour. This *openness* of the municipality consequently results in increased *social diversity*, as more individuals may act upon these reduced sanctions. This behaviour shows that direct, penalising sanctions are not always necessary, and may be enacted through an opposing way of economic incentives as discussed in the following.

2. Provision of Capacity:

This variable determines the resource environment the bottom-up initiatives find themselves in. Particularly for the Steenbreek case, one may observe a high degree of resource provision (see Appendix C). The participant described situations where the accompanied subsidy funds for façade gardens were used up quicker than expected and needed to be replenished (Appendix A). The made *investments* clearly result in amplified *cultivation of innovation practices,* and consequently experience high public acceptance. Such subsidy funds are "paid from the water taxes, […] the water boards, because it's all about climate adaption and collecting water[…] part of that money is used for this." (Appendix A). This means that the financial capacity provision is governed through regional authorities - adding a vertical level of multi-level governance to this initiative. Nevertheless, the previously described municipal coordination remains to be the dominant top-down actor, with access to regional funds.

Due to the online sessions during the COVID-19 pandemic for the Buurkracht case, resource requirements were small, since internet *infrastructure* was commonly available, and the photovoice approach required little *training & skills*. Later, in its implementation phase, the required capacity for

the realisation of ideas was provided by the municipality. They were described as "small" (Appendix A), leaving the impression of simple solutions. This realisation of ideas may also entail technical and professional human resources employed by, or partnered with, the municipality, enabled through appropriate *investments* and *training & skills*.

The independency of action by the environmental activist makes this actor reliant on self-sufficient capacity provision. However, "it basically costs nothing, because I only used second-hand plants from gardens I work in, and then yeah, you plant it and it will grow" (Appendix B). The small-scale interventions are hereby again key to its simplistic application, reflected in *socio-technical diversity*.

3. Framing of Co-Benefits:

This variable clusters action taken based on associated positive externalities. The Steenbreek Foundation is a multi-year campaign (since 2015), with coverage in several newspaper articles, as well as documented successful "Geveltuinen" implementation across Groningen. The realised numbers of gardens have increased every year since its start, aiming to become the "façade garden capital of the Netherlands" (Appendix C). Not without reason are governmental subsidies incentivising a wide variety of changes: "We already had a subsidy for green roofs, and now we are extending this subsidy. We broaden it a bit. So you can also get a subsidy for removing your tiles and plant plants, trees or other greenery in your garden or to collect water. […] [Not putting additional stress on the sewage system], but to collect water in your garden" (Appendix A). The interviewee mentions the facilitated adoption of directives, policy packages, and subsidies aiming for nature inclusivity & climate adaptation due to the current green and liberal local government. Particularly, directives on public space as well as the mobility vision are integrating these wider benefits into more sustainable urban environments and their associated inhabitant's behaviour emerging from drastically decreased car-dominance with a human-centred development approach (Appendix A). Such a broad influence throughout *culture*, *investments*, and *infrastructure*, shows its effects on various locations, leading to a feedback-cycle that improves *innovation citizenship*.

For the Buurkracht case, the framing of co-benefits appears to be the reason why the municipality has joined the discussion sessions. The developed ideas and concepts may not only serve the very specific problems discussed but could provide insights and lessons for other districts in Groningen.

The Guerrilla Gardener highlighted the long-lasting consequences of simple changes, as well as improved urban quality through additional plant material: "the fact that it's just so easy, that it just takes a minute to plant it. […] So it will, in only a short moment, change a place for a very long time. I think guerrilla gardening starts from just the fact that you can upgrade." as well as: "for me, the main reason is just the health of people, which is also influenced by these warm city centers, but also just the green [colored] area and more of a connection with nature. And it's just pretty nice, like you feel cozy and you feel happy with more plants around you" (Appendix B). This underpins the many positive externalities individuals may experience through an urban environment that is greener (Kaplan, 1995). The activist achieves this through personal *training & skills* as well as third-party *investments,* resulting in the strengthened feeling of *innovation citizenship.*

4.2.2. Co-Production of Knowledge

The local scope of the research project limits this variable to its horizontal application. It may arguably be one of the key components of successful green space governance, due to the inclusion of place-specific knowledge by local residents. The municipality's interviewee mentioned additional participation requests for locations and ideas, hosted on the municipality's website, of which ten ideas were successfully implemented last year with more in progress. Moreover, the "Geveltuinen" initiative leaves the responsibility of finding accurate locations for new greening developments up to the city's inhabitants. In the further implementation process of the garden, "you only have to put in the plants for yourself, but you can also get an advice on which plants are wise to plant in that area. And also get

some advice on how to use plants, and how to arrange it so that they climb up, but not damage the building." (Appendix A). This provision of *training & skills* necessary for realisation is coming from the partners of the Steenbreek Foundation (Appendix C). A diverse set of gardens, and other *socio-technical innovation* is the result of such *cultivation of innovation practices* democratically enabled through appropriate *infrastructure*.

The Buurkracht case might represent the most innovative knowledge co-production approach, since: "they asked inhabitants to come up with pictures, which were heat islands in their opinion, and they thought, 'how can we green this up?'" (Appendix A). These pictures, particularly in an online setting, provide for innovative means to the end of knowledge co-production. Since it can accurately and elaboratively portray opinions and ideas about places through easily accessible smartphone cameras, its efficiency is undisputed (Reimer-Watts et al., 2022). In the subsequent discussion of collected pictures, involvement of the municipality is described as limited and external (Appendix A), showing signs of *openness* required for the resulting *empowerment of niche innovations*.

The environmental activist naturally shows limited signs of any co-operation with other parties. However, "a connection with a woman working on biodiversity, and I had like three coffees with her to plan to green-up Zuiderdiep" (Appendix B) was described. Coincidentally, Figure 2 displays especially this southern part of the city centre, including Zuiderdiep, featuring the highest urban heat island effect. Unfortunately, the plan was described as unsuccessful due to the non-sufficient acquisition of financial means (Appendix B). Again, knowledge production is facilitated through *training & skills*, which would have led to an increase in *socio-technical diversity,* however, could not be completed without required *investments*.

4.2.3 Civic Engagement

As seen in the pictures in Appendix C, Geveltuintjes are traditionally including a high level of civic engagement. The fact that these are relatively unique for the Netherlands, provides an indication that *culture* may play a crucial role for the initiative's success. From the initial request, over to the collaborative implementation, towards the ongoing maintenance responsibilities, one observes strong citizen engagement. The felt *innovation citizenship* is a key contribution factor acquired through this bottom-up initiative.

The interviewee mentioned: "It was not organized by the municipality, but it was organized by 'Buurkracht'. That's just an enthusiastic group of people." (Appendix A). Buurkracht, hereby providing an easy-to-access platform, where citizens can organise their ideas and enrich their outreach. This crucial *infrastructure* is therefore clearly reflected in increased *cultivation of innovation practices.* The notion of highly motivated citizens for this case is highlighted in the quote, which seems to be the main contributor to the successful prolonged engagement of civil society.

The Guerilla Gardener is already fully representing active and engaged individuals of society. Furthermore: "I think the smartest way to do for me in future is just growing myself and using secondhand plants and then, yeah, organize days and produce the plants by myself." (Appendix B). Thereby showing signs and plans of collaboration with other likewise motivated citizens in the future on dedicated dates, which may show larger results due to the amplified engagement of other members of civil society and increased *innovation citizenship*.

4.3 Limitations

Due to the small sample size, it may only be assumed that this bottom-linked governance approach is common practice in Groningen. The interviewee described an edible city concept, as well as ambassadorships towards the end of the interview (Appendix A), which would have been other interesting cases to include. However, time and word constraints of this project have limited the cases to three. The exact solutions originating from the intriguing Buurkracht case could unfortunately not be identified, as well as a missing cartography of decentral green space developments in the recent years.

5. Conclusion

Collectively deciding to replace more stone and concrete materials for vegetation is a necessary step to advance climate resiliency of urban environments. The presented cases display various angles from which such green space developments can be approached and share the common narrative of bottom-linked governance throughout the city of Groningen in order to mitigate the urban heat island effect. Transdisciplinary involvement through socio-technical diversity of these bottom-up initiative enhances and complements the set of solutions. Multi-scalar projects in ambivalent directions are observed. With municipal subsidies paid by water taxes on a regional level, collaborative realisation and plan making, as well as local maintenance, greening efforts in Groningen are utilising bottom-up solutions to efficiently govern this difficult task of socio-environmental change on multiple levels.

From the very beginning of this research project, participants have articulated that developments are going into the right direction. The municipality's employee made a rightful remark that agendas are highly dependent on the government's stance and priorities in order to get more policy documents approved, further promoting and enabling green space developments. Bottom-up initiatives consequently find themselves in a governance environment where ideas can flourish. Wider awareness and felt responsibility by citizens is required for cultures and societies to become more sustainable not only in their acting, but also in the way we design our urban landscapes (Dreyer et al., 2021). The integration of this narrative into mobility and public space visions is achieved through exceptional acceptance of all actors, with open communication playing a traditional role in Dutch culture. This may arguably be the main lesson for other places and countries seeking to improve and facilitate bottom-up innovation. The resulting enhanced urban as well as spatial quality is felt throughout. Diffusion of power relationships and the merging of responsibilities are leading to situations where top-down authorities and bottom-up residents are actively co-working on a shared objective. In many systems such as this one, there exists a coordinating, governing authority - whilst citizens have a democratic right for decision-making; influencing the degree of involvement as well as active participation, and, of course, contributing towards innovation, progress, happiness and well-being.

6. Bibliography

Cambridge University, P. (2008). *Cambridge advanced learner's dictionary* (3rd ed.). Cambridge University Press.

de Roo, G. (1998). Environmental planning and the compact city a dutch perspective. *Studies in Environmental Science*, *72*, 1027-1042. https://doi.org/https://doi.org/10.1016/S0166-1116(98)80061-7

Dreyer, B. C., Riemer, M., Spadafore, B., Marcus, J., Fernandes, D., Taylor, A., Whitney, S., Geobey, S., & Dennett, A. (2021). Fostering Cultures of Sustainability in a Multi-Unit Office Building: A Theory of Change. *Front Psychol*, *12*, 624311. https://doi.org/10.3389/fpsyg.2021.624311

Fraser, E. D., Dougill, A. J., Mabee, W. E., Reed, M., & McAlpine, P. (2006). Bottom up and top down: analysis of participatory processes for sustainability indicator identification as a pathway to community empowerment and sustainable environmental management. *J Environ Manage*, *78*(2), 114-127. https://doi.org/10.1016/j.jenvman.2005.04.009

Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, *1*(1), 24-40. https://doi.org/10.1016/j.eist.2011.02.002

Gemeente Groningen, & Strootman. (2020). *Groenplan Groningen - Vitamine G*.

Haaland, C., & van den Bosch, C. K. (2015). Challenges and strategies for urban green-space planning in cities undergoing densification: A review. *Urban Forestry & Urban Greening*, *14*(4), 760-771. https://doi.org/10.1016/j.ufug.2015.07.009

Heaviside, C., Vardoulakis, S., & Cai, X. M. (2016). Attribution of mortality to the urban heat island during heatwaves in the West Midlands, UK. *Environ Health*, *15 Suppl 1*, 27. https://doi.org/10.1186/s12940-016-0100-9

Homsy, G. C., & Hart, S. (2019). Sustainability backfire: The unintended consequences of failing to engage neighborhood residents in policymaking. *Journal of Urban Affairs*, *43*(3), 414-435. https://doi.org/10.1080/07352166.2019.1607746

Homsy, G. C., Liu, Z., & Warner, M. E. (2018). Multilevel Governance: Framing the Integration of Top-Down and Bottom-Up Policymaking. *International Journal of Public Administration*, *42*(7), 572-582. https://doi.org/10.1080/01900692.2018.1491597

IPCC. (2022). Summary for Policymakers In D. C. R. H.-O. Pörtner, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (Ed.), *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Cambridge University Press.

Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, *15*(3), 169-182. https://doi.org/10.1016/0272-4944(95)90001-2

Leavy, P. (2017). *Research Design: Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches*. The Guilford Press. https://doi.org/https://doi.org/10.1111/fcsr.12276

Moulaert, F., MacCallum, D., & Hillier., J. (2013). Social Innovation: Intuition, Precept, Concept, Theory and Practice. In F. Moulaert, D. MacCallum, & A. Hamdouch (Eds.), *The International Handbook on Social Innovation: Collective Action, Social Learning and Transdisciplinary Research* (pp. 13-24). Edward Elgar. https://doi.org/https://doi.org/10.4337/9781849809993.00011

Rakoto, P. Y., Deilami, K., Hurley, J., Amati, M., & Sun, Q. (2021). Revisiting the cooling effects of urban greening: Planning implications of vegetation types and spatial configuration. *Urban Forestry & Urban Greening*, *64*. https://doi.org/10.1016/j.ufug.2021.127266

Reimer-Watts, B. K., Abel, E., Coulombe, S., & Riemer, M. (2022). Co-Creating Cultures of Sustainability and Co-Imagining the Teaching Green Building: The Use of a Participatory Photovoice Process in a HPGB Context. *Research Square*. https://doi.org/10.21203/rs.3.rs-1315967/v1

Sabatier, P. A. (1986). Top-down and Bottom-up Approaches to Implementation: Research A Critical Analysis and Suggested Synthesis. *Journal of Public Policy*, *6*(1), 21-48. https://doi.org/https://doi.org/10.1017/S0143814X00003846

Smith, A., & Stirling, A. (2018). Innovation, Sustainability and Democracy: An Analysis of Grassroots Contributions. *Journal of Self-Governance and Management Economics*, *6*(1), 64-97. https://doi.org/10.22381/jsme6120183

Spijker, S. N., & Parra, C. (2017). Knitting green spaces with the threads of social innovation in Groningen and London. *Journal of Environmental Planning and Management*, *61*(5-6), 1011-1032. https://doi.org/10.1080/09640568.2017.1382338

Syvitski, J., Waters, C. N., Day, J., Milliman, J. D., Summerhayes, C., Steffen, W., Zalasiewicz, J., Cearreta, A., Gałuszka, A., Hajdas, I., Head, M. J., Leinfelder, R., McNeill, J. R., Poirier, C., Rose, N. L., Shotyk, W., Wagreich, M., & Williams, M. (2020). Extraordinary human energy consumption and resultant geological impacts beginning around 1950 CE initiated the proposed Anthropocene Epoch. *Communications Earth & Environment*, *1*(1). https://doi.org/10.1038/s43247-020-00029-y

Taylor, B. R. (2010). *Dark Green Religion: Nature Spirituality and the Planetary Future*. University of California Press. https://doi.org/https://doi.org/10.1525/9780520944459

Wallage, J. (1977). *Verkeerscirculatieplan Groningen*. Municipality of Groningen.

7. Appendices

Appendix A: Interview with an employee of the municipality of Groningen - 11/01/2022

Speaker 1: First, I'd like to tell you some stuff about ethics. That's always a big thing with the university obviously you're gonna be anonymized and there's nothing identifiable. I might have to put in who you are, like what you do. But apart from that the recording is also just for myself. I will transcribe some of your answers and then also let you know what I put into my research paper and then the rest is gonna be deleted. So basically if you're fine with that we can start with a small introduction from yourself. Firstly, the research I told you about in the email is basically a scientific blog [about greening policies in Groningen]. We're supposed to do, so I'm now in my last semester of my bachelor's program, and we are kind of going into like slowly going into the the bachelor thesis. So they let us choose a free topic where we can already explore some things and then maybe later on further research on it in the actual thesis. But for now it's really like a contemporary topic that is interesting. And also interesting that we like to research about it and just know more stuff about it. I was reading lots of international articles as well. There, I can try to now relate it to the situation Groningen, but first, um, maybe just tell me something about what you do, what you do in your daily life and what you do also what is it like working for municipality. And generally what you like about Groningen and anything that comes to your mind.

Speaker 2: Yeah. Okay. Well, I work for the city of Groningen for almost six years. I studied landscape architecture and marketing. And after my education in marketing and I first worked for Alterra, which is a research institute in marketing. And then I worked for 10 years in the city of Zwolle, mainly as a project leader on several landscape projects. And then my, we are my husband and my son, we moved toward the city of Groningen and I was still working for Zwolle, but when my second child came, I wanted to work a bit more in the neighbourhood, so I started to apply for a job and found this job at the city of Groningen. So we live in Peize a small village in the southern part of Groningen and yeah, within the city, I work for the department of city development and mainly work on climate adaptation and greening, greening up the city. So we did a lot, quite a lot of work in, mostly on policy, on climate policy and, together with, my colleague, we wrote, Vitamine G, the green vision. Um, and my role actually within the municipality is to bring our policy into practice. So we wrote a lot of policy, well, we did a lot of work on policy description, but how is it going to end into our, into our projects? So that is actually my role.

Speaker 1: Did you do that already in Zwolle or was there now like a different task to do?

Speaker 2: Yeah, this is really a different task in, yeah. In Zwolle, I was not working for the municipality, but I was working on a separate organization and we were working for the municipality, but not working at the municipality. So actually all the municipalities within the province of Overijssel we worked for on different projects on landscape and city planning.

Speaker 1: OK. So do you think you now also have like the thing to work for the municipality where you can actually put it into practice and not necessarily only work that is already decided by them basically?

Speaker 2: Yeah. What I really like is that you are actually working for the municipality. So actually the things you decide or the things you do, also, is being put into practice when you see it outside in the city. So that's, that's very nice. Yeah.

Speaker 1: Yeah. Um, so how's Peize like, your neighborhood itself, is there lots of green space? I guess it's a bit further out it's um, yeah, quite green already, right?

Speaker 2: Yeah, it's, it's a smaller village and it's, it's located near the Onlanden and big nature area between, well Groningen and Peize actually. And there there's a lot of green space surrounding the village, but also within the village it's different, lots very different than, yeah. Very relaxed though. I, I really like it here.

Speaker 1: I guess you didn't move there when the Onlanden was still agricultural field, right? Like you already moved when it was already transformed back into nature area basically.

Speaker 2: Yeah, that's true. You know, I, I think we live here for almost nine or 10 years or something, then it was already a nature area.

Speaker 1: That's nice. How about the, um, policies themselves? Like, are they more of the generic thing or because like, I, in my studies, we were always told it's specific, so it's like very, specific for the area. And it's nothing you can apply in a blueprint, like how they did that in the sixties, or like, you can just copy and paste. It's always a lot of work to do for the area itself. When you now did the whole policy package was it always like the vision itself? Was it in a broader theme to put everything in one big package and then have smaller clusters? Or how did that work out?

Speaker 2: What we did actually did in Vitamine G is that well we were thinking again about the impact of green in the city, on well, climate, nature, health, food, all different aspects. So we made like a general policy for the entire city of Groningen about that, based on these different aspects of green, for the city of Groningen or for the municipality. And then we looked at where what is needed, at which location. So for instance, we have this, the heat stress map of the city of Groningen, where you can see what are the locations that are getting extremely warm because there's, well, there's not that much green in that area. So then we focused on locations. Okay. If you want to do something about cooling down the city, then these are the locations where we have to use green to cool down the city. And we've also looked at where do we want to increase biodiversity? So at these locations, we made a green access. Green gardens for example. I also mean corridors for connecting green areas.

Speaker 1: Sounds good. Like, how did you choose the plants in those spaces? Like, was it just, um, random sort of, or was there anything specific into the plan of the biodiversity or something that was already close by? The plants that were planted in those corridors, were they native plants or something that was already established, or how did you execute this?

Speaker 2: Well, we tried to, to look for a mixture of different plants and different trees and we use mostly plants that are native, but that's not really my part. I'm more into, well, what areas are we going to look at? What has to be greened up? And then we, then we bring it to the design department and then they look at the exact type of plants, but we have like a general way of thinking about greening up the city. And it's mainly of, well, local

species, native species. And also a good mixture of different plants and different trees that if we get like diseases, then, then there are enough trees that will stay alive.

Speaker 1: Okay. Sounds good. You mentioned the heat map that is taken as one indicator. Was there anything else you put into consideration when designating those areas?

Speaker 2: Yeah, it's a combination actually of the heat map which shows where the warmest places are in the city. But together with the city, we also looked at places where people gather, so where a lot of people meet. We also looked at places where a lot of elder people are living because elder people are more vulnerable to heat than younger people. And we also looked at locations where more vulnerable [and lower social class] people are living, to also support them or to engage them to come outside and, and, um, do something in the green, like green gardening or things like that. So actually to also increase the health situation of people. So those were all different aspects. Where, what do we wanna do, on what, at which locations do we really think it is needed to green-up, to make the city greener?

Speaker 1: So I guess there's like some certain neighborhood statistics you use for, um, indicating these vulnerable people. Like there's probably some unemployment rate or something you take into consideration. Okay. We want to have some also maybe certain immigration minorities who are then [receiving these greening benefits]. Still have the same level of, it's called in the literature was always 'environmental justice' so that everyone has the same access to that green space. And can enjoy the same benefits. 'Cause obviously it's a very big health improvement if you can have access to green spaces. So this sounds like a bit of a top-down approach that you like design the spaces how they should be. Are there any citizen participation efforts? I guess, as I'm studying now for almost three years in Groningen this question might be redundant, since it's always like that, but if you can elaborate a bit on how you engage the citizens themselves in the plan.

Speaker 2: Yeah, we did. Also, I think when we started to work on the green vision, we already had, COVID, so we could have nice online meetings with people. So we did a lot of online. So we asked people on our website what are locations that they think are important that they want to keep green or wherever they want to enlarge green space, and for what reason. And we also asked people to come up with ideas, like locations, which they want to improve very specific locations, which they want to change and to make it more green. And we have quite a long list of all these ideas. I think last year we realized about 10 of these ideas in 2021, and next year, or this year, we will take another group of ideas and also realize them. So these are mainly smaller ideas, like a square where we want to put some trees, or a street. We can make the pavement smaller and allow for extended green areas besides.

Speaker 1: So then you also share some of these ideas? Like if some person on a certain spot has a certain idea, do you share that with other citizen? Or like how do you decide that this certain idea is good and you would like to take it further? Or is it the frequency? Like, when people always indicate the same location? That's what we did in my first semester, actually, that was still without COVID, where we like ran from door to door. And we just we split our students into the different parts of the city. And then we decided, okay, we want to have a new park there because we have the largest frequency of ideas of the, a location, gathered from the people. People were just indicating that

on the phone. Okay. We wanna have it there. So we just took it by frequency, but I guess there are lots of other indicators going into that?

Speaker 2: We, when now actually, in making of the green vision, we really, actually, everyone who had an idea could bring it into the discussion, could write it down on the website and by that we've collected all these ideas. But now when we are putting it into practice, we really want that people [are passionate], that that's not only one person with one idea, but the person who has this idea also has to make other people enthusiastic for the idea. So, if there's a street and someone wants to green it up or make a square more green then he needs to inform his neighbours, but also interact with his neighbours in making this plan together with us.

Speaker 1: That's a very nice approach. Like that's something in Germany that's not happening really. Like it's not really involving the citizen as much. I remember for example, when my street at the moment is greened up too a little bit, because it's close by the Suikerterrein in that strip that you are developing. The whole I looked at the sponsland website, and basically it's going all the way into the city. Right. It's that corridor you were talking about? So it was very interesting that they just informed us with a small letter, okay, this is what we're gonna do. And if you have any other ideas or any other improvements, just let us know and like a communicated approach towards everything that is happening. So, do you think that there's anything you can do improve to include all social groups? Because by now, like you said, okay, we're gonna look at certain indicators, but there's always, it's always the people who have time and who want to, do this or it's always a little bit limited, right? Is there anything you can, I mean with these online means, and now it's already a lot better, I guess. Cause I think there's always someone with more time or some more availability, so people can be quicker with these online means so they can participate. Otherwise, usually we were seeing a problem sometimes that um, if people are just gathering in the evenings, then it might only be the people who don't work currently, or who can have the time to share their ideas. So if you now do it in an online setting where time is not a problem anymore, then you have more people included, right? And that's always what you want.

Speaker 2: Yeah. I think what you need is a mixture of communication, participation ways. And I think that's something we can also improve. What we are doing right now is we are making now a new subsidy. For inhabitants. And they can for their own environments, they can, we already had a subsidy for green roofs, and now we are extending this subsidy. We broaden it a bit. So you can also get a subsidy for removing your tiles and plant plants, trees or other greenery in your garden or to collect water. Not putting it in the ground [Not putting additional stress on the sewage system], but to collect water in your garden.

Speaker 2: And we also have this subsidy for gardens in front of your house. Front yards. There is, there's a name for it, the small ones, the very small gardens. [Geveltuintjes]. So these are all particular initiatives that you can just apply for as a person. But also last year, we did an online session in Vinkhuizen, one of the neighborhood of Groningen, and it was not organized by the municipality, but it was organized by Buurkracht. That's like just an enthusiastic group of people. And they asked inhabitants to come up with pictures, of places which were heat islands in their opinion. And they thought how can we green this up? So we had about three of these online sessions and the municipality was just part of it, they just participated in these sessions, but they did not organize it.

Speaker 2: And I think that also helps because then it's not the municipality that wants something from the inhabitance but it's an organization that is closer to the people that are living in the neighbourhood. So it's an easier way to join this. And we had about three of these sessions and then they offered all the ideas to us, to the city. And now together with the people we are now continuing this and putting it into practice, but I think it really helps to have someone externally organizing.

Speaker 1: That sounds very nice. And also interesting that you mentioned these subsidies, 'cause actually when I first thought about my research, I found that is actually one of the main key points I would like to stress in the blog as well, like how do citizens themselves arrange their own greening. Of course some property owners, some rents their property, but like how do the surroundings become a little bit more green by the citizens themselves? 'Cause I think that's most effective usually. You can add some small plants and you already get some benefits in there. I was always wondering if the façades themselves, I also took a few pictures how they can be greener, cause obviously it's a problem if something grows on the façade, then it's usually not that good for the building. Like it's not good for the structure, right? So I saw many small structures, sometimes they're out of wood, like in my neighborhood, like a wooden frame and then you have only some ropes in there. And from there, the plant can already grow higher. That looked like the most organic and best solution, but sometimes it's out of metal as well. Um, so for this sort of façade greening, would there also be a subsidy applied? Is it in the same program?

Speaker 2: Yeah. It's not only a subsidy actually, you can go to the website of the municipality of Groningen, and then you can click on 'I would like to have a façade garden', and then someone will call you and visit you. And then, we actually, the municipality or someone who works for municipality is going to realize this garden. You only have to put in the plants for yourself, but you can also get an advice on which plants are wise to plant in that area. And also get some advice on how to use plants, and how to arrange it so that they climb up, but not damage the building.

Speaker 1: That sounds good. That's funded by public money, I guess like just public funds that are there? Because obviously somebody has to work for that, but that's cause there's no direct economic benefit of course, but in the later, bigger scheme. That's also in some literature talking about the climate problem as an economic problem in that sense. So if you put it in a very larger scale that over decades, then you have that economical turnover actually. By investing money now in small portions, it will trickle down to the better economy.

Speaker 2: Yeah, and this is paid from the water taxes. The water boards. So parts of it, because it's all about climate adaption and collecting water. So the part of that money is used for this.

Speaker 1: So the collection of water is mostly for the sewage system, so that the system that usually collects the water is not overflowed, like staying within its capacity sort of.

Speaker 2: Yeah, and also the subsidy for green roofs is also paid from the water taxes.

Speaker 1: How about the green roofs of like buildings that are existing already? I see in Groningen of course you have many old buildings, I guess it's sometimes not possible, but I also see a few like flat roofs that are technically capable, but might need some insulation

and like some technical improvements. How is that gonna be developed in the future? Or is it usually that a new building is set up and then it has to comply to a certain standard regarding greening? Or can you also transform existing structures?

Speaker 2: Yeah, that's depending a bit on the structure of the building. Not all buildings have sufficient structure, so they have the possibility for green roofs. But so you want to have a green roof, then you can you can get a subsidy, but you, as a person, you have to arrange the rest of it. So you get really a subsidy for the plant material and for the realization of the green roof. But if you need to do something about the capacity of your building or for instance insulation, then that's on your account. So we only subsidized the green roof but actually it's mainly existing buildings that get green roofs. I see, because now have we have at this moment, all roofs can get a, get a subsidy, also newer, new build areas, but we want to change that.

Speaker 2: And we only want existing buildings to get the possibility for this subsidy because for new buildings we have also this policy which is called 'nature inclusive building' and with nature inclusive building actually, before you start to build your, or before a house or a building gets built, you can get points for parts that are nature inclusive, for instance like a green roof or having locations where birds can breed. So if you get like all these different aspects in your new house, then you can get points for that, and you need a minimum amount of points for starting to build your house. So then actually green roofs are actually one of the arrangement within this nature, inclusive buildings. So we said, well, it's a bit weird then if you also subsidize that, because it's actually just the way we want it to be done [from the beginning].

Speaker 1: So basically, if you have a certain private developer in an area, then he needs to collect these points in order to even get the permit to build. 'Cause I always thought it's more of a branding strategy, by the developers, because obviously it gives them more money, to say they have built a more sustainable neighborhood or like more sustainable building. Because mostly private real estate developers obviously have monetary goals in the first place. And then in the later stage it trickles down to sustainability actually fulfill the profit essentially. So how would you say is the, the city itself trying to become a green city, like in a sense of city branding? Do people go to Groningen and they think of all these new green spaces that are actually gonna be developed? I looked at a few schemes [and plans], it should become quite quite green in the next decades.

Speaker 2: You mean like we are going to also promote the city?

Speaker 1: Yeah, is there any campaign going alongside it or is it only something that is already in a passive way? Like you make it green and then everybody will know about it just by the word of mouth?

Speaker 2: Um, there's not really a campaign on greening the city. But we do be thinking about it more, like we are looking at like this international or European contests or the greener city. I think a few years, I think maybe already 10 years ago, we did a Dutch contest on greener cities, and then we got this award for being the greener city. I think it was in 2013 or something. And we are also looking for more of these international or European awards, but then you have to put a lot of effort in, well, joining these awards. So then you need a lot of data and a lot of input from how do we really green up our city, but we are looking for possibilities.

Speaker 1: So it's interesting that you already won the award for the greenest city in the Netherlands. I think that's a little bit surprising to me, but I always see Groningen as having many small scattered green spots. So it's like all around the city, there's some small green spots. And I think in the future you will sort of connect them a little bit, I guess? It's that integrational part of the whole area being actually like what you said earlier with that corridor approach that you like to connect the biotope a little bit. I think so far I have only one more question about transportation. So is there, because obviously Groningen as a bicycle city, sometimes a strip of pathways where people walk all the way through the city and they never have to leave the green space? Is there something like this gonna be developed for cycling, where you cycling the green and you go from one side to the other?. So sort of don't have to leave the green space, or is there any connection to transport?

Speaker 2: Well, we are actually, just before Christmas in December, we had two policy documents which were approved by our college networks. The mobility vision, and a guidance for streets, something like that. A framework for public space, and both were about bringing the cars more to the outside of the streets. So bring all the traffic from 50 to 30 kilometers an hour. And actually get more space for people to walk and cycle, and less for transport by cars. And the other one, the guidance on public space was mainly about our streets that were mainly dominated by cars.

Speaker 2: And now we are trying if something happens in the street, like you have to repave the asphalt, or you put more new trees in it, or you have to change the sewage system, then we use this guidance and then we also make the street more green, climate proof with more locations to meet and less car traffic, and more places for walking and cycling. So that actually will green up the entire city, at least in a long term, but that's the idea. So I think that it's mainly more about not really having corridors or connections for cyclists to only cycle through green areas, but actually use all the streets within the city or within Groningen, and create more opportunities within one street. So actually get rid of the dominance of the car, and make more green and more livability within the streets. That's more the change.

Speaker 1: Yeah, I guess that also has the more positive externalities, ‘cause you're not having to focus on only bicycling and walking. You can combine them as like some big slow mode activity and the main transportation with like public transport as an alternative and then reducing the car. I think that's a very strong focus in the Netherlands. I mean dropping down the speed limit is already a big change. That's something not many other countries can really do. In the Netherlands, it seems to go so effortlessly in that sense. But, there, it would also be my question if you have one thing that is most difficult to get these policies approved. Is there something where you in your daily life and your daily practice have a certain issue with approving these policies, or what is the biggest challenge when designing them?

Speaker 2: Yeah, it depends a lot on the politics. So at this moment we have quite a green, left wing, government in Groningen. So now is the moment to get more green policy documents approved. But it really depends on what is the policy at that moment and if it's more difficult, then you have to find other ways, I think, but, from as long as I work for the municipality, actually most of the more green ideas there were not that difficult to get approved.

Speaker 1: Okay. So is there sometimes the case that certain ideas get approved, like you don't doubt to get the grant, but you have to improve it and then it's, later on in practice, but it goes through, as you say, because of governmental direction.

Speaker 2: Yeah. At least in the current situation, it is not that difficult. Of course you always have cases like this for instance, this nature inclusive building, it's difficult to get it through to the government or the [parliament], the policy that they have to decide upon is not that difficult, but within the municipality and within your own colleagues, it's more difficult sometimes, because you have, for instance, where I work at the department of city planning, you have, I work for climate adaptation and green, like livability, livable cities, but there are also people that work on the economic [development], the spatial quality and, or on buildings. And they also look at whether we really have to [intervene], the city is growing, but there is a lack of houses at this moment. So we really have to speed up the number of houses that are being built. So it's difficult if we say 'no, it also has to be nature inclusive' because that is for them an extra thing to do. So within the municipality, you sometimes have these differences, you have some conflicts, that we have to solve before we can bring it into practice.

Speaker 1: Yeah. You're making the city better, but not necessarily faster in the development in that sense. I totally see that. Is there anything else you would like to share? Like I'm sort of done with my questions, I think I, you answered all of them. Any things, anything you would like to see in the future that it's not yet there, where you have like some certain vision or a certain thing that you would like to tell me about when I write my scientific blog about the greening of Groningen, in that sense, but also in general how it's put into practice, like how Groningen acts upon it in regard to how other cities do.

Speaker 2: Yeah. Well, I actually feel that the city of Groningen is developing well, at least with this guidance on public space, and the mobility vision and getting rid of the dominance of the car and being more into climate adaptation and greening up the city. I think is already quite well. I'm quite positive about the way it's going at this moment. And I think it's getting really interesting because now we've put everything into policy, but how is it really going to work in the field? So it's going to get interesting, I think, the upcoming years, and can we really improve the city and green up the city, because when you put it into practice, you will come across many other conflicts.

Speaker 2: Some people that don't even want a tree in front of their house, or some people within the municipality, we also need to have enough space for cars when people want to park their car in front of their house, if that's not possible anymore. So it's difficult, we'll see. But I think it's going to be exciting to see how it really is going to work out. Maybe it's interesting if I send you the guidance on public space because it's in Dutch, but there are a lot of images. So I think based on that images, you can already understand a lot of the ideas we have.

Speaker 1: Yeah, I can also read Dutch more or less, so it's fine. I can understand you better than talking myself, but yeah, thank you very much for that. That guidance, maybe one more thing that came to my mind. So when you say how it's gonna work out, is there anything connected to these subsidies? Is there any [additional information], like you said, it's on the website and, how people being informed by, do you think everyone knows of these possibilities? I [personally] heard from a few people already that there are

subsidies for collecting rain water and all things, so probably everybody knows of it basically.

Speaker 2: Yeah, no, I don't think everybody knows, about the subsidies. We are trying to communicate through the website, but we also have these green markets, where before Corona, we also went into the neighborhoods and there were for instance markets. And then we had these flyers with which we shared information. And now we are working on ambassadorships. So we have these ambassadors that are connected to one area of Groningen. And they inform the neighborhoods, together with a group of people. They look at locations, which they want to green, or they want to do something on climate adaptation or collecting water. I think about 10 ambassadors divided over 10 urban districts within the city and they just started, but it's the idea that they can inform and think with us about ideas to green up those urban areas.

Speaker 2: And they can also be the ones communicating about the subsidies more easily. And we have the green mayor, so he also comes more into the urban areas and share ideas and also inform people about the subsidies. But yeah, I think, there's still enough to do to get more people involved. On the other hand, the subsidy for green roofs, for instance, we have like two and a half hundred thousand euros in this subsidy. And in 2021, it was before summer, the money was already gone. So we did an on another one hundred thousand Euro and that was also gone within two months. So I think there are a lot of people who know about this. And then it's growing, people inform each other.

Speaker 1: Yeah, exactly. I personally liked that letter came into my mailbox a lot, just saying okay, this is what we do and stuff like that. It's like an indirect, but also direct way of communicating. I mean, it's a bit of paper that we produce everywhere, but then everyone has the, the opportunity to know about it. I guess in many ways and with Corona, you are in some sense limited, but also have more opportunity how you, how you approach it. That's why you do the website I guess mainly, right?

Speaker 2: Yeah, that's true. And we are now working on a new website, it's going well, we have a working title's called sustainable Groningen, but it's a website for inhabitants and we put everything about sustainability on it. So like food, energy, climate, green, circularity. So it'll be one website where people can get information about subsidies, but they can also put their own ideas on how to be more sustainable. We share ideas, all those things. And we really want to start a campaign on this new website so that people really know where to find it. And yeah, then all our subsidies will also be part of that website.

Speaker 1: Sounds good. You mentioned food. Is there any connection, I heard earlier on also that you said urban gardening, is there any connection to food growing within these green spaces, or is the main purpose recreational?

Speaker 2: No. Also on urban gardening. We have this [initiative], it's called eedbare stad - edible city. And people can, well, actually adopt a piece of green from the city of Groningen and start their own gardening location over there. And we are also looking for creating new locations for urban gardening, a bit more outside of the city. So for instance, making a connection towards Meerstad, to see if there's also a demand for more urban gardening over there. So we're enlarging that.

Speaker 1: Sounds good. So then eventually there will be like a bit of a circular economy sort of growing your own food and then also transporting, a lot deeper values in that sense. I think if you grow your own food, you really have a stronger connection to what you're actually eating during your day. Well, I'm, I'm very happy with everything you told me. Um, if there's nothing else, I guess we can stop this interview at this moment. That was very insightful, like really a lot of things and I can really [use] for a nice little blog, it's only for us, like it's really only our conference where we have this little cohort of like 16 people, I think, where we all have our own topic and then present it and it's just a preparational thing for our thesis later on, but now it's just an exploration of what is possible. What is being done. And I think what you told me was very insightful.

Speaker 2: Okay, well, good to hear. Good luck. Thank you.

Appendix B: Questionnaire answered (voice messages) by environmental activist - 19/04/2022

Okay, morning, I'll answer the first question. What is it, what you have done in Groningen and where do you think guerrilla gardening starts? Well, I haven't done a lot. I have only done some things. And for me, most of the things I did just came from the thought ‘there can be a plant here’, like just the fact that there was no plant, even when it was a great spot to plant a plant. And then also the fact that it's just so easy that it just takes a minute to plant it. And it basically costs nothing because it only used second-hand plants from gardens I work in, and then yeah, you plant it and it will grow. So it will, in only a short moment, which will change a place for a very long time. I think guerrilla gardening starts from just the fact that you can upgrade, so you see a picture or you see a street or a corner, and just the fact that you think, ‘oh, if there would be a plant here, it could be so much nicer, just for me. It's just pretty nice.

And then the second question, the motivation. Yeah. As I already told you, the motivation for me is that it's just so easy and so much nicer. And I just did it by myself because if you, I had contact with the municipality and then you have to like, get permission for this and you have to do this, you have to do this, and it's like a very long way to reach what you want. In fact, it's just digging a hole in the ground, putting a plant in and that's it. So for me, it was just like, okay, let's skip this whole beginning part of getting permission for it. Let's just do it because it is only like 10 minutes and it will change a lot. So that's why I just did it because I was like, that's just the easiest and quickest way.

How did I organize it? The first one I did was together with my friend. She is a photographer and she had, for her education for her school, she had to reach the news with one of her pictures. That was the challenge. So she asked me if I knew anything if I had some great ideas and then I said, greening from cities is pretty trendy. So probably that will work. And then she had a yes on that idea. And then she was like, why should I not picture you? And then you are in the newspaper. So she did. And that's the pictures which are in the newspaper. So it basically started with her asking me, and then I had an idea and then there was an opportunity. I didn't pay for all the materials because I used second-hand stuff. So yeah, it's just local and as cheap as I can.

How do I/how did I pick the locations? But mostly it's just, if I walk, I see a place I'm like, oh, perfect. There, that's perfect to plant something. So mostly it's just the ways I walk in the city, just the streets I walk and then I just have a focus on a place, or sometimes there's like a tile missing, like a brick missing in the ground. And I'm like, well, if it's already missing, then why not? So mostly it's just from looking like accidentally walking around and seeing opportunities. And I went to a lot of big cities in Europe and my focus has been on like plants and greening and yeah, at some point you just see where you plant and what's a good location and yeah, you can learn a lot if you look at it a lot.

Is there anyone involved? I tried to, I had a connection with a woman working on biodiversity, and I had like three coffees with her to plan to green-up Zuiderdiep. That's the place where I lived because there was just so much space, like even around the trees, the tree dripline, and they have like, they are protected by like some fence but they don't really, like, they don't take out the bricks and then you can easily put something else in it. So I had like a whole, I made with her, a whole plan and like a biodiversity plan and which season, which plant will work and which side is sunny enough. And so I had many conversations with her about this.

And then I also had contact with the municipality, and I wanted to have permission, but they didn't give permission, but they will accept it, allowed it because it's guerrilla gardening. And then the only thing I needed was materials. But because this one was a bigger plan I made an email and sent it to like 50 companies in the area to like growing companies from plants and trees. And sadly only like three people reacted and they were like, yeah, if you have a better plan, you know, and I was like, well, I have a plan. This is the plan. So there was not much, much response. Probably because it didn't take out much for

them. But I think the smartest way to do for me in future is just growing myself and using secondhand plants and then, yeah, organize days and produce the plants by myself.

I think everyone can do this, but there are some facts you have to keep in mind, like, for example, safety on the street. And also the way, like, for example, if you clean, if you take out the bricks around a tree, then there will be grass or there will be plants or whatever, and then it's harder to clean. So the municipality has to clean those areas better from plastics. And it's harder to reach. So yeah, but I think if they come anyways, like they can clean up anyways, it should not be a problem because it doesn't take much more time. And those people also don't do their best job. So I think if you educate and you keep them up to date and that there's something changing and that they have to keep an eye on it. And I think that will not be a problem.

But it might be that some people are just randomly putting plants on places. I was thinking maybe just to put a plant on the Grote Markt, just to make a statement. Yeah, a lot of places are just not made for, if you think about it, roots from trees, they will eventually grow bigger and then it can damage houses. So there are like, you can do whatever you want, but there are some, some things you really have to think about because if you do not, then it can just make damage later or so. Yeah. I think if you have a bit of knowledge of plants and city planning, then I think it's perfect. But if you don't, you just randomly do something, then it might be causing trouble.

Do you have suggestions for more bottom-up solutions? I think a more bottom-up solution for me is that for example, the city is renewing the tiling at the moment. So they put new bricks in all streets. And I think from that, that beginning, this is a great opportunity to keep the spaces open and not put bricks in and then put plants in directly or just keep them open and just say, 'Hey, feel free to plant' like just create an opportunity for a citizen in a city to plant whatever he has or she has to put in there. And then it's much more easy because then the facility is already there. And then the only thing you have to do is just put something in. And which I don't like right now is that they don't really, like, there are some, some companies that you can, you can say, Hey, I want a small garden in front of my building, and they do, but not all do. And I think if you just force them, like, if you just say everyone has to have that, like, that's the way you build new in your city, then you will create the opportunity anyways, because you will leave open spaces like ground spaces. And even if they're not filled up, then essentially grass will grow or a flower or weeds, which I all agree on. So I think it's just the fact that they close it and then change it again, makes it one more step. And I think if they change it, they should just change it directly to something I think will be smarter to do.

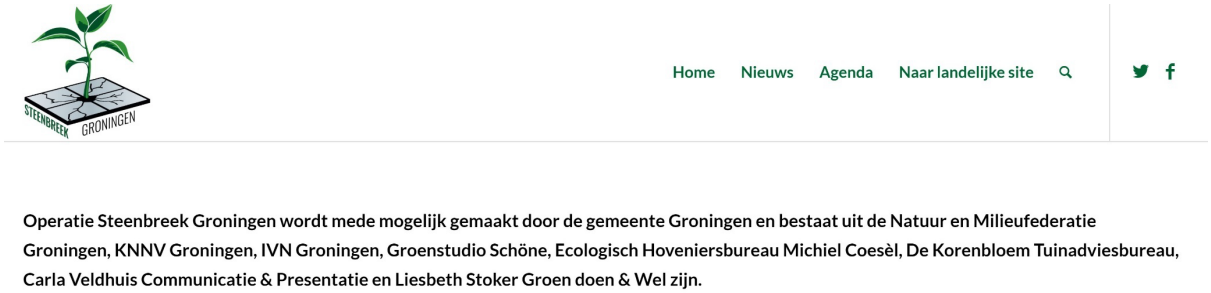
The next question is urban heat islands. I for sure think, and thought about that because I was living in the city south and at some point I had a lot of plants on my rooftop and I felt that my rooftop was getting colder in like high summer, because there were just so many leaves to cover the ground. So for sure, I was thinking about it, also like plants on walls to like protect walls from extreme heat. But for me, the main reason is just the health of people, which is also influenced by these warm city centers, but also just the green (color) area and more or connection with nature. And it's just pretty nice, like you feel cozy and you feel happy with more plants around you.

Okay. This is a lot of information. I think hopefully I answered some of your questions.

Appendix C: Steenbreek Screenshots and Brochure

"Operation Steenbreek Groningen was made possible through the municipilaty of Groningen."

"Together we ensure a green, biodiverse and climate resilient living environment"



Partners of the Foundation: Nature & Environment Federation Groningen; Royal Natural History Association; Nature Educator; Greenstudio Schöne; Ecological Consultant Michiel Coesèl; De Korenbloem Gardenadvisor; Carla Veldhuis Communication & Presentation; Liesbeth Stoker Make Green & Well-being

Dit jaar hebben we 835 geveltuinen aangelegd!

Het geveltuinseizoen 2021 zit erop. Samen met de bewoners hebben we dit jaar 835 geveltuinen aangelegd, fors meer dan de 620 uit 2020. Daarmee is 2021 het meest succesvolle geveltuinjaar ooit in onze gemeente Groningen. Die 835 geveltuinen zijn goed voor zo'n 1,5 km nieuwe geveltuinen. Zo wordt Groningen elke dag een klein beetje fleuriger, groener en biodiverser. Eind februari 2022 beginnen we weer en stomen we op naar 4.000 geveltuinen in totaal. Wilt u in 2022 ook een geveltuin? Meldt u dan nu alvast aan. Dat kan via: gemeente.groningen.nl/geveltuin-aanvragen-of-boomtuin-adopteren.

Groningen, de Geveltuin Hoofdstad van Nederland!

"This year we created 835 façade gardens!

The façade garden season of 2021 has come to an end. Together with the inhabitants we built 835 façade gardens, even more than the 620 from 2020. Thereby is 2021 the most successful year of façade gardens ever in our municipality of Groningen. The 835 façade gardens extend towards 1.5km of new façade gardens. That is how Groningen becomes a little more flowery, greener and more biodiverse every day. End of February 2022, we are again starting to push for 4,000 façade gardens in total. Do you also want a façade garden in 2022? Register yours now already. That is possible via: gemeente.groningen.nl/geveltuin-aanvragen-of-boomtuin-adopteren

Groningen, façade garden capital of the Netherlands!"










'Een geveltuin op maat voor een groene en gezellige straat'

Geveltuinen doen wat met je straat.
Ze zorgen voor kleur en een aangenaam straatbeeld.
Vlinders, vogels en bijen vinden er een schuilplaats.
En je raakt met je buren aan de praat!

De gemeente Groningen helpt je met de aanleg!
Voorwaarden
Voor een geveltuintje heb je plaats nodig en eventueel toestemming van de eigenaar als je huurt.
Het trottoir moet minimaal 150 cm breed blijven nadat het tuintje van maximaal 45 cm diep is aangelegd.

Aan de slag
1 | Bel bij je buren aan om te peilen of zij ook interesse hebben voor een geveltuintje. Inventariseer hoeveel mensen mee willen doen.
2 | Neem contact op met Laurens Stiekema van de gemeente Groningen via laurens.stiekema@groningen.nl en leg je plan voor.
3 | Als gemeente en evt. woningbouwcorporaties akkoord zijn wordt een datum gepland waarop de gemeente de geveltuintjes netjes aanlegt.
Ook worden zo verzakkingen aan het trottoir voorkomen.
4 | organiseer eventueel een gezamenlijk moment om de geveltuinen in te richten en suïf af met een gezellig drankje.
5 | Haal het maximale uit je geveltuin en mail geveltuinexpert en ecologisch hovenier Michiel Coesel om een avond geveltuintips te geven aan jou en je buren: michielcoesel.ecohovenier@gmail.com en kijk voor meer tips op www.operatiesteenbreek.nl/groningen

Is je trottoir te smal voor een geveltuin?
Zet dan bloembakken op de vensterbank.
Die geven ook veel kleur en plezier.
Denk ook eens aan het adopteren van een boomspiegel (dat is de grond rondom een boom!)

Tip:

Appendix D: Vitamine G Developments Map