



Bredamaaktmijblij, n.d.

Leaving No One Behind

Ensuring the Implementation of Nature-Based Solutions in a Way that Benefits of Green are Accessible in a Just Manner

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Abstract

Climate change effects are impacting well-being, and these will increase in frequency and severity in the future. Urbanised areas such as the Netherlands are specifically at risk. Therefore, climate adaptation is required. Nature-based solutions can be implemented as these address multiple challenges simultaneously. Implementation needs to be just to ensure that vulnerable populations are not left behind. This is important as marginalised populations are often disproportionately affected, as is described by the term 'climate gap'. Several planning challenges arise, including green gentrification and inhabitants experiencing accessibility barriers to implementing green in private spaces, the latter often stimulated through subsidies. Homeowners and inhabitants with more income seem to apply more frequently than others. By considering the green roof subsidy of the municipality of Breda, located in the province of Noord-Brabant, and access of inhabitants to this regulation in a neighbourhood of lower socioeconomic status, this study shows what factors or actions may hinder or increase the number of applications. Recommendations were developed based on analysis of interviews with stakeholders and regulation documents, and considering the three dimensions of radical environmental justice: distribution, procedure and recognition. See *Appendix I* for the Dutch summary of this research.

Key words: Access, Climate change; Climate gap; Nature-based solutions; Justice

List of Abbreviations

EJ	Environmental justice
NBS	Nature-based solutions
SDG	Sustainable development goal
SES	Socioeconomic status
UN	United Nations
US	United States

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1. Introduction

In 2021, extreme precipitation and flooding affected the three European countries Germany, Belgium and the Netherlands. This event in July damaged residential and commercial buildings and infrastructure. The insured loss estimates for the Netherlands account for approximately 150 to 250 million euros (Koks et al., 2022). River flooding and heavy precipitation are hazards associated with climate change. Other consequences include heat waves and worsened air pollution. These hazards influence human well-being, especially affecting urban populations and infrastructures (Hobbie & Grimm, 2020), as the 2021 flood showed (Koks et al., 2022). The climate continues to change (Hobbie & Grimm, 2020), and cities are notable in their contribution to this trend as these areas have high carbon footprints, which can be problematic as urbanisation is another impactful global trend putting pressure on the environment (Filho et al., 2021). On the other hand, as the authors explain, cities are also severely confronted with the aforementioned hazards. For example, the risk of heatwaves has increased in cities, impacting human health (Filho et al., 2021). Marginalised populations are disproportionately affected by these hazards while likely having the fewest resources, resulting in higher vulnerability, as Morello-Frosch and Obasogie (2023) and Shonkoff et al. (2011) indicate. This has been described by these authors as the 'climate gap' and could result in amplifying or creating inequalities. Marginalised populations can be communities of colour, Indigenous people and low-income communities, and their living environment is often in neighbourhoods of lower socioeconomic status (SES) (Morello-Frosch & Obasogie, 2023; Shonkoff et al., 2011). Consequently, the need for climate adaptation is high.

Nature-based solutions (NBS) can be adopted as this is a climate adaptation approach that responds to economic, environmental and social challenges simultaneously (Dorst et al., 2019) by restoring ecosystem services. Implementing NBS is an approach with many benefits, including cooling and reducing stormwater runoff volumes, and can include interventions such as bioswales, parks and green roofs (Hobbie & Grimm, 2020). The authors explain that these interventions would contribute to human well-being, however, there are complications associated with access, translating into planning challenges consisting of the need to respond to climate change while taking justice issues into account (Anguelovski et al., 2022). For example, Wijsman and Berbés-Blázquez (2022) mention green gentrification, referring to new green infrastructure increasing the attractiveness of an area that could cause displacement of marginalised populations (Anguelovski et al., 2022). Another issue of a similar nature relates to the implementation of NBS within participatory processes (Wijsman & Berbés-Blázquez, 2022).

Therefore, and following the inclusion of the social dimension within NBS, the consideration of justice becomes important when implementing these measures (Wijsman & Berbés-Blázquez, 2022). Besides, the authors express that this is the case as NBS could contribute to achieving justice goals, and those goals are also required to limit the climate gap (Morello-Frosch & Obasogie, 2023). Justice is, however, difficult to define and depends on perspectives and interpretations (Wijsman & Berbés-Blázquez, 2022). The authors mention several considerations that inform how justice and just access to the benefits of NBS can be understood. This study does not pre-determine what this entails, but radical environmental justice (EJ) is the type of justice that is considered in this research. It is typically used and all-encompassing as it goes beyond the consideration of only the dimension of distribution by also including the dimensions procedure and recognition (Quinton, Nesbitt & Sax, 2022). The authors describe that these are the three main dimensions. Based on the article by Svarstad & Benjaminsen (2020), the first dimension is about the distribution of burdens and benefits. Procedural justice considers who is involved and the degree of influence within decision-making. Lastly, recognition refers to whose interests, values and views are taken into account (Svarstad & Benjaminsen, 2020).

It is of social relevance to further investigate justice issues associated with NBS implementation. For instance, as mentioned by De Vries, Buijs and Snep (2020), it has been stressed in the European Green Deal that it is important to realise greener cities with a specific note that this needs to be achieved in a just way. Moreover, also indicated by the authors, access to green is one of the targets of the United Nations (UN) Sustainable Development Goals (SDG). Hence, ensuring access would contribute to SDG11: Make cities and human settlements inclusive, safe, resilient and sustainable (De Vries, Buijs & Snep, 2020; United Nations, n.d.). The implementation of NBS is in line with these goals and would thus contribute to a pleasant living environment. Moreover, as the implementation of green would mean that there are natural mechanisms in place able to respond to climate change, the problems associated with this can also be addressed (Hobbie & Grimm, 2020). Hence, it is relevant to research how to ensure widespread implementation, especially if this means that marginalised populations can be prevented from falling behind. Therefore, limiting issues of diverging access to green can contribute to minimising the occurrence of the climate gap, for which NBS are specifically appropriate due to their characteristic of being a holistic approach (Morello-Frosch & Obasogie, 2023; Dorst et al., 2019).

In the Netherlands, it became clear that Dutch neighbourhoods characterised as being of lower SES have less quality greenspace (De Vries, Buijs & Snep, 2020). This country is a relevant focus for this research based on the occurrence of this inequality and as follows from the description of the flood event in 2021 (Koks et al., 2022), as well as the occurrence and expectations regarding other climate change hazards such as heat risks (Ahmed, Van Esch & Van der Hoeven, 2023). The consequences of climate change are expected to happen more frequently in the future and with more severe impacts

(Dai, Wörner & Van Rijswijk, 2018). As explained above, climate change is strongly connected to the urban context, and the Netherlands is a densely urbanised country (Mattijssen et al., 2023). Therefore, planning for climate adaptation is required, especially in an inclusive way.

It is also scientifically relevant to investigate the challenges associated with just access to the benefits of NBS. Climate adaptation measures have been separated into large-scale public space measures and small-scale measures inhabitants can implement in private spaces (Lenzholzer et al., 2020). The former in association with just access challenges has been researched frequently, as shown by the numerous studies on green gentrification, for instance, by Anguelovski et al. (2022). On the other hand, there is limited research on these challenges connected to small-scale interventions. These interventions are often stimulated by subsidies (Boas Berg et al., 2017). In 2023, a study on access to solar panels in The Hague was published, researching the ability of households to adopt solar energy in the context of the energy transition, and showing that there are inequalities as the subsidies mainly benefitted wealthier households (Kraaijvanger et al., 2023). This study is recent and thereby indicates that research on justice issues related to subsidy applications in the context of climate change is new and still limited. Especially justice issues with access to subsidies for climate adaptation measures, as distinct from climate mitigation approaches such as solar panel installation, are now becoming visible while research is still considerably absent. This research gap can be defined as an empirical gap because research on this topic does not seem to exist (Miles, 2017). This topic will be further investigated, also because preparatory research indicated that several municipalities of at least the Southern part of the Netherlands experience that blue-green subsidies end up less with inhabitants living in neighbourhoods of lower SES.

To respond to the research gap, the following research question has been developed: How can nature-based solutions be implemented as a climate adaptation measure in a way that the access to measures is just according to stakeholders to limit and prevent the climate gap? Consequently, this Spatial Planning Master's thesis aims to inform governmental actors about how to implement NBS so that inhabitants living in neighbourhoods with lower SES are not left behind and thus live in neighbourhoods well-adapted to climate change, contributing to a just living environment. For this research, the understanding of justice relating to distribution and decision-making depends on the perspectives of the stakeholders. The following sub-questions are considered:

- 1) Taking barriers relating to accessibility into account, how can the desired distribution according to stakeholders of benefits of the nature-based solutions measure be achieved?
- 2) To what degree is the procedure of who has what role in and influence on the decision-making on the application conditions for the nature-based solutions measure desirable from the point of view of the stakeholders?

- 3) To what extent have the interests, values and views of inhabitants living in a neighbourhood of lower socioeconomic status been recognised and considered in enabling access to the nature-based solutions measure?

To answer these questions, the research considers a case study in the Netherlands, the province of Noord-Brabant, from now on referred to as the province. The unit of analysis is inhabitants and organisations involved in the application for the green roof subsidy in the municipality of Breda, from now on referred to as the municipality, in the neighbourhood of Doornbos-Linie.

Next, the literature review including the conceptual and theoretical framework will be presented. Then, there will be a methodology section with the case selection, data collection, processing and analysis and the operationalisation. The section after the methodology will present the results, followed by the discussion. The report is finalised with the conclusion and recommendations. Moreover, several appendices are included.

2. Literature Review

In this section, the literature review will be presented, starting with the conceptual framework. This framework shows the relevant concepts and relations. As the research context is the Netherlands, references to this country will be made. Connected to this, it will be discussed what research has already been conducted and this will lead to the research gap. Then, the theory behind the research problem will be presented, resulting in the research framework.

2.1. Conceptual Framework

The conceptual framework is schematically shown below, see *Figure 1*. This figure shows the relations between the concepts that form the research context. These concepts are more extensively discussed in the following paragraphs.

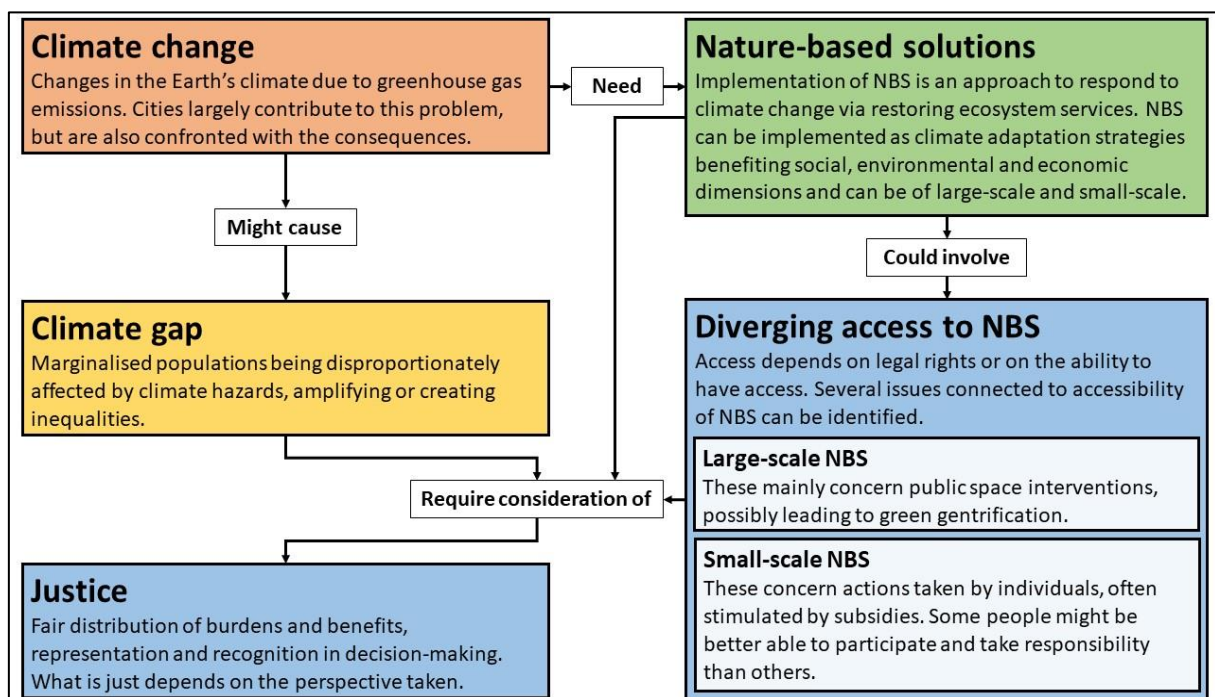


Figure 1, Conceptual framework (based on Boas Berg et al., 2017; Anguelovski et al., 2022; De Haas, Hassink & Stuiver, 2021; Doorn, Brackel & Vermeulen, 2021; Dorst et al., 2019; Filho et al., 2021; Hobbie & Grimm, 2020; Lenzholzer, et al. 2020; López-Maciél et al., 2023; Mikhaylov et al., 2020; Morello-Frosch & Obasogie, 2023; O'Brien et al., 2017; Quinton, Nesbitt & Sax, 2022; Sax, Nesbitt & Quinton, 2022; Wijsman & Berbés-Blázquez, 2022).

2.1.1. Climate Change in the Urban Context

The starting point of this research is the need to respond to the consequences of climate change. Climate change refers to the yearly increase in the average temperature on Earth and it can be explained by manufacturing and economic activities that involve the emission of greenhouse gasses, as Mikhaylov et al. (2020) explain. The authors name carbon dioxide and methane as examples of greenhouse gases. Over approximately the last 200 years, human activity has influenced the Earth's

climate which consists, among several components, of temperature, amount of precipitation and air humidity (Mikhaylov et al., 2020).

Cities are important focuses in this context as these geographical locations are significant contributors to the problem, while urban areas are also often extensively impacted by climate change consequences (Filho et al., 2021). Starting with cities as the cause of the problem, this past research by the authors revealed that the inhabitants of 100 cities form 20% of the global carbon footprint. Moreover, several features of cities amplify the impacts (Hobbie & Grimm, 2019). An example the authors provide is the urban heat island effect, resulting in warmer urban areas than surrounding areas. They explain that city features create this issue as heat is stored in building materials, or additional heat is generated following energy use. Next to heat issues, the authors state that cities will be confronted more frequently, as well as more severely, with extreme weather events, including heavy precipitation, floods and droughts. On top of that, they indicate that climate change has social consequences, including physical and mental health impacts, mortality and illness. Moreover, infrastructure systems can be affected, these might, for instance, be vulnerable to storms and could thus be damaged (Hobbie & Grimm, 2019).

2.1.2. Climate Gap

These consequences disproportionately affect marginalised populations while these populations often have the fewest resources to respond to climate hazards (Morello-Frosch & Obasogie, 2023). The authors indicate that marginalised populations can be communities of colour, Indigenous people and low-income communities and that these populations are often more vulnerable, also indicated by Shonkoff et al. (2011). In the context of climate change, according to Shonkoff et al. but comparable to how Morello-Frosch and Obasogie explain it, this means that the populations have more difficulty with anticipating, coping with, resisting and recovering from impacts. An example Shonkoff et al. provide is the lack of access of marginalised populations to air conditioning. A study showed that in the US, the elderly of marginalised populations are more at risk of mortality (Shonkoff et al., 2011). Within the Netherlands, the higher vulnerability of several groups to extreme heat is also acknowledged (Mees, Driessen & Runhaar, 2015). According to that research, these groups include the elderly, disabled and socially deprived. Tesselaar, Botzen and Aerts (2020) provide an additional example of an effect, namely due to the increasing severity and frequency of floods, rising insurance premiums could decrease demand for insurance and consequently increase the financial vulnerability of households. This is, for instance, forecasted to happen in Portugal (Tesselaar, Botzen & Aerts, 2020).

Hence, it can be expected that climate change will amplify inequalities, namely, health, social and economic inequalities, or create new types (Morello-Frosch & Obasogie, 2023). This issue has been

named the 'climate gap', as indicated by the authors and the research by Shonkoff et al. (2011). Morello-Frosch and Obasogie explain that the climate gap can be caused and maintained due to several structural factors. Examples they provide include housing and land use policies rooted in different treatments of privileged and disadvantaged groups and sacrifice zones, these are areas located near, for instance, polluting facilities. Holistic approaches are needed to respond to this problem: '... holistic climate policies can explicitly lay the groundwork for connecting climate change mitigation and adaptation with community building, economic opportunity, and political power in ways that advance racial and economic justice and reduce health inequities' (Morello-Frosch & Obasogie, 2023:947).

2.1.3. Nature-Based Solutions

A holistic strategy to adapt to the consequences of climate change is the implementation of nature-based solutions, for instance, Dorst et al. (2019) explain that NBS require holistic and integrative approaches. The authors indicate that the measures address social, economic and environmental challenges simultaneously. For example, Hobbie and Grimm (2020) express that NBS have the potential to be beneficial in responding to temperature- and water-related hazards, but also for mental and physical health. Generally, NBS would improve human well-being (Hobbie & Grimm, 2020). As the authors indicate, NBS are based on the restoration of ecosystem services. According to Dorst et al. (2019), in that way, renewable natural processes would be applied instead of non-renewable natural capital. By protecting, restoring and managing ecosystems, NBS can potentially minimise vulnerability to climate change by reducing exposure and sensitivity to impacts and improving the adaptive capacity (Seddon et al., 2020). This indicates the benefits across boundaries and the multifunctionality of the intervention (Hobbie & Grimm, 2020). Besides, the authors express that NBS are seen as flexible and appropriate for the uncertainty connected to climate change.

Examples of NBS include parks, green roofs, bioswales and other urban greening interventions (Hobbie & Grimm, 2020). These are part of four urban climate change adaptation strategies identified by previous research by Lenzholzer et al. (2020). According to them, these strategies include considering the city layout, using vegetation, using appropriate materials and minimising anthropogenic heat sources. The authors indicate that measures can be either large-scale or small-scale. The former mainly relates to interventions implemented by urban designers, planners and public decision-makers in the public spaces. On the other hand, small-scale interventions include inhabitants taking action themselves by, for example, greening walls and de-tiling gardens (Lenzholzer et al., 2020).

2.1.4. Access to NBS

As followed from the description above based on the study by Lenzholzer et al. (2020), adaptation measures, including NBS, can be large-scale or small-scale. However, challenges, different per scale,

associated with access to these measures may occur (Hobbie & Grimm, 2019). As O'Brien et al. (2017) explain, within access to green infrastructure, there is a difference between legal rights to access and accessibility where the former depends on public or private ownership, activity, land use type, time, distance and size, while the latter refers to the ability to access green infrastructure. Several barriers may influence this ability (O'Brien et al., 2017), on which this research will further focus. Examples of these challenges will be introduced, including green gentrification for large-scale NBS, among others researched by Anguelovski et al. (2022), and challenges with participation and responsibility of inhabitants for small-scale NBS, for instance, included in the study by Doorn, Brackel and Vermeulen (2021). There is limited research on this second issue, with a specific research gap on barriers related to access to blue-green subsidies for climate adaptation, often an approach to stimulate inhabitants to act (Boas Berg et al., 2017). There is considerable research on large-scale measures, which will be shown first to illustrate the gap. Therefore, this research aims to elaborate on accessibility to small-scale NBS.

2.1.4.1. Large-Scale NBS

The access to NBS in public spaces has been researched, these are often large-scale interventions (Lenzholzer et al., 2020), which will be shown by examples later in this section. Different methods have been used to measure the accessibility of public facilities and land uses (Zhou & Parves Rana, 2012). Examples of some of the approaches mentioned in the article about greenspace are using the measurements 'location', 'intuitive accessibility', influenced by the major barriers often relating to demographics, and 'distance', which can be based on determining the origin to the nearest destination or the number of destinations within a certain distance. Factors behind these measurements could form barriers. A study on access to urban forests identified several of these barriers, including distance and distribution, road infrastructure, recreational infrastructure and quality, information and knowledge, cultural norms, and lastly, safety and confidence (O'Brien et al., 2017).

To give an example of an access issue associated with large-scale NBS implementation and to illustrate that this has been well-researched and is, as of now, likely less relevant to research in the context of the Netherlands compared to the access complications that may arise relating to small-scale interventions, the issue green gentrification will be outlined. This issue, mainly affecting marginalised populations, is increasingly and regularly being researched (Anguelovski et al., 2022). Green gentrification occurs when a greening project in an area attracts investment, causing the cost of living at that location to increase (Sax, Nesbitt & Quinton, 2022). The authors explain that this could result in the need for inhabitants to relocate in case they cannot adapt to the higher costs. Hence, physical displacement is a consequence. Other consequences the authors mention include the creation of a sense of exclusion and reduced access to quality greenspace. Reasons for the in-move of wealthier

inhabitants consist of an interest in the function of green, aesthetic aspects and sustainability (Sax, Nesbitt & Quinton, 2022). All taken together, green gentrification is thus an issue of diverging access to green interventions (Anguelovski et al., 2022). As a solution, applying 'just' enough green was proposed, consisting of green on a smaller scale and of lower quality to ensure that low-income inhabitants can remain in their neighbourhood (Rigolon et al., 2020). However, it can be questioned whether that is a fair approach, leading to research by Rigolon et al. (2020) on park projects in Atlanta, Chicago and Philadelphia, developing four strategies to ensure 'more than "just green enough"'.

As exemplified by the study on the park projects introduced above (Rigolon et al., 2020), green gentrification studies mainly revolved around US case studies. A review of methods for green gentrification research indicated that 70% of the case studies examined at least one US city and the same is true for gentrification in general (Quinton, Nesbitt & Sax, 2022). Originally, gentrification was introduced by Ruth Glass in the early 1960s, focusing on working-class neighbourhoods in London and in the 1970s, gentrification research entered the US (Finio, 2022). As the author explains, in this country, gentrification is often related to the additional aspect of racial demographic change in the central parts of the city. But as the understanding of gentrification is mainly based on the American context, research on gentrification outside of the US, and green gentrification more specifically, should not apply the American understanding because contextual factors could involve different processes and outcomes (Quinton, Nesbitt & Sax, 2022). This is the case as areas outside the US-UK-Canada-Anglo-Oceania context have different urbanisation patterns and planning practices (Finio, 2022).

Research by Doucet (2013) indicated that this is indeed true for the Netherlands. Firstly, the author explains that in this country gentrification is often a policy goal instead of a problem. Doucet indicated that gentrification and urban regeneration are commonly regarded as comparable, hence, distinctions have become less clear. The author mentioned that the same applies to 'restructuring' and 'social mixing', these terms have a positive association and are therefore preferred. Still, in case these processes of change involve class transformation, it can be understood as gentrification (Doucet, 2013). Moreover, Doucet expresses that social housing provision is influential. The movement away from social housing in the Netherlands has possibly enabled gentrification (Doucet, 2013), as the case of Nieuwmarkt in Amsterdam showed (Uitermark, 2009). Regardless, Dutch gentrification is more regulated and managed than in other countries as there is a comparatively strong government and because of the presence of housing associations (Doucet, 2013). Additionally, Doucet expressed that policies prevented the transformation of neighbourhoods into homogeneous high-income areas. The study indicates that even though neoliberalism has had an impact over the last few years, these three aspects remain valid and inform the relatively mild forms of gentrification in the Netherlands.

The same applies to green gentrification, which has been studied for seven years in neighbourhoods near parks in Amsterdam, Amersfoort and Arnhem, published in 2017, as referred to by De Haas, Hassink and Stuiver (2021). These authors indicate that the 2017 study showed that there was indeed an influx of high-income inhabitants, while the share of low-income inhabitants remained the same, showing that neighbourhood change occurred, but not to a degree that environmental injustice can be recognised in terms of large differences in income or the occurrence of conflicts. However, the feeling of exclusion and perceived gentrification was observed, mainly related to the quality of greenspace (De Haas, Hassink & Stuiver, 2021). Another study published in 2020 showed the potential of green gentrification in Utrecht, indicating with maps that there are areas where green gentrification may occur as urban nature did impact housing prices, decreasing as the house is located further from the NBS, but that impacts still differ per type of intervention and that local conditions remain of influence (Bockarjova et al., 2020).

The influence of the local context also seems to follow from the paper by De Haas, Hassink and Stuiver (2021), investigating other large-scale green interventions, namely implementing green to include vulnerable populations. In the Netherlands, these are people with a lower income and education level, the elderly and people with mental health issues, as the authors explain. The study considered three case studies showing how green could be a strategy to create inclusion, but could also lead to exclusion, understood in the study as the process leading to a 'systemic shortage of opportunities to participate in society' (De Haas, Hassink & Stuiver, 2021:2). According to them, challenges with accessing these initiatives may include finding suitable locations, dealing with complex rules and regulations that also tend to change every four years due to elections, opposition against initiatives, finding funding, knowledge limitations, narrow target groups and ownership.

2.1.4.2. Small-Scale NBS

Next to large-scale NBS, there are small-scale interventions. These are important since there is increasing involvement of inhabitants in climate adaptation, as expressed by Doorn, Brackel and Vermeulen (2021). According to the authors, this fits the shift from 'government to governance' and is assumed to increase legitimacy because many and multiple stakeholders are involved, resulting in support for measures. However, as the authors state, it can be questioned whether these arrangements are effective. For instance, they give the example that well-organised groups have more chance of success. Consequently, transferring responsibilities to inhabitants might not always be justifiable, inhabitants should be able to take on the responsibility, which can be based on capacity and the feeling of membership or obligation (Doorn, Brackel & Vermeulen, 2021). As indicated in the article, the government has a role in ensuring that inhabitants can take responsibility, for example, by providing access to information and enabling inhabitants to map their vulnerabilities. Besides, the authors

express that the government has to prevent inequalities as some inhabitants, such as vulnerable populations, may have limited capacity, based on cognition, finance, physical ability and local conditions, to act. This could result in inhabitants being left behind (Doorn, Brackel & Vermeulen, 2021). These factors connected to limited capacity to act may hinder the accessibility of small-scale measures. Often, these are encouraged by subsidies, for instance, the subsidy to install rainwater harvesting systems (Doorn, Brackel & Vermeulen, 2021). An example of a NBS intervention commonly stimulated by subsidies is a green roof (Boas Berg et al., 2017; López-Maciel et al., 2023). According to Doorn, Brackel and Vermeulen (2021), there are risks of subsidies only ending up with property owners. In the context of climate mitigation, inequalities within the Netherlands connected to providing subsidies have become apparent. The study by Kraaijvanger et al., published in 2023, investigated the adoption of solar panels in The Hague, indicating that measures regularly benefit wealthier households with more access, for instance, because upfront capital is required. In The Hague, areas with lower home values, a lower percentage of natives and owner-occupied homes and a higher share of apartments have less access to solar energy, showing that the energy transition is exclusive (Kraaijvanger et al., 2023).

Research on the accessibility of blue-green subsidies for climate adaptation such as for green roofs specifically has not been found, indicating the research gap. On the other hand, research on access to climate change mitigation measures connected to the energy transition is more common, for example, the previously mentioned research by Kraaijvanger et al. (2023). Therefore, inspiration was drawn from this research for understanding what 'access' means for small-scale interventions. The authors consider access to mean 'the freedom of individuals to decide whether or not to adopt solar energy' (Kraaijvanger et al., 2023:2), and this freedom can be limited or enforced due to possible barriers. Based on other studies, Kraaijvanger et al. mention four key factors. The first barrier is 'affordability'. As the implementation requires initial investment capital, households lacking this have lower access. Secondly, there is 'homeownership'. It may be legally impossible to adopt the intervention in case a household does not own the property. On top of that, there may be instances of split incentives between the tenant and the owner. 'Housing type' is the third factor, it relates to suitability. It needs to be technically feasible to install solar panels on a roof, the same could be expected for green roof implementation. Another barrier mentioned is related to an apartment block, here the roof is shared among multiple inhabitants. Lastly, 'suitable information' is determinant as people require transparent and credible information for deciding, but also regarding support mechanisms. The authors mention that this might especially form an issue for people confronted with language barriers.

2.1.5. Issue of Justice

Based on the papers previously mentioned, the challenges presented above are important to consider when implementing NBS as these form risks for issues of justice to occur. For example, green gentrification has been connected to justice issues of diverse types, including social justice (Finio, 2022), climate justice (Anguelovski et al., 2022; Banerjee, 2014; Gonzalez, 2019; Quinton, Nesbitt & Sax, 2022; Sax, Nesbitt & Quinton, 2022), spatial justice (García Lamarca et al., 2021) and urban justice (Fainstein, 2014). While studies remain limited in the Dutch context, with a specific absence of studies on justice issues connected to blue-green subsidies, past research already showed that both the quality and quantity of greenspace are lower in Dutch neighbourhoods with lower SES (De Vries, Buijs & Snep, 2020). The authors mention that considering these problems will contribute to achieving UN SDG11, with the aim of making cities and human settlements inclusive, safe, resilient and sustainable.

The notion that green could contribute to justice goals originated from the inclusion of the social dimension of NBS (Wijsman & Berbés-Blázquez, 2022). The authors express that this results in the need to consider justice, and consequently, equity and fairness when implementing NBS. The inclusion of justice in NBS seems to follow from the aim of improving well-being, but other and multiple reasons could be involved in the question of why justice matters, as the authors explain. Based on the article, well-being refers to the greatest good to the greatest number of people, or it could imply that people can express themselves with the resources available to them. Other reasons for justice to be included mentioned in the research are human dignity about equal rights and welfare that might require redistribution, membership referring to justice as a responsibility instead of an individual right, and correction of past wrongs to remedy harm inflicted on others. The focus may impact how the goal of justice is aimed to be achieved (Wijsman & Berbés-Blázquez, 2022).

This suggests different interpretations of justice, as Wijsman and Berbés-Blázquez (2022) also express. Consequently, they indicate that next to considering the reasons for including justice, several questions need to be asked. These include the question of who is targeted, what principles of justice are recognised and what are the building blocks of justice. According to the authors, those building blocks are important to indicate the core elements of the understanding of justice. Based on the study, these elements refer to justice as deciding what is just based on rules or deliberation, focusing on just procedures or just outcomes and as a universal general ideal or informed by specific cultures or societies. This results in justice 'not as a static "thing" to be achieved through formalized protocols and procedures, but (justice) is instead better understood as a constantly redefined and negotiated ideal' (Wijsman & Berbés-Blázquez, 2022:378). According to the authors, these justice considerations are important for understanding the desired distribution of benefits, burdens and responsibilities around NBS existence, use and also access.

2.2. Theoretical Framework

Next, the theory behind the justice issue of diverging access to the benefits of green in responding to climate change. *Figure 2* shows the theoretical framework, indicating the theoretical background.

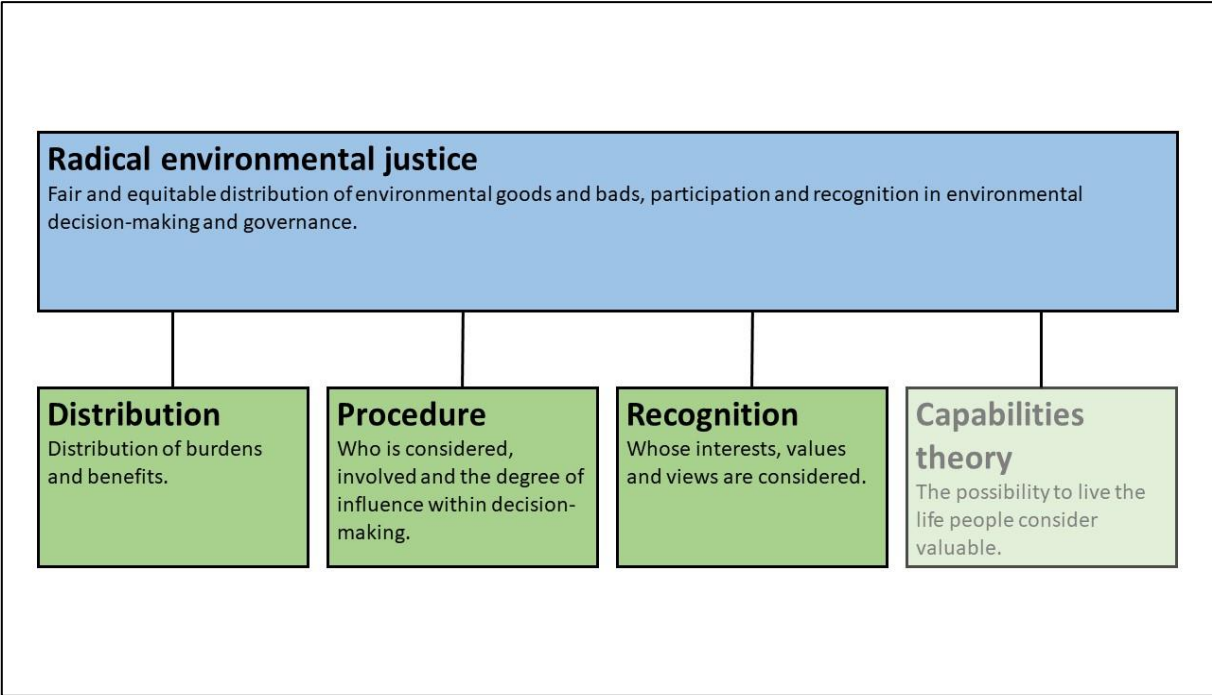


Figure 2, Theoretical framework (adapted from Quinton, Nesbitt & Sax, 2022).

2.2.1. Environmental Justice

Environmental justice is referred to most frequently in the considered papers above. It is defined as: ‘fair and equitable distribution of environmental goods and bads and participation and recognition in environmental decision-making and governance’ (Quinton, Nesbitt & Sax, 2022:962). The authors indicate that EJ is linked to activism and disparities of different kinds. An example they provide is the exposure to toxic waste facilities of racially and socioeconomically marginalised populations that sparked protests in the US. According to the article, the focus is on the distribution of burdens and benefits, considering proximity to environmental hazards. Quinton, Nesbitt and Sax (2022) then mention that EJ has expanded to issues beyond the focus on toxic waste to the inclusion of access to diverse environmental benefits, including greenspace. This was also expressed by Schlosberg (2013), referring to a horizontal and vertical expansion, the former relating to the range of issues and the latter to the scale becoming more global. By also integrating normative theories, including social justice, political-economic analyses and social-movement theory, radical EJ was established (Quinton, Nesbitt & Sax, 2022).

Radical EJ, typically employed in research, appears to be all-encompassing regarding the various types of justice previously mentioned and will thus be further applied. With the inclusion of the normative theories, radical EJ encompasses the dimensions of procedure and recognition, next to the already

established dimension of distribution (Quinton, Nesbitt & Sax, 2022). This framework was first developed by Schlosberg (Svarstad & Benjaminsen, 2020). The authors explain how, on top of these three dimensions that form the key elements of radical EJ, a fourth dimension was added, the capabilities theory. It is argued that all of these dimensions are components of a ‘comprehensive understanding of justice’ (Schlosberg, 2007:12). However, this research will exclude the latter dimension of capabilities theory because of several reasons stated next. According to Schlosberg (2007), capabilities theory can be understood as a link between the other three dimensions. Svarstad and Benjaminsen (2020) express that it refers to the extent to which it is possible to live the life people consider valuable. The authors indicate that this is specific per individual while capabilities are often discussed in terms of homogeneous populations. Additionally, the authors explain that considering this fourth dimension could result in deviation from the root causes of the problem. These form limitations of this dimension (Svarstad & Benjaminsen, 2020). Besides, other studies on greening referring to (radical) EJ do not include capabilities theory (Rigolon et al., 2020; Anguelovski, Connolly & Brand, 2018). Due to time constraints, this dimension is therefore excluded. As for the other three dimensions, even though several papers focus only on distribution (De Vries, Buijs & Snep, 2020; Anguelovski et al., 2018), Wijsman and Berbés-Blázquez (2022) argue for the inclusion of all three, because, in research on justice related to NBS, social practices and deeper structures form the contexts that are at the core of much injustice. The three dimensions will be elaborated on below.

2.2.2.1. Distribution

The first dimension is distributive justice. Svarstad and Benjaminsen (2020) and Wijsman and Berbés-Blázquez (2022) indicate that this refers to the distribution of burdens and benefits, in this research of NBS. This follows from ‘A Theory of Justice’ by John Rawls (Schlosberg, 2007). Schlosberg (2007) explains that Rawls argues that rules governing a just distribution of goods and bads would follow from developing principles of justice that everyone could agree on without knowing what someone’s position in life would be. The author indicates that this has been called stepping behind a veil of ignorance. When considering distributive justice, three questions are important according to Svarstad and Benjaminsen (2020). The first one mentioned is the ‘who’ question, referring to who experiences the burdens and the benefits, who contributes to the cause of the problem and who could pay the costs. Then they indicate there is the ‘what’ question, about what should be distributed connected to the intervention. Thirdly, there is referred to the question of what principle of distribution is or should be, applied. Several principles have been identified (Svarstad & Benjaminsen, 2020; Wijsman & Berbés-Blázquez, 2022), see *Table 1*.

Table 1, Principles of distribution (Svarstad & Benjaminsen, 2020; Wijsman & Berbés-Blázquez, 2022).

Principle	Explanation
Equality	Equal benefits and burdens to all.

Equity and guaranteed standard	An example is that everybody has the right to clean water, meaning that everyone gets the same guaranteed quantity and/or quality.
Guaranteed minimum	There is a minimum allocation, and only above the minimum can there be variations according to personal income and choices.
Need	Allocation of resources according to who needs what.
Desert	A positive or negative treatment, depending on quality, responsibility or effort.
Entitlement	Claim following from historical processes or rules.
Market value	Allocation based on supply and demand.
Priority	Distribution based on who is least advantaged.
Utility	Distribution according to the enhancement of social utility.

Each principle relates differently to the question of what a ‘fair and equitable’ distribution is, resulting in diverse understandings of what is just. According to Wijsman and Berbés-Blázquez (2022), fairness is about ‘what is due’ (Wijsman & Berbés-Blázquez, 2022:379), and what is due depends on the principle applied. It could mean that everyone gets the same thing, which would be in line with the equality principle, it could mean everyone gets what they deserve, described as meritocracy and this could refer to the principle of desert, or it could mean that those who have the most help those who have the least, referring to the principles of need and priority (Wijsman & Berbés-Blázquez, 2022). It has often been argued that equity should be employed, for example by Rigolon et al. (2020). In that case, more resources would be allocated to those who are more severely impacted, for instance, by climate change, and have limited access to opportunities (Rigolon et al., 2020). On the other hand, a previous study on justice connected to greenspace defined the distribution ambition as ‘... everybody has equal access to good quality greenspace.’ (De Vries, Buijs & Snep, 2020:2). This illustrates that distributive justice thus depends on the perspective of actors on justice and that these may differ. The principles of distribution will be considered in this study to understand justice, become aware of possible definitions and discover potential differences between stakeholders in their perspectives.

2.2.2.2. Procedure

The second dimension is called ‘procedural justice’ and this is about who is considered, involved and the degree of influence within decision-making (Svarstad & Benjaminsen, 2020). This dimension connects to participation (Schlosberg, 2007) as it is about how participation is organised and how and to what degree participants are engaged (Wijsman & Berbés-Blázquez, 2022). As the authors mention, this relates to principles of democracy and questions about whether inhabitants should be able to influence decision-making directly or via representatives. Regardless, the article indicates that fair representation can be understood as the inclusion of perspectives of those affected by the decision-making on problems and solutions. In the case of public participation, it is important to acknowledge that for some populations, participation is more difficult (De Haas, Hassink & Stuiver, 2021).

Consequently, as the authors indicate, conditions of participation and opportunities to access resources should be considered. There are other possible risks, for example, the project might have been determined before participation, leading to tokenism which reduces the meaning of participation (Wijsman & Berbés-Blázquez, 2022; Lane, 2005), or outcomes may be in favour of dominant actors (Svarstad & Benjaminsen, 2020). This relates to questions of power, as the authors express. Svarstad and Benjaminsen (2020) mention that power theories in this context are not extensively covered by research. Regardless, three main perspectives stand out. Firstly, the authors refer to actor-oriented power theories about the ability of individuals to achieve their goals in relation to others. Secondly, there are structural power relations that differ between social classes, which follows from Marxist political ecology. Additionally, there is the discursive power perspective, which is less relevant to procedural justice (Svarstad & Benjaminsen, 2020). There are different degrees of power that participants may have within the procedure (Lane, 2005). These have been categorised into a ladder by Arnstein, see *Figure 3*. This will be considered relating to actual participation and desirability.

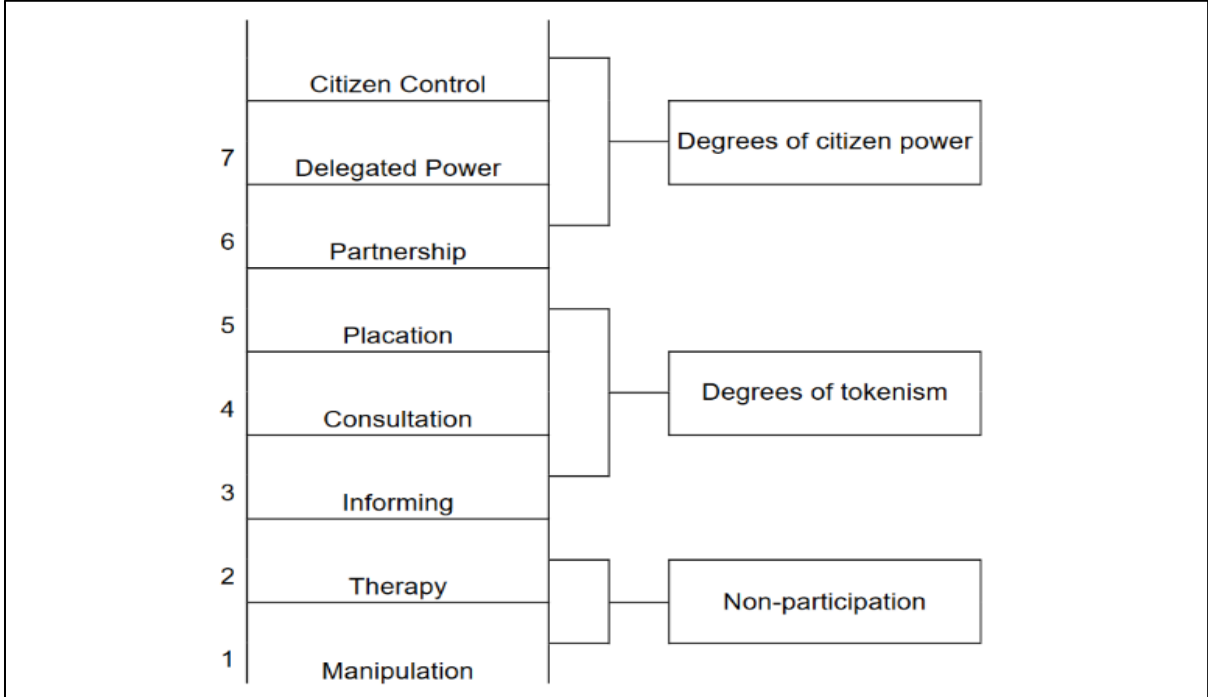


Figure 3, Arnstein's ladder of participation (Lane, 2005).

2.2.2.3. Recognition

Lastly, recognition. This dimension considers whose interests, values and views are taken into account (Svarstad & Benjaminsen, 2020). This is important as some groups or individuals are limitedly recognised, as follows from the article. Schlosberg (2007) also indicates how this dimension originates from the actual injustice, differing from the imagined realm of Rawls's veil of ignorance. Svarstad and Benjaminsen (2020) mention that this misrecognition has been connected to social status concerning gender, race, religion and ethnicity. According to the article, two aspects might enhance recognition. The first one mentioned is a sense of justice, this informs how justice is expressed by marginalised

populations themselves concerning an intervention. Furthermore, there is the aspect of critical knowledge production. This is required as there might be power imbalances regarding access to information such as laws and policies, as the article explains. To produce knowledge, information on responsibilities, consequences of interventions and ways for expressing alternatives are needed (Svarstad & Benjaminsen, 2020). The aim of incorporating this dimension would be to allow room for differences that might exist, for example following diverse identities, histories and cultures (Wijsman & Berbés-Blázquez, 2022). To illustrate why this is important to include, even though named differently, namely interactional justice instead of recognition, Rigolon et al. (2020) incorporated this aspect in their research to ensure that parks are welcoming places for minorities who often feel excluded.

3. Methodology

This methodology consists of justifying the choice for a case study and case introduction that has been determined based on preparatory research and selection criteria introduced below. Then, the approach to data collection, processing and analysis will be presented, followed by the operationalisation, the research framework, and the discussion of ethics and research quality.

3.1. Case study

This research included a case study. A case study looks closely and intensively into a single case (Bryman, 2016). Here, it resembles an exemplifying case study because it enabled the examination of a social process and showed what happened in one of multiple possible cases that are comparable to a certain degree, which is in line with the description of the exemplifying case study by Bryman (2016). As indicated, this research focuses on the justice issues connected to climate adaptation, specifically the small-scale measure of stimulating the adoption of NBS by subsidies. Diverging access to these subsidies is valuable to examine in a single case as it is an issue in a specific setting that is a member of a broader category, namely neighbourhoods of lower SES. Bryman (2016) explains how this could lead to understanding conditions for a commonplace situation. Furthermore, the author indicates that this type of case study is useful for understanding literature connected to a particular topic. As this research builds on the study by Kraaijvanger et al. (2023) applied to another situation, a case study is an appropriate approach.

3.1.1. Case Selection

As indicated before, this study is situated in the Netherlands, leading to case selection within this country. One reason for this is that the study was conducted in connection to an internship at the province of Noord-Brabant. On top of that, the Netherlands is a relevant focus in the context of climate change. For instance, the country is confronted with several hazards that may occur more frequently and severely in the future (Dai, Wörner & Van Rijswick, 2018). The authors express that heavy precipitation has impacted Dutch cities and the intensity of such weather events is rising. This results in increased stormwater that is difficult to deal with due to limited canal and sewage system capacity (Dai, Wörner & Van Rijswick, 2018). Next to water-related issues, heatwaves are risks in the country (Ahmed, Van Esch & Van der Hoeven, 2023). These issues intensified by climate change are especially impactful in dense urban areas (Dai, Wörner & Van Rijswick, 2018; Ahmed, Van Esch & Van der Hoeven, 2023), and as the Netherlands is characterised as such (Mattijsen et al., 2023), the need for climate adaptation via implementing NBS is high, and thus the focus on this country is appropriate. Next to the importance of responding to climate change due to risks, the occurrence of diverging access to NBS

further indicates the relevance of focussing on the Netherlands. Inhabitants of Dutch neighbourhoods with lower SES have less access to quality greenspace, resulting in lower adaptive capacity than areas with a higher status (De Vries, Buijs & Snep, 2020). Consequently, it is important to formulate how to improve the situation and achieve a just society within this country. Several steps were taken to select a relevant case interesting to investigate further.

3.1.1.1. Preparatory Research

The focus on subsidies for NBS in neighbourhoods of lower SES followed from the literature review. Justice issues connected to this were, for example, described by Doorn, Brackel and Vermeulen (2021). On top of the literature review, preparatory research was necessary to determine what problem related to accessing NBS is experienced or expected most in the Netherlands, being the next step of the case selection. Moreover, it was required, as the initial aim of this research was to investigate how to prevent green gentrification. However, as followed from the literature review, it is questionable whether green gentrification has occurred and is likely to happen in the Netherlands because of contextual factors (Finio, 2022; Doucet, 2013). Therefore, unstructured interviews were conducted. The data collection method can be understood as such because the procedure is comparable to having a conversation about a topic (Bryman, 2016). All conversations started with a short introduction about what green gentrification entails and what the possible consequences are. Then, the question was asked to what extent this problem is expected or occurring in the subsequent region where the interviewee was employed or whether issues with comparable characteristics and consequences are more present. After this, it was possible to respond to interesting points and ask for specific cases.

Participants were reached via e-mail, and these e-mails indicated the possibility of green gentrification and issues with access to subsidies as possible risks. Hence, both topics were introduced to potential participants before the conversations. A contact person within the province initiated interaction with employees of the so-called B7 municipalities that are part of BrabantStad (Gemeente Roosendaal, 2023). BrabantStad consists of seven large cities in Noord-Brabant, namely Breda, Eindhoven, Helmond, 's-Hertogenbosch, Roosendaal, Oss and Tilburg in collaboration with the province that share knowledge to develop and achieve a higher standard of living (BrabantStad, n.d.). Waterboards active in the province were also invited. This resulted in four unstructured interviews, of which three took place with municipality employees and one with a waterboard employee. Three interviews took place online and one in person. One of the interviews was a group interview with three interviewees. The interviews were not recorded nor transcribed, but notes were taken.

As was expected, all participants indicated to have a limited idea of whether green gentrification occurs. One participant mentioned that following cause-effect reasoning, the occurrence seems probable, but there is currently no clear view. Another participant indicated that the valuation of

immovable property (WOZ-values) for rental homes of housing corporations can only rise to a certain degree. Hence, displacement seems unlikely. Multiple participants indicated that greening is often a component of a larger neighbourhood redevelopment project, and this is seen as an effective intervention that improves liveability. On the other hand, the situation where particular populations apply more frequently for blue-green subsidies compared to others has recently been noticed. The interviews provided an idea regarding what climate adaptation subsidies exist and showed that the impression stands that subsidies end up more frequently with inhabitants with a higher income, homeowners, inhabitants who are more aware of the necessity to implement NBS, organisations with a good understanding of the application procedure and inhabitants able to self-organise. Based on the advice of a participant, an additional appointment was made with an employee of Cultuurfonds Noord-Brabant, who confirmed the idea that subsidies are less applied for by inhabitants living in neighbourhoods of lower SES. Preparatory research showed the relevance of further focusing on access to subsidies connected to the possible problems associated with participation and responsibility in climate adaptation. This does not mean that green gentrification is irrelevant to research in the Netherlands. As this preparatory research was limited in scope, areas where green gentrification is a problem or risk could be overlooked. Moreover, it might become a relevant topic for future research.

3.1.1.2. Selection Criteria

Following the above, it was decided to focus on inhabitants and organisations involved in the application for blue-green subsidies in a neighbourhood of lower SES where applications were limited. Consequently, several selection criteria were developed. Firstly, a type of blue-green subsidy to focus on should be determined. This was based on the number of applications. Secondly, a neighbourhood needed to be selected. The first criterion is that this neighbourhood is of lower SES. Several factors indicate whether a neighbourhood can be classified as such. Research by De Vries, Buijs and Snep (2020) expressed that those neighbourhoods have a high share of low-income inhabitants. Moreover, SES relates to inherited wealth, educational status, beneficial social networks and race/ethnicity (Shonkoff et al., 2011). These factors connect to defining marginalised populations, climate vulnerability and the climate gap (Shonkoff et al., 2011; Morello-Frosch & Obasogie, 2023). The focus was placed on income, ethnicity and education. The second criterion was that there were limited blue-green subsidy applications. Lastly, the neighbourhood was chosen based on the poor availability of green. The selected case consists of the application for the green roof subsidy of the municipality of Breda in the neighbourhood of Doornbos-Linie. Following the preparatory research, this neighbourhood was proposed to focus on as it was believed to fit the selection criteria. The next section describes the case and simultaneously shows why it is appropriate.

3.1.2. Case Description

As indicated, the focus is placed on the green roof subsidy. The municipality provided data about blue-green subsidy applications in the year 2023, and this showed that within that year, there were 290 subsidy applications, of which 131 applications were for green roofs. As this is a substantial part of the applications in that year, it is relevant to more closely consider this type of NBS, and thus the subsidy for this intervention. This is also the case because similarities regarding barriers to accessing solar panels and green roof subsidies could be expected as both measures are on roofs.

Moreover, a neighbourhood in Breda was selected. Researching a neighbourhood can be justified based on the typical focus on the micro-level within qualitative research (Brown-Saracino, 2017). Neighbourhood Doornbos-Linie was selected, see *Figure 4* for the location of this neighbourhood within the municipality. The municipality of Breda advised to research specifically the Southern part consisting of the streets Stevinstraat, Snelliusstraat, Van Musschenbroekstraat, Drebbelstraat, Vuchtstraat, Jan van der Heijdenstraat and Swammerdamstraat. This

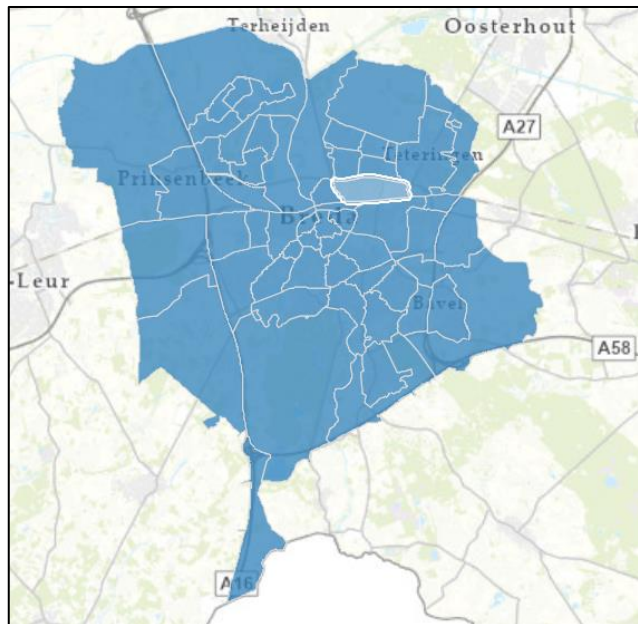


Figure 4, Neighbourhoods in Breda. Doornbos-Linie is coloured a light shade of blue (Esri Nederland, n.d.).

area is part of the European project UPSURGE. This project aims to improve air quality, increase climate resilience, address heat issues and improve water storage and biodiversity via implementing NBS (Gemeente Breda, n.d.c). UPSURGE describes the southern part of Doornbos-Linie on its website as: ‘an outdated residential area from the 60s populated by a multicultural society, with many social rental properties for residents with lower incomes.’ (UPSURGE Project, n.d.). This is in line with the first neighbourhood selection criterion, namely, the neighbourhood needed to be of a lower SES. *Table 2* shows these and additional neighbourhood characteristics for Doornbos-Linie as a whole.

*Table 2, Neighbourhood characteristics. *These values may not be retrievable at the time of reading as the website updates the data and does not show all old data.*

Characteristic	Values in Doornbos-Linie
Number of households	2,555 households (KadastraleKaart.com, 2023)
Number of inhabitants	4,580 inhabitants (KadastraleKaart.com, 2023)
Income	Average annual income per inhabitant: 25,700 euros. Of the 52 neighbourhoods, Doornbos-Linie is ranked at position 43 (AlleCijfers.nl, 2021).

Level of education of inhabitants between 15 and 75 years old	Low education level: 27.6% Secondary education: 36.9% High education level: 35.5% (AlleCijfers.nl, 2021*)
Ethnicity	Dutch: 55.41% Non-Dutch European country: 13.11% Non-European country: 31.48% (AlleCijfers.nl, 2023*)
Homeownership	Owner-occupied: 36% Rental housing corporations: 53% Other rental: 11% (AlleCijfers.nl, 2023*)
Housing type	Apartment: 52.2% Terraced house: 33% Corner house: 10.9% Semidetached house: 1.9% Detached house: 1.5% Remainder: 0.5% (AlleCijfers.nl, 2023*)

This can also be confirmed based on *Figures 5, 6 and 7*** below, providing insights into the distribution of the subsidies for green roofs in association with income, education and ethnicity, see *Appendix II* for the data as registered in Microsoft Excel. Doornbos-Linie is positioned towards the bottom of the images, indicating the neighbourhoods with a lower ranking and associated SES.

Moreover, these figures show that the distribution of subsidies in absolute numbers is not extremely convincing towards the neighbourhoods with the highest ranking on the three factors. However, when considering the top 10 highest in comparison to the top 10 lowest, the top 10 highest neighbourhoods based on income and education have more applications, 27 compared to 20 and 20 compared to 13 respectively. Neighbourhoods with a lower share of inhabitants without a migration background, meaning more diversity, have more applications. This is especially the case as 10 out of 24 applications originated from one neighbourhood. This neighbourhood was also part of the top 10 lowest ordered based on income. The neighbourhood with 10 applications is Doornbos-Linie. Hence, it is a neighbourhood with relatively many applications. Still, these applications were mainly for recently constructed sustainable owner-occupied homes. Moreover, the data provided by the municipality indicated that there were no subsidy applications in the southern part. Hence, the area is in line with the second selection criterion. The figures on the right side show the number of applications per inhabitant per neighbourhood and indicate that all neighbourhoods have a low application rate. This seems higher in the higher-ordered neighbourhoods, while not extremely convincing.

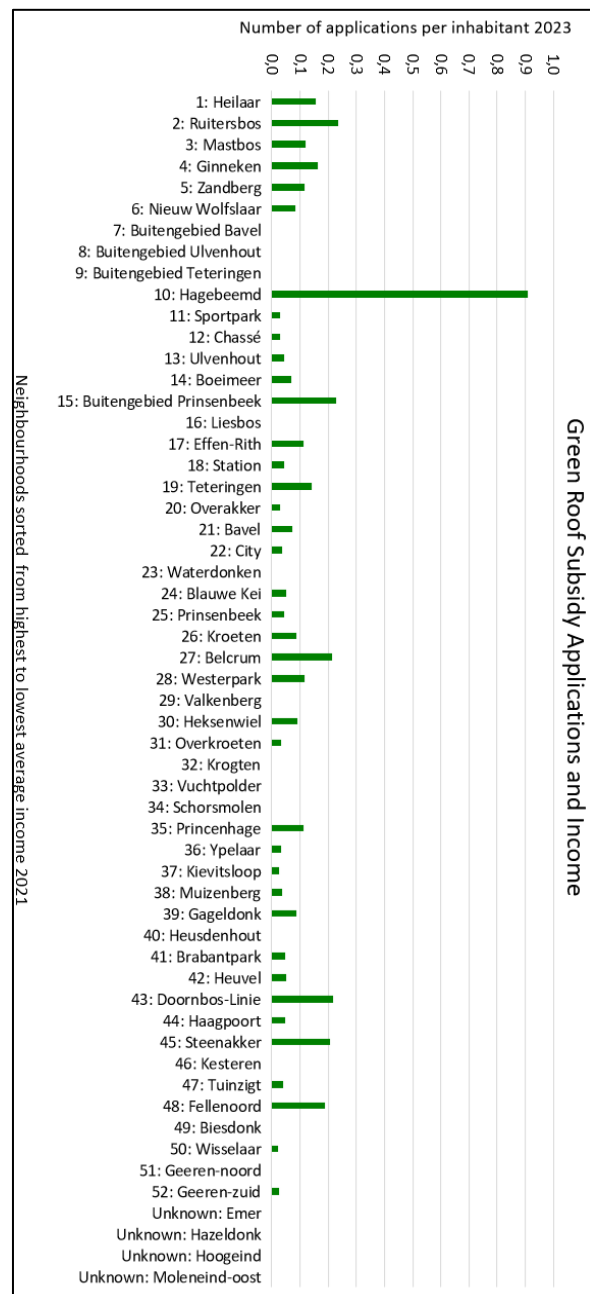
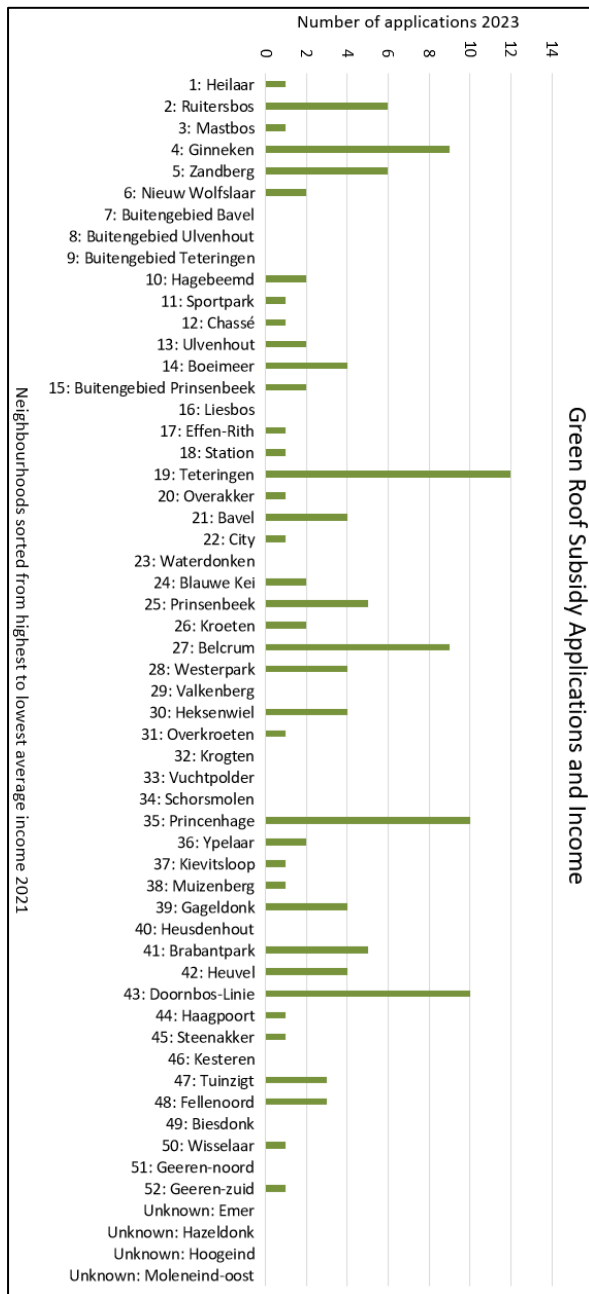


Figure 5, The number of green roof subsidy applications per neighbourhood in Breda sorted from highest to lowest average income in the year 2021. The neighbourhood with number one is the neighbourhood with the highest average income in 2021. The left picture (5A) shows the absolute number of applications per neighbourhood, while the right picture (5B) shows the number of applications per inhabitant in 2023 per neighbourhood (Based on data provided by the municipality of Breda and AlleCijfers.nl (2021;2023).

**The ‘;’ on the y-axis indicates a decimal point, due to Microsoft Excel settings, this could not be adjusted.

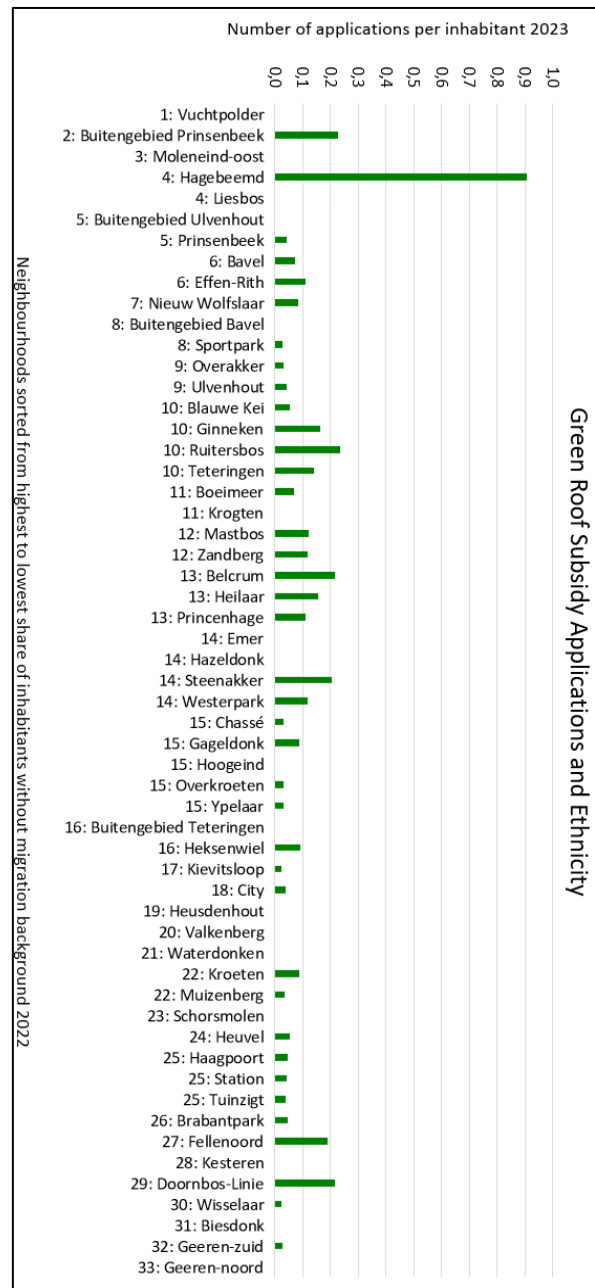
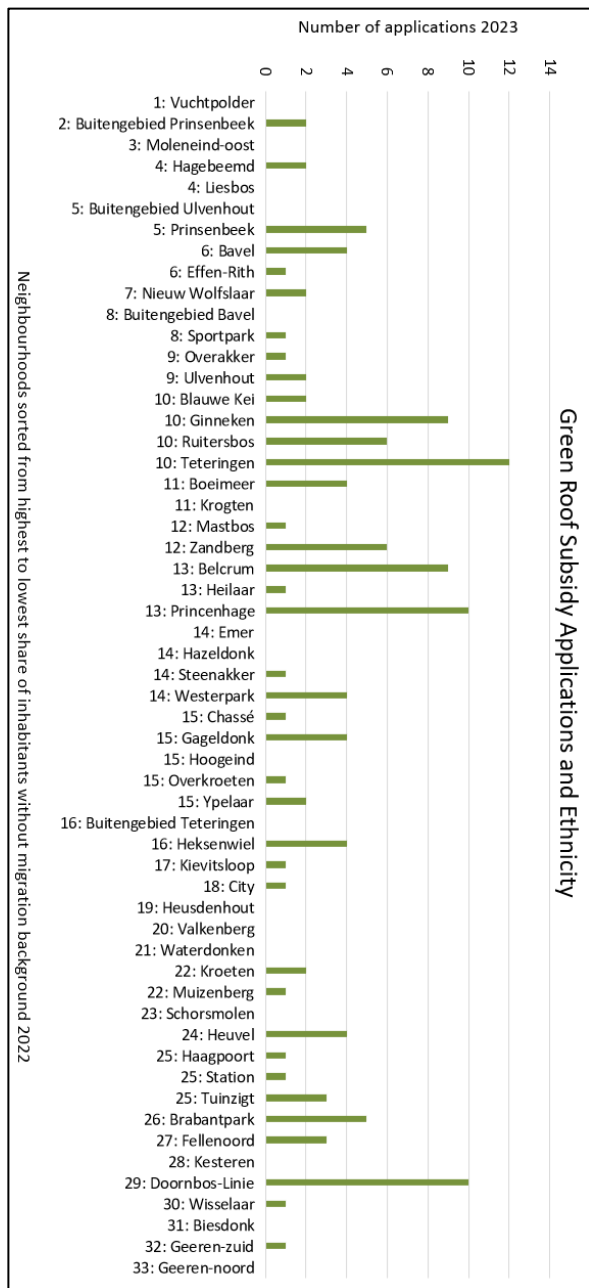


Figure 6, The number of green roof subsidy applications per neighbourhood in Breda sorted from highest to lowest share of inhabitants without a migration background. The neighbourhood with number one is the neighbourhood with the highest share of inhabitants without migration background in 2022. The left picture (6A) shows the absolute number of applications per neighbourhood, while the right picture (6B) shows the number of applications per inhabitant in 2023 per neighbourhood (Based on data provided by the municipality of Breda (2023) and AlleCijfers.nl, 2022*;2023).

*These values may not be retrievable at the time of reading as the website updates the data and does not show all old data.

**The ‘;’ on the y-axis indicates a decimal point, due to Microsoft Excel settings, this could not be adjusted.

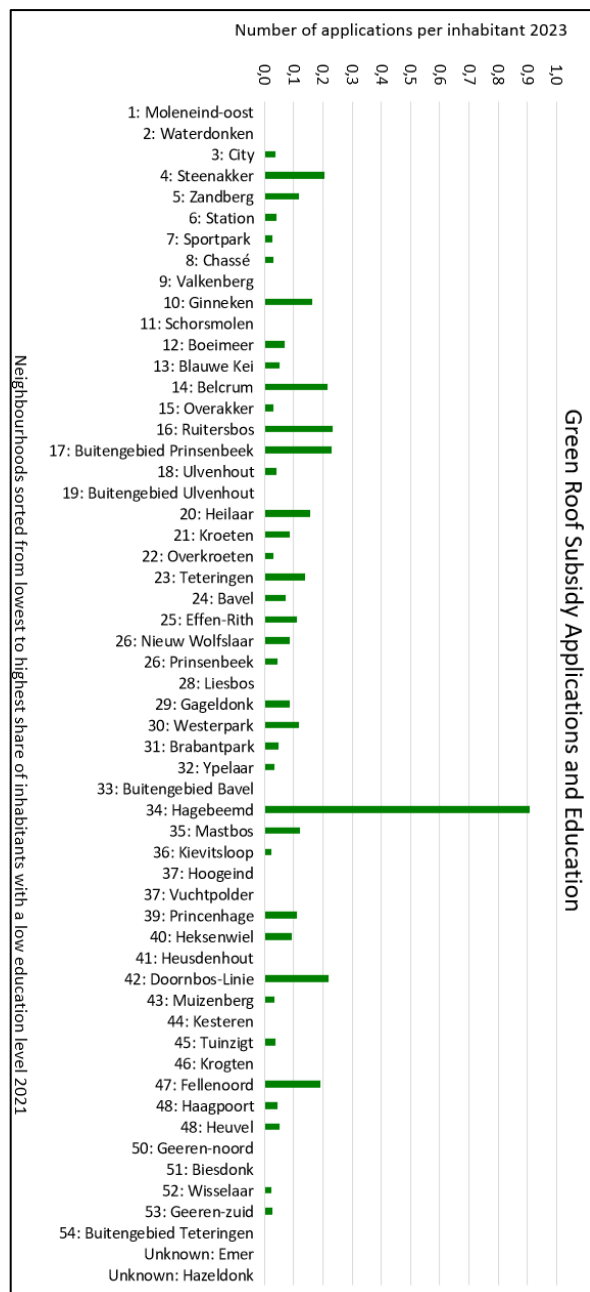
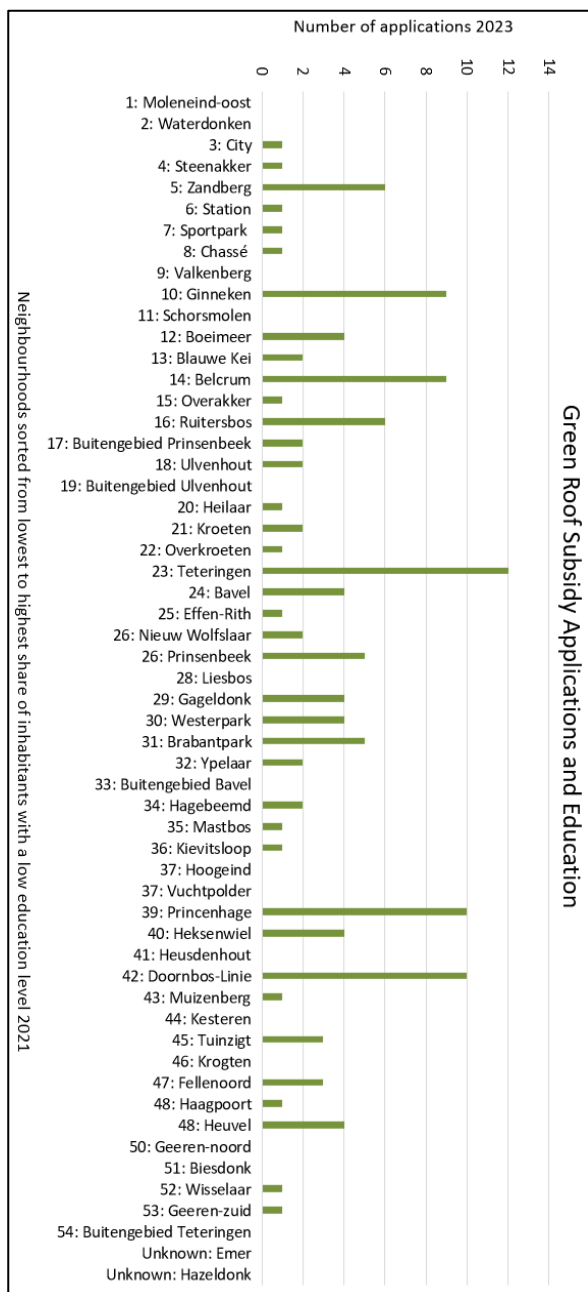


Figure 7, The number of green roof subsidy applications per neighbourhood in Breda sorted from lowest to highest share of inhabitants with a low education level. This information applies to inhabitants between 15 and 75 years old. A low education level refers to primary education, vocational education (VMBO), the first three years of senior general secondary education (HAVO) or pre-university education (VWO), entrance training, the first year of vocational college (MBO1) or practical education. The neighbourhood with number one is the neighbourhood with the lowest share of inhabitants with a low education level in 2021. The left picture (7A) shows the absolute number of applications per neighbourhood, while the right picture (7B) shows the number of applications per inhabitant in 2023 per neighbourhood (Based on data provided by the municipality of Breda (2023) and AlleCijfers.nl (2021*;2023).

*These values may not be retrievable at the time of reading as the website updates the data and does not show all old data.

**The ‘,’ on the y-axis indicates a decimal point, due to Microsoft Excel settings, this could not be adjusted.

Lastly, the neighbourhood was selected based on the poor availability of green. This became visible from Google Maps Street View and the satellite layer, see *Figures 8, 9, and 10*.



Figure 8, The south of Doornbos-Linie from above. This image shows a lot of space for parking. From above it looks green with many trees, but apart from trees few green is visible (Google Maps, 2024.a).



Figure 9, Place in Doornbos-Linie. Based on this Google Street View image made in 2022, there are many grey areas and parking spots (Google Maps, 2024.a). From the street level, the area looks grey in contrast to the image from above.



Figure 10, Place in Doornbos-Linie. Based on this Google Street View image made in 2022, there are trees but there are still many parking places and grey areas (Google Maps, 2024.a).

The images show some green, mainly trees with limited other vegetation. Contrastingly, the neighbourhood with the most green roof subsidy applications, Teteringen, looks greener with a variation in bushes and trees in public spaces, as well as gardens with vegetation in private spaces, see Figure 11. This neighbourhood is higher ordered on the factors indicating SES than Doornbos-Linie.



Figure 11, Place in Teteringen. Based on this Google Street View image made in 2023, there are trees and bushes between parking places and inhabitants have vegetation in front of their homes (Google Maps, 2024.b).

In sum, the unit of analysis was the inhabitants and organisations involved in the application for green roof subsidy in the municipality of Breda in the neighbourhood of Doornbos-Linie, the southern part.

This subsidy aims to enable the adoption of green roofs by the inhabitants of the municipality. The intervention can be understood as a small-scale adaptation measure because of the large role of inhabitants (Lenzholzer et al., 2020). The government has a facilitating role. Further details on the subsidy will follow from the data analysis and will be presented in *Section 4*.

3.2. Data collection

Data was required on subsidy characteristics, decision-making and application procedures as well as on the perspectives of stakeholders. Two data sources were used.

3.2.1. Documents

Information was required on the characteristics of the subsidy regulation, the application conditions and the application procedure, as will follow from the operationalisation table below. Hence, documents and websites that contained this information were selected. By looking online for green roof subsidy Breda in Dutch, information about the characteristics of the subsidy as well as application conditions was found on the website of the municipality of Breda (Gemeente Breda, n.d.b). The same was true for the application procedure, which was found by selecting a link on the website (Gemeente Breda, n.d.a). Also via this website, legal technical information was obtained in the document ‘Nadere regels subsidieverstrekking gemeente Breda 2017’, including detailed information about subsidies in general and especially chapter 10 was of importance for information specific to the blue-green subsidy (Overheid.nl, n.d.b). That document referred to ‘Algemene subsidieverordening Breda 2017’, which was then deemed important too, also for understanding the organisation of subsidies in general and the green roof subsidy (Overheid.nl, n.d.a).

3.2.2. Interviews

Next to these documents, interviews were organised. Visiting in person was believed to positively contribute to willingness to participate. Hence, inhabitants were invited to participate through door-to-door visits and asked for their names and e-mail addresses in case they were open to participation. As the whole neighbourhood was too large to visit everyone within a reasonable time, only addresses in the streets mentioned that form the southern part of Doornbos-Linie were visited, excluding homes without a front door at the street level. A student also unfamiliar with the neighbourhood joined during the door-to-door visits for increased comfort. Additionally, inhabitants were asked to participate at PUKplein, a square in the area, on the third of April. On this date, the UPSURGE redevelopment plan of the area was presented and it was advised to be present. As introduced above, comparable to this research, UPSURGE is a project for implementing NBS, but in public spaces instead of private spaces. It thus has common ground with this study, which provided the opportunity to talk to inhabitants when they were already thinking about greening the living environment. Also, this resulted in the chance to

make contact with inhabitants living in a home without their front door at the street level. To reach these and more inhabitants, the information flyer for the door-to-door visits, see *Appendix III*, was also visible on the window of the Buurtsalon. Inhabitants could apply for participation there or via sending an e-mail.

It was indicated by various people that it is difficult to reach inhabitants, this was also experienced. Therefore, inhabitants were asked to participate in an interview and were given the choice to participate individually or in a focus group later to ensure that there would be enough participants. The question about this preference was asked in an e-mail, see *Appendix IV*, also including the longer information flyer, see *Appendix V*. This e-mail was sent to six of seven inhabitants who indicated to be willing to participate, one inhabitant preferred to be visited the next day. Only one participant was willing to join a focus group, hence, all interviews were individual. At first, individual interviews were planned for data triangulation, but this became the main method of data collection as it proved too difficult to find participants for a focus group, even though a location was selected within the neighbourhood. Three inhabitants replied to the e-mail with whom appointments were made. On the third of April, one inhabitant agreed to participate on the spot and one of the inhabitants who was willing to participate but who did not answer the e-mail made an appointment for the interview. No additional appointments followed from the flyer at the Buurtsalon. Hence, six inhabitants were interviewed, of which two interviews took place online, and four in person. All interviews took around 30 minutes. Interviews or focus groups with inhabitants who did apply for the green roof subsidy were not possible due to privacy considerations.

Additionally, it became clear based on the preparatory research that multiple actors are involved in the green roof subsidy application. Therefore, their perspectives were important to include as well, and data on this was also collected via interviews. The actors other than the inhabitants interviewed depended on whether they were indicated to be of importance during the preparatory research. These participants were reached via e-mail, see *Appendix VI*, after receiving contact information from contact persons. Subsequently, two employees of the municipality of Breda, one employee of the housing corporation and one employee of the province of Noord-Brabant were interviewed. For the municipality, these were the coordinator of neighbourhood deals and subsidies for blue-green and the advisor for climate adaptation. For the province, this was the coordinator Nature for and by Brabant. To enable comparability between the actors and to have structure, the interviews were of the format of semi-structured interviews, which included using an interview guide (Bryman, 2016), see *Appendix VII*. Before the interview took place, participants were asked to sign the informed consent form, see *Appendix VIII*. For the inhabitants, the informed consent form was part of a small survey including several general questions, see *Appendix IX*.

Based on the survey, it became clear that the inhabitants who participated did not apply for the subsidy and lived in social rental homes. Two inhabitants have lived in the neighbourhood for 2-5 years, one inhabitant for 11-15 years, two for 16-20 years and one for 26 years or more. 50% of the inhabitants interviewed finished higher professional education (HBO), one inhabitant finished the fourth year of vocational college (MBO4), one inhabitant finished the upper years of senior general secondary education (HAVO) or pre-university education (VWO) and one inhabitant is educated in practical education. Regarding the question about the income category, one inhabitant preferred not to answer the question. For the other five participants, each one is part of one of the categories. Five of the six inhabitants have an age of above 65 years old and one inhabitant has an age close to 40 years old. One participant has a migration background.

3.3. Data Processing and Analysis

The data that followed from these data collection methods was recorded after participants gave permission, and notes were taken during the interviews in case something went wrong with the recording. Recordings were transcribed, and two data analysis methods were applied.

3.3.1. Stakeholder Analysis

Support of stakeholders and clear expectations can positively impact the success of a project (Kennon, Howden & Hartley, 2009). A stakeholder is someone who might be affected by change (Swyngedouw, 2005). A stakeholder analysis results in an understanding of the interactions between a project and the stakeholders, enabling the identification of who is involved and their priorities as well as the impact on the project (Kennon, Howden & Hartley, 2009). Within their research, the stakeholder analysis tool has been introduced, consisting of five steps. The first step is to identify who is a stakeholder with a focus on the actor and role. This enables becoming aware of relationships between stakeholders. Then, a matrix with one axis 'importance' and the other 'influence' needs to be filled in to determine the priority of stakeholders. The third step is understanding the attitudes towards the initiative. Step four, setting goals and identifying costs of the analysis, and step five, evaluation and revision, seem to be applicable in case the stakeholder analysis is used during the planning and development stages of a project (Kennon, Howden & Hartley, 2009). As the aim of the stakeholder analysis for this study was to understand who is involved in what way with what influence on the decision-making, these last two steps were not part of the analysis, nor was determining the importance of stakeholders.

Past research on justice and climate adaptation conducted interviews that informed a stakeholder analysis, leading to information regarding how stakeholders frame adaptation, use resources and influence policy implementation (Malloy & Ashcraft, 2020). This shows that previous research with a comparable topic incorporated a stakeholder analysis. On top of that, this type of analysis is relevant

because the 'who' question is important for EJ (Svarstad & Benjaminsen, 2020). Moreover, as the problem of access to subsidies connects to issues associated with participation and responsibilities, a stakeholder analysis was appropriate.

3.3.2. Thematic Analysis

Moreover, data was analysed following the approach of a thematic analysis. This is one of the most common qualitative data analysis methods (Bryman, 2016), for instance, employed in research on equitable greening by Rigolon et al. (2020). The approach outlined by Bryman (2016) was followed. Hence, the analysis started with reading the data, followed by initial coding connected to indicators, which will be introduced in the operationalisation tables below. This was done by colouring parts of the transcripts in Microsoft Word. Some of the data could be connected to multiple indicators. The coloured sections were placed in a table, sorted by indicator and type of measure, see the operationalisation. This enabled going through all codes twice. The table was then analysed, using NVivo. Themes followed from reading the data per measure and codes were developed when a new aspect was mentioned. Data with common elements were taken together in these codes, hence, repetition was the main criterion for identifying a theme. Still, aspects only mentioned once in connection to a type of measure are part of the list of codes for the themes. Then, sub-themes were identified. This meant going through the data and codes again. For the sub-themes, a code was created when the information was more detailed than the name attached to the code and when there was repetition. Lastly, there was a reflection on the name of the themes (Bryman, 2016). This also served as a final check to ensure that the right data was attached to the right theme, some redistribution was required. A list of themes and sub-themes in Nvivo was the result. These were registered in tables in Microsoft Excel per indicator or measure, including the frequencies of the themes. The frequencies followed from counting the occurrence of themes of all the participants taken together, in other words, the themes are not counted separately per type of participant. Lastly, suitable quotes were easy to find in NVivo.

3.4. Operationalisation

Below, the operationalisation is presented, informing the thematic and stakeholder analysis. *Tables 3, 4 and 5* show each the operationalisation for one of the three radical EJ dimensions to give them substance with criteria, indicators, measures and explanations. The tables indicate that the research is mainly deductive, meaning exploring the applicability of theoretical conceptions in actual situations (Wijsman & Berbés-Blázquez, 2022). The concept of justice is not deductively determined as different understandings of justice are possible due to stakeholders having different perspectives, as introduced before. Past research by the authors indicated the importance of considering how justice is framed. On

top of that, the focus within justice can be placed on either outcome or process (Wijsman, Berbés-Blázquez, 2022), in this case, both were considered.

Table 3, Operationalisation distributive justice.

Criterion	Indicator	Measure	Explanation
Accessibility	Affordability	<ul style="list-style-type: none"> • Overview of the amount of money and the moment someone receives it after applying. • Overview of perspectives on to what degree affordability plays a role in accessibility. 	Affordability may reduce access because the investment might remain high regardless of the subsidy (Kraaijvanger et al., 2023).
	Home-ownership	<ul style="list-style-type: none"> • Overview of who can apply for subsidy relating to the type of homeownership. • Overview of perspectives on to what degree homeownership plays a role in accessibility. 	Homeownership may determine access because ownership influences what changes to the property are allowed and depending on ownership it may or may not be of interest to invest in the property (Kraaijvanger et al., 2023).
	Suitable information for inhabitants to make their decision about adopting the NBS intervention	<ul style="list-style-type: none"> • Overview of perspectives on what is deemed important for deciding to apply. • Overview of what information is there. • Overview of perspectives on whether this information was available, in what way, and what was missing. • Overview of support mechanisms for deciding and applying that are there and that people are aware of. 	Suitable information refers to information being accessible, credible and transparent, leading to people being confident in their decisions. Important components are support mechanisms and considering language barriers. When suitable information is unavailable, access may be complicated (Kraaijvanger et al., 2023).
	Additional factors that could be barriers to accessibility	<ul style="list-style-type: none"> • Overview of perspectives on what other factors influencing access exist. 	There could be other factors influencing access not yet mentioned or different from solar panels subsidies.
Understanding of justice	Principle of distribution	<ul style="list-style-type: none"> • Indication of the principle of distribution used in practice. • Indication of the principle of distribution desired according to the stakeholders. 	Several principles have been introduced earlier. These influence how justice is understood and aimed for (Svarstad & Benjaminsen, 2020; Wijsman & Berbés-Blázquez, 2022).

Stakeholders	Actors involved in the application for the green roof subsidy of Breda	<ul style="list-style-type: none"> • Overview of actors that are involved. • Overview of the roles of the actors. • Overview of the attitudes of the actors towards the subsidy application. 	The 'who' question is important in distributive justice, this also leads to questions about who caused the problem, who benefits from the problem and who can compensate (Svarstad & Benjaminsen, 2020).
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Table 4, Operationalisation procedural justice.

Criterion	Indicator	Measure	Explanation
Stakeholders and their influence on the application conditions	Stakeholders and their influence	<ul style="list-style-type: none"> • Overview of stakeholders' influence on the application conditions. 	Power is important in decision-making. EJ relates to power theories, however, it is not often explicitly discussed. Participation is commonly included and described as the involvement of local people, but the actual influence is frequently questioned (Svarstad & Benjaminsen, 2020). There are different degrees of influence relating to 'power', as shown by Arnstein's ladder of participation (Lane, 2005).
Structural power	Factors influencing structural power	<ul style="list-style-type: none"> • Overview of what factors are believed by stakeholders to determine power in decision-making on the application conditions, this could have implications for actor-oriented power. 	
Participation	Participation preferences	<ul style="list-style-type: none"> • Overview of the desired participation type per stakeholder and why. 	

Table 5, Operationalisation recognition.

Criterion	Indicator	Measure	Explanation
Sense of justice	Consideration of demographics and diversity	<ul style="list-style-type: none"> • Overview of perspectives on to what degree demographics have been considered. 	The sense of justice enables people to express their voices, making their perspectives and interests known (Svarstad & Benjaminsen, 2020). To identify whether there is a sense of exclusion or a perceived risk of the potential of being excluded (Sax, Nesbitt & Quinton, 2022).
	Expression of views on justice by inhabitants living in neighbourhoods of lower SES	<ul style="list-style-type: none"> • Overview of perspectives on to what degree and in what way inhabitants of a neighbourhood of lower SES were able to express their views on a just distribution. 	
Critical knowledge production	Access to information	<ul style="list-style-type: none"> • Overview of perspectives on to what degree inhabitants of a neighbourhood of lower SES were able to access information to develop and express their perspectives on justice. 	Critical knowledge production is important because differences in power may result in differences regarding access to information and perspectives of powerful actors becoming dominant

	Awareness	<ul style="list-style-type: none"> • Overview of perspectives on to what degree there is awareness of the benefits of green. • Overview of perspectives on whether awareness would influence applications. 	(Svarstad & Benjaminsen, 2020).
	Expression of perspectives	<ul style="list-style-type: none"> • Overview of how inhabitants of a neighbourhood of lower SES want to improve the living environment. • Overview of the degree to which inhabitants of a neighbourhood of lower SES were able to express their approach to improving the living environment. 	

3.5. Research Framework

Figure 12 shows a summary of what has been presented above, indicating the steps of this research.

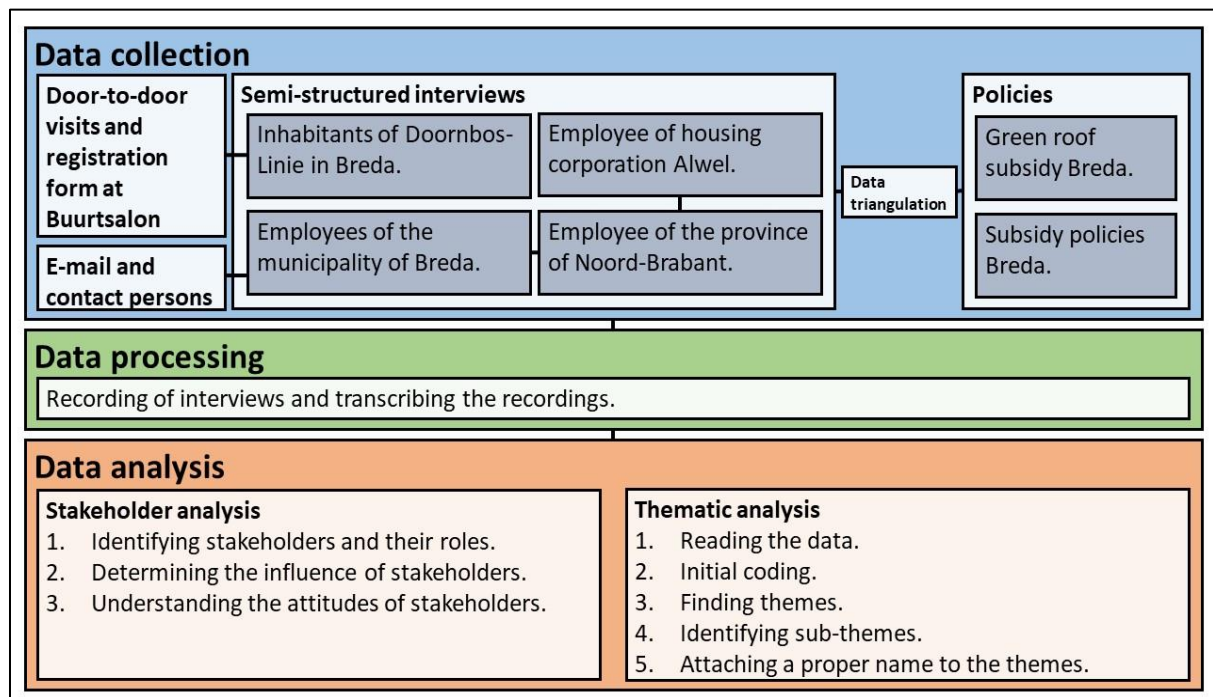


Figure 12, Research framework.

3.6. Ethics and Research Quality

This research adopted data collection methods involving the participation of people. Hence, several principles were considered. Starting with giving something back to the participants. This includes recommendations to the government to improve access to climate adaptation measures that will

benefit the population. Moreover, results can be accessed. Importantly, the no-harm principle should be considered (Bryman, 2016). This was done by asking participants to sign informed consent forms, including information on rights, privacy and data storage, which was preceded by an information letter. Connected to this, people were anonymised. Lastly, plagiarism should be avoided at all times (Bryman, 2016). Hence, the information used in this research was cited according to APA standards.

Furthermore, it is important to evaluate several quality criteria. This includes considering validity, reliability and credibility. As there was a case study, it is difficult to generalise (Bryman, 2016). Therefore, there is limited external validity. However, it became clear from the preparatory research that multiple cases are confronted with comparable issues. Consequently, lessons learned can be considered in other cases. Moreover, as the measures reflect the concepts, see the operationalisation, there is considerable validity regardless. A complication for validity relates to the method for determining the frequency of themes. The data of all interviewees was taken together and this could reflect reality in a certain way. For example, a theme with a high frequency might seem important, while it could be that this theme followed from the input of only one participant. To make differences in actors' input transparent, the text in the results connected to figures with themes and frequencies will provide information on this. Moreover, it is possible to replicate the study by following the methodology, referring to reliability (Bryman, 2016). Besides, multiple data sources were used, as there was data triangulation. This improved the credibility of this research (Patton, 1999). Changes in context could, however, contribute to different results.

These criteria mainly apply to quantitative research but have also been considered for qualitative studies. However, trustworthiness and authenticity are two criteria for evaluating qualitative research (Bryman, 2016). Firstly, in contrast to past research by Rigolon et al. (2020), who analysed data according to thematic analysis as a team, others checking themes to ensure trustworthiness was not possible for this thesis and could thus reduce the research quality. However, transcripts were first coded and then sorted in a table, which enabled checking the codes again. Also, data triangulation contributed to trustworthiness and so did transferability. As for authenticity, there were limited criteria for participation, so diversity was ensured. Hence, the research represents diverse viewpoints even though the majority of the inhabitants interviewed were elderly. The research could thus also contribute to a better understanding of the perspectives of others (Bryman, 2016).

4. Results

This section presents the results of the data collection and analysis, starting with the overall findings, followed by the results connected to the radical EJ dimensions. Several quotes will be presented, these were translated from Dutch to English, the original quotes can be found in *Appendix X* as there might be translation errors. See *Appendix XI* for the overview of results as registered in Microsoft Excel.

4.1. Overall Findings

Based on the analysis, the impression was developed that several aspects stand out. Firstly, the interviewed inhabitants mainly seemed positive towards greening. Regardless, they did not know that the subsidy for green roofs or green in general exists. Secondly, all stakeholders indicated that they have the idea that subsidies end up more frequently with homeowners or inhabitants with a higher income. Several barriers result in the subsidy being less accessible to some, even though the subsidy is open to everyone. Changes in this principle of distribution do not seem likely, however, it might be possible to give more attention to inhabitants living in neighbourhoods of lower SES with a focus on facilitating and promoting. On top of that, green roofs are relatively expensive, hence, more attention to measures such as green gardens or façades might result in more green in the neighbourhood as these measures require less own monetary contribution.

This impression corresponds to the themes with the highest frequencies. The results show that there is awareness of the benefits of green, possibly relating to positive attitudes. This theme was identified 26 times, heat and biodiversity stand out. Relating to the available information for making a decision, the theme that many inhabitants are unaware of the subsidy for green was identified 14 times. Moreover, own monetary contribution was mentioned as an influential factor, namely 15 times. The possibility to put effort into facilitating follows from the data on support mechanisms and the principle of distribution. For the former, the theme 'Facilitating' was identified 16 times and for the latter, 'Unburden the inhabitant' 18 times. The impression that it might be fruitful to focus on less expensive measures also relates to the frequency of the theme that green roofs are relatively costly. This theme was identified 16 times. See *Figure 13* for the top 10 most frequently identified themes.

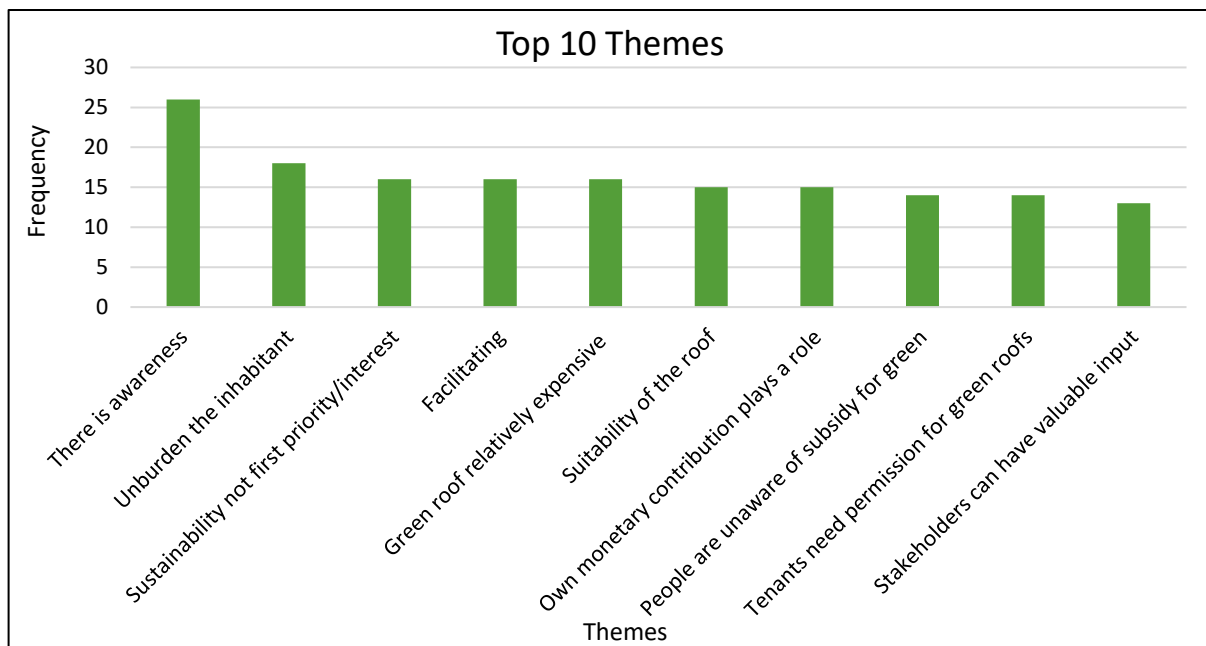


Figure 13, Top 10 most frequently identified themes based on the interviews.

4.2. Distributive Justice

This section shows the results for the distributive justice dimension. First, it will be presented what the possible barriers to accessibility of the subsidy are according to the stakeholders. Then, the questions of what principle of distribution forms the basis of the subsidy distribution and what is desirable from the point of view of the stakeholders will be responded to, relating to the understanding of justice. Lastly, the ‘who’ question will be answered based on the stakeholder analysis.

4.2.1. Accessibility

Following past research on the accessibility of solar panels by Kraaijvanger et al. (2023), four factors were of influence. This section discusses how and to what degree the previously identified factors apply to the accessibility of the green roof subsidy and whether there are other barriers.

4.2.1.1. Affordability

The first factor that might result in a barrier to accessibility is affordability. Based on the policy documents, the subsidy that applicants receive is maximally 25 euros per square meter and 3000 euros in total. To be compensated, the subsidy application can take place until six weeks after construction at the latest. It is allowed to apply for a subsidy for green roofs before the construction. On top of that, it is possible to receive subsidy for a construction advice, this is 250 euros maximum for a surface of until 100 square meters and 350 euros for a surface larger than 100 square meters.

Based on stakeholders’ perspectives, affordability has a large influence on whether or not to apply for the green roof subsidy. As one of the inhabitants stated: “I think it has a large influence for me, because the information I saw, it would actually not be affordable for me at this moment, because a large own

monetary contribution would remain if I understood correctly.”. The need to pay their own monetary contribution was regularly mentioned during the interviews. A sub-theme was identified in connection to this theme with the name ‘Always part of the subsidy’, as one of the municipality employees mentioned: “And it is a stimulating contribution. It is not meant to set fully free of charges, so there will always be a part consisting of the own monetary contribution.”. The interviewee of the province also indicated that “... subsidy is never 100%.”.

On top of that, the theme ‘People already have trouble making ends meet’ stands out as exemplified by this statement of one of the inhabitants: “People living in an owner-occupied home have more money than people living in social rental homes. For making ends meet if you live in a social rental home, then all extras are simply a no-go zone.”. Governmental actors also recognised this and the situation is closely related to the theme ‘Green or sustainable is not the first priority’.

It also became clear that a green roof is a relatively expensive measure, resulting in a barrier. The sub-theme ‘There are cheaper sustainable measures’ was identified four times, mainly referring to de-tiling: “Yes, because the compensation in comparison to the costs is well compensated. So yes, I am happy to see that de-tiling is becoming more common.”, as one of the municipality employees experienced. A green roof being an expensive measure was expressed by all stakeholders except for the inhabitants. Furthermore, the municipality employee mentioned the subsidy for construction advice and the possibility of applying for the green roof subsidy before the construction, concerning the measure requiring upfront capital. These aspects only apply to a green roof as also became clear from the documents. *Figure 14* shows the themes and frequencies related to affordability.

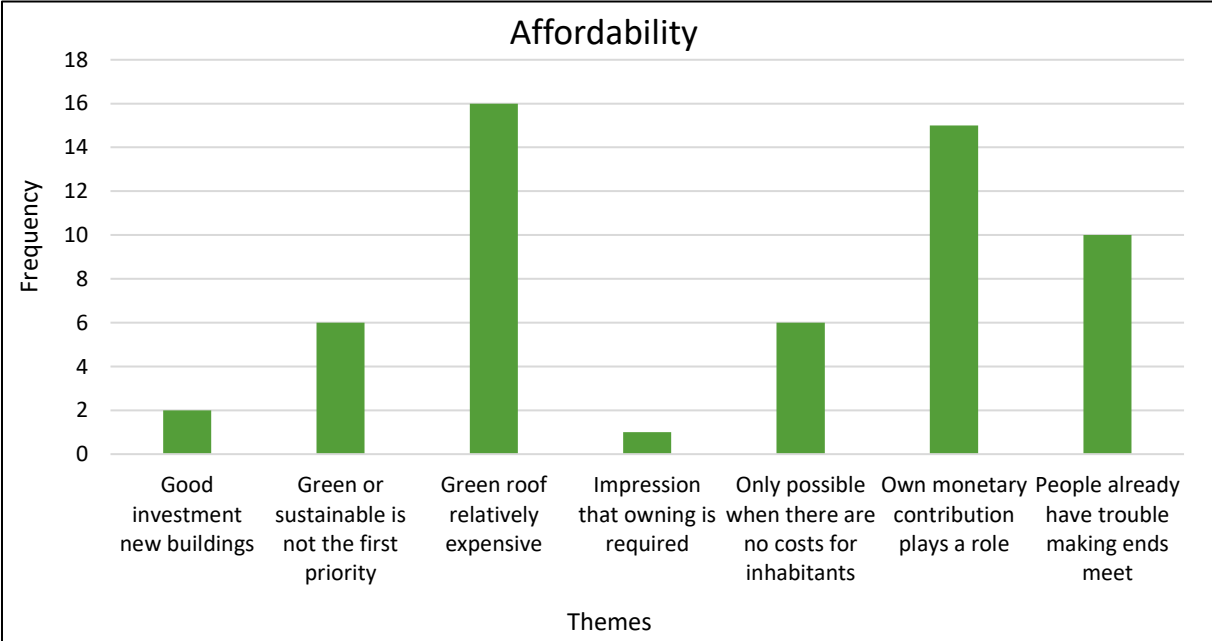


Figure 14, Themes related to affordability and frequencies based on the interviews.

4.2.1.2. Homeownership

The second factor related to accessibility is homeownership. Following the documents, the subsidy is available to both homeowners and tenants. Tenants, however, need permission from the owner, housing corporation Alwel in the case of Doornbos-Linie. Related to the indicator 'Homeownership', the theme 'Tenants need permission for green roofs' was identified most frequently as the need to ask permission is of importance according to the Alwel interviewee, but also inhabitants are aware of the need to do this. A sub-theme was identified three times, namely 'Extra step but not very limiting'. As one of the inhabitants explained: "I also have solar panels on the roof. ... It went quite easily, but I had to take steps via the housing corporation whether I was allowed, right? That went very flexibly.". The housing corporation indicated that permission will most likely be given, but that roof maintenance is of influence, this sub-theme referring to maintenance was identified three times.

Furthermore, it became clear that the applications mainly came from homeowners. This was stressed numerous times by a municipality employee. Related to this, the stakeholders had the impression that implementation is easier for homeowners, another theme with the sub-theme 'Less choice restrictions', identified four times. Another reason for tenants not to apply for a subsidy that would not be the case for homeowners relates to the sub-theme 'Cannot benefit from the investment when moving out'. This sub-theme was identified three times, it was not explicitly stated by the inhabitants themselves but it was expressed as a possibility by the housing corporation interviewee: "So I can imagine that when you are a homeowner and maybe that home will increase in value when you put a green roof on it for example. And when you sell it, you will earn it back of course. A tenant naturally does not have that, so that could also be of influence.". This links to another theme: 'People invest less in rental homes'. However, one of the municipality employees indicated there is no difference in motivation between owners and tenants to green their homes. This would follow from a factsheet and be the case concerning a green garden (Bos & Keuchenius, 2024). *Figure 15* shows the themes and frequencies related to homeownership.

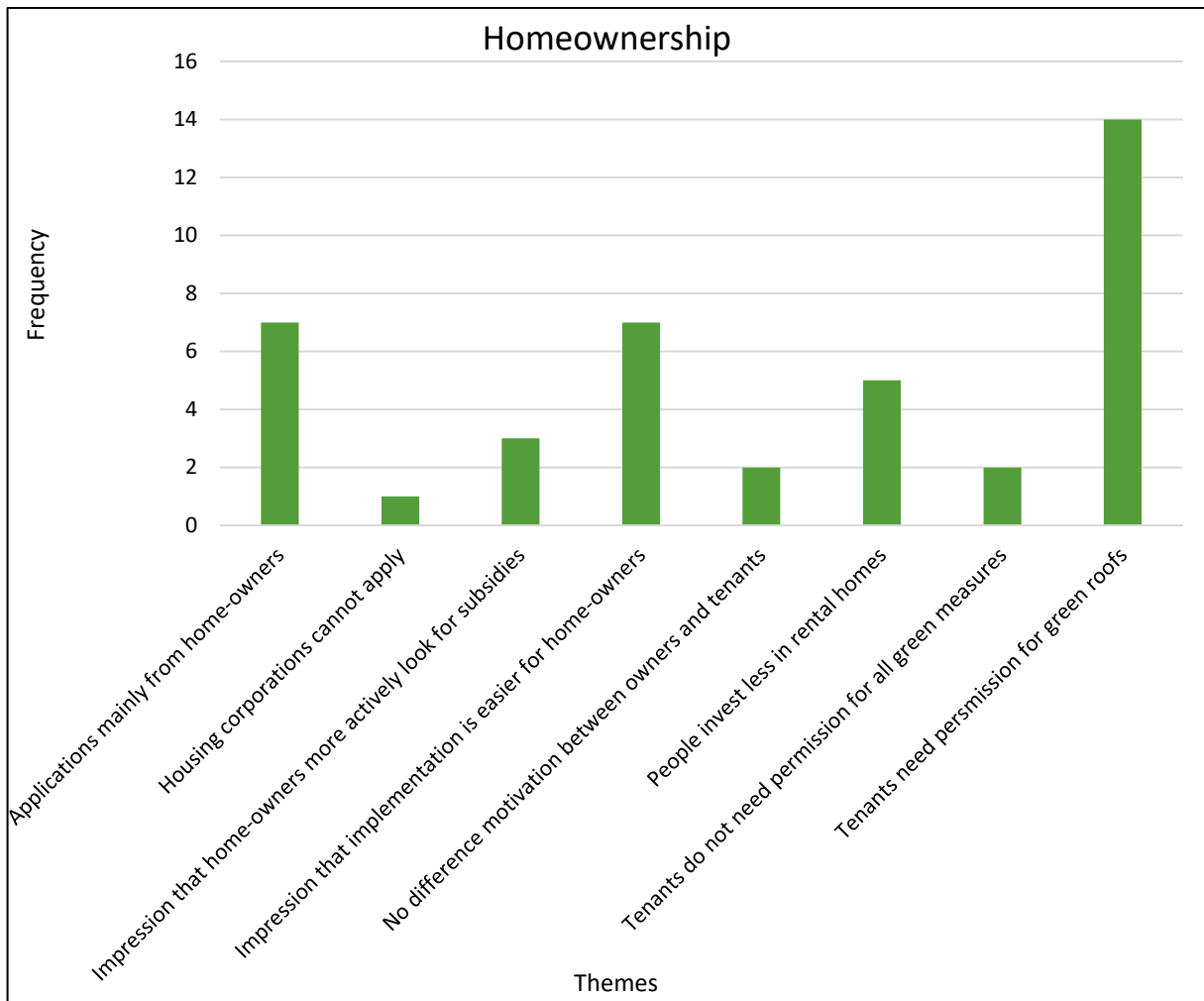


Figure 15, Themes related to homeownership and frequencies based on the interviews.

4.2.1.3. Housing Type

As indicated before, based on previous research, it might be more difficult for some housing types compared to others to construct greening measures, in this case, a green roof. As follows from the documents, there are several requirements, for instance, it should be possible to store a minimum of 25 liters per square meter, which was also mentioned to be important by a municipality employee, and there should be at least eight types of plants on the roof and a substrate layer of 40 millimetres. There are concerns about the suitability of the roof, one of the themes following from the interviews. This is mainly related to the sub-theme 'Roof carrying capacity and firmness' that was identified seven times. One of the inhabitants shared an experience with this: "Look, we have a shed, sedum would be placed on it, but it is too weak. And most of what we have here is a ruin. So, you can only construct a green roof and apply for a green subsidy when you have a firm, yeah, house or shed.". Based on an interview with the municipality and the documents, it is possible to apply for a subsidy for a construction calculation, however, this will only be granted when the green roof is constructed. Other concerns relate to the roof slope and whether a green roof can be constructed depending on when the housing corporation needs to maintain the roof.

Besides, several points were raised about the suitability of apartment blocks. One theme identified is 'Impression that apartment blocks are more challenging'. Two sub-themes came forth, namely 'Difficult to develop a shared vision' and 'Technical challenges', both with a frequency of three. An inhabitant expressed both sub-themes in one quote: "Not the access to the subsidy, but when you are talking about a green roof, if you live in an apartment, then you do not have that much roof and then you also have neighbours you need to consider. So I think that there is a problem there.". However, another theme that became apparent is 'Collective application apartment blocks', indicating an opportunity instead of a challenge. One of the inhabitants has this expectation: "Yes, I can imagine that when you live with many people in an apartment block or something ... Then you could think, stronger together, so to say.", another inhabitant expressed that it might be an opportunity via the owner association. The municipality confirmed that there are indeed applications from owner associations. The sub-theme 'Via owner association' was identified four times. This opportunity argument is also the reason why collective action is an application condition for the provincial subsidy for green. Still, housing type might not be the most influential factor in accessibility. As follows from the documents, it is at least possible for both ground-based houses and apartment blocks to construct a green roof, provided that there is a surface of at least eight square meters. See *Figure 16* for themes and frequencies.

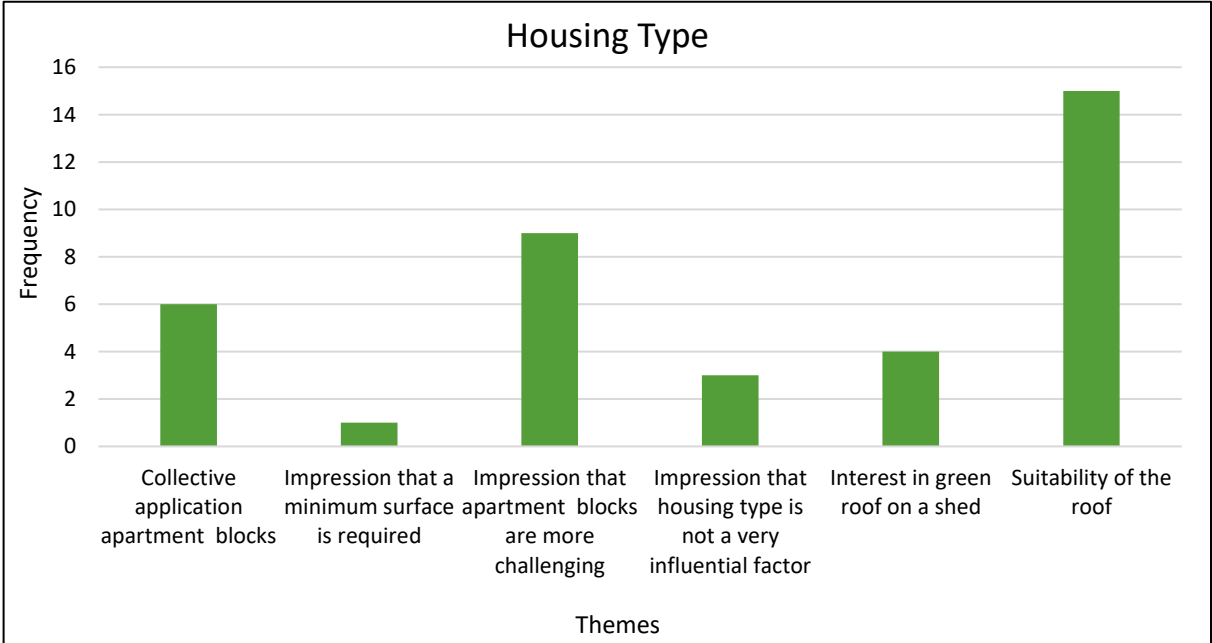


Figure 16, Themes related to housing type and frequencies based on the interviews.

4.2.1.4. Suitable Information

The next factor is suitable information, consisting of several types of measures. Starting with perspectives on what information is important for decision-making. There is quite some diversity in the aspects deemed important, see *Figure 17*, but the theme most frequently mentioned is ‘Knowing what is needed’, with the sub-themes ‘Plants’, four times, and ‘Soil’, two times. All questions relating to knowing what is needed followed from one of the municipality employees. The second most frequently identified theme is ‘Instructions on where to find additional information/help’. This was mainly expressed by the interviewee from the province: “So I think that mainly making it known, like, where can people go, to make the barriers as low as possible.”. The related sub-themes are ‘Help with construction’, two times, and ‘Help with the subsidy’, four times. For inhabitants, costs are important to know, as well as knowing what is allowed, with the sub-theme ‘To avoid unwanted consequences’: “I would like to know very clearly what is allowed. So you would not be confronted with all kinds of hassle.”, as one of the inhabitants expressed.

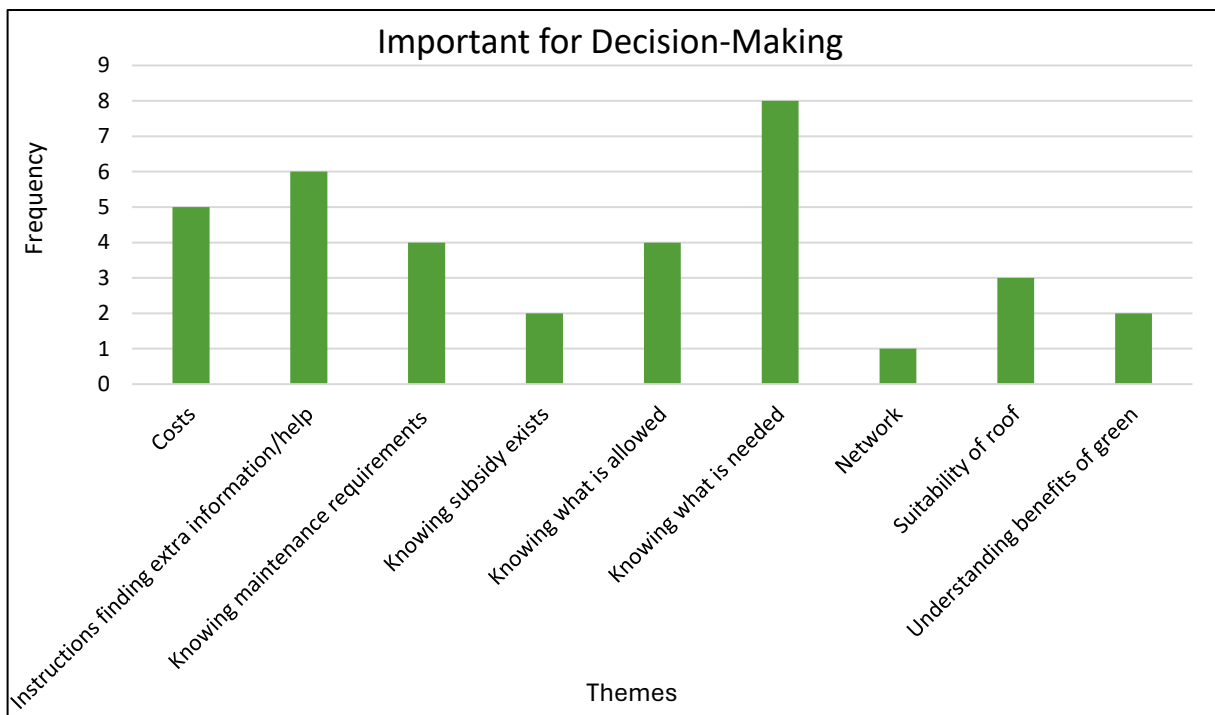


Figure 17, Themes related to perspectives on what is important for decision-making and frequencies based on the interviews.

Following the information about the regulation documents on the website of the municipality, most of the aforementioned aspects that are important for decision-making are available. These explain the benefits of a green roof, the monetary compensation is communicated as well as application conditions and what activities cannot be paid for via subsidy. However, it can still be questioned whether inhabitants experience this information to be accessible to them. This relates to the next measure. The data showed that several aspects remain unclear, the theme ‘Uncertainties’ was identified twelve times. Two sub-themes are related, the first one, identified seven times, being ‘Information gaps’, as one inhabitant puts it: “Well, I think that we are poorly informed. We are informed, but I often have

the impression that they think we are a couple of silly people over here. So you get a little bit of information, but not enough to be able to make a good decision.”. The second sub-theme is ‘Technical uncertainties’, registered five times. Additionally, information might be out there, but inhabitants did not receive it, resulting in people being unaware of the existence of the subsidy for green, this theme is part of the top 10 themes. One of the municipality employees expressed to be aware of this, the remaining number of references to this theme followed from the input of the inhabitants, quotes from three inhabitants reflect the theme well. One of the inhabitants mentioned the following: “In any case, it is remarkable, I think I am very well aware of local and global news, that I actually did not read anything about this topic that was by the housing corporation or by the municipality, meaning written, shown to me. There may be links ready, but I did not look for them. So unasked I did not see anything.”. Another inhabitant expressed a comparable view: “The point is, I did not know that there was a subsidy until this board was here in the neighbourhood, while I am very occupied with my garden and green and which plants I want to have in there and that I want there to be biodiversity, I did not think for a second that there might be a subsidy for this.”. The inhabitant indicated to have noted the board on the day of the invitation to participate in the interview for this research, expressing that it was the first time the existence became known. The same is true for another inhabitant: “You visited me at the door with it. I had never heard of it. Yeah, I heard there is a subsidy, but then I think, that is not for us.”.

Another aspect that appeared influential is the format within which the information is available. It was regularly expressed that digital information is an advantage. The governmental actors indicated that information was mainly available online, this is one of the sub-themes, identified four times. Other sub-themes are ‘Good application platform’, two times, and ‘Links to subsidy on multiple websites’, five times. Regarding the latter, one of the municipality employees indicated the advantage of this: “We have a number of sub-sites from the municipality, on the city in the park and other sites referring to greening. Those nowadays put a link on their website towards the subsidy water and green. So we become more known.”. Alwel indicated to have this link on their website, and also an inhabitant made it known that this is the case. On the other hand, there also seems to be a need for non-digital information. The theme ‘Digital as a disadvantage’ was identified, with the sub-themes ‘Elderly have difficulties’ and ‘Information is difficult to find online’, both three times. Data on the first sub-theme originated from one of the inhabitants while the latter came from the municipality and the housing corporation. An alternative may be newsletters, the sub-theme ‘Newsletters are used’ was identified three times, following expressions from the province and housing corporation. The sub-theme for the

desirability of newsletters also came forth three times, expressed by the inhabitant who indicated the issues for the elderly. All the themes related to this measure can be found in *Figure 18*.

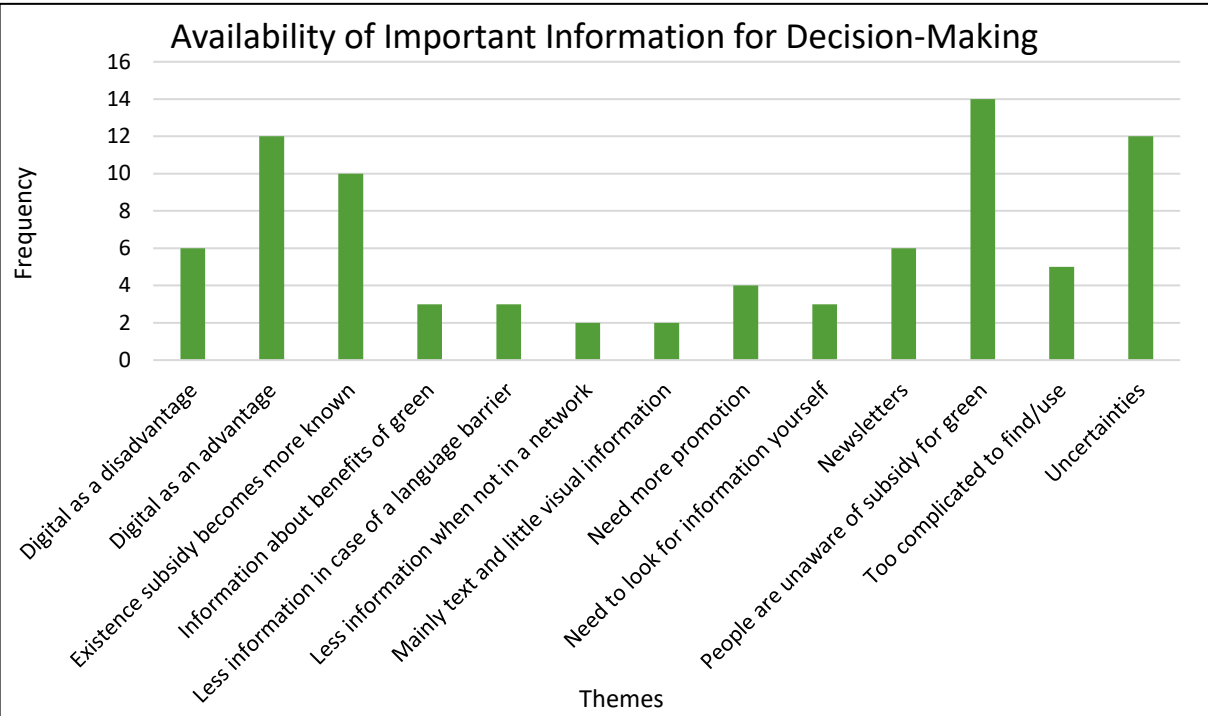


Figure 18, Themes related to perspectives on the availability of information important for decision-making and frequencies based on the interviews.

Regarding the support mechanisms, the theme that stands out is ‘Facilitating’, as it was identified 16 times. *Table 6* shows the sub-themes and frequencies.

Table 6, Sub-themes related to ‘Facilitating’ based on the interviews.

Theme	Sub-theme	Frequency
Facilitating	All-in package	3
Facilitating	Facilitator	4
Facilitating	Plants	2
Facilitating	Tile-taxi	3

These facilitating approaches could support inhabitants with their green roofs and subsidy applications. Some of these are already in place, others are not. The all-in package is not there, but an idea of one of the municipality employees. It is referred to as to “reduce burdens and worries”, or more elaborately: “What is a sustainable roof? How high should the layer of sand be? What has to go underneath, what type of plants, what type of sedum? I think it would be possible to offer a package for this.”. Facilitating can also be organised via facilitators, the municipality employees referred to a gardener, garden coach or active inhabitants in the neighbourhood. A municipality employee also indicated that the required plants are often already in the sedum mats. Moreover, a tile-taxi is applied, this is a facilitating measure that is present in Breda assisting with de-tiling gardens. Other support mechanisms mentioned are campaigns, one time, and online options, four times, with the sub-themes ‘Link to municipal subsidy on websites’ and ‘Online portal’, as introduced before, both two times. However, it remains to be the case that inhabitants need to take action themselves, which is another theme. It was identified four

times with the sub-theme ‘Otherwise do not know what is there’, which was counted twice. ‘Construction calculation’ was identified two times, this support mechanism also became clear from the documents. Via analysis of that data source, a roadmap for the application was also found.

4.2.1.5. Other Factors

The previous factors influenced accessibility for solar panel subsidy, other or additional factors might be related to the green roof subsidy. Consequently, a question to gain insights into this was asked, resulting in the identification of several themes, see Figure 19.

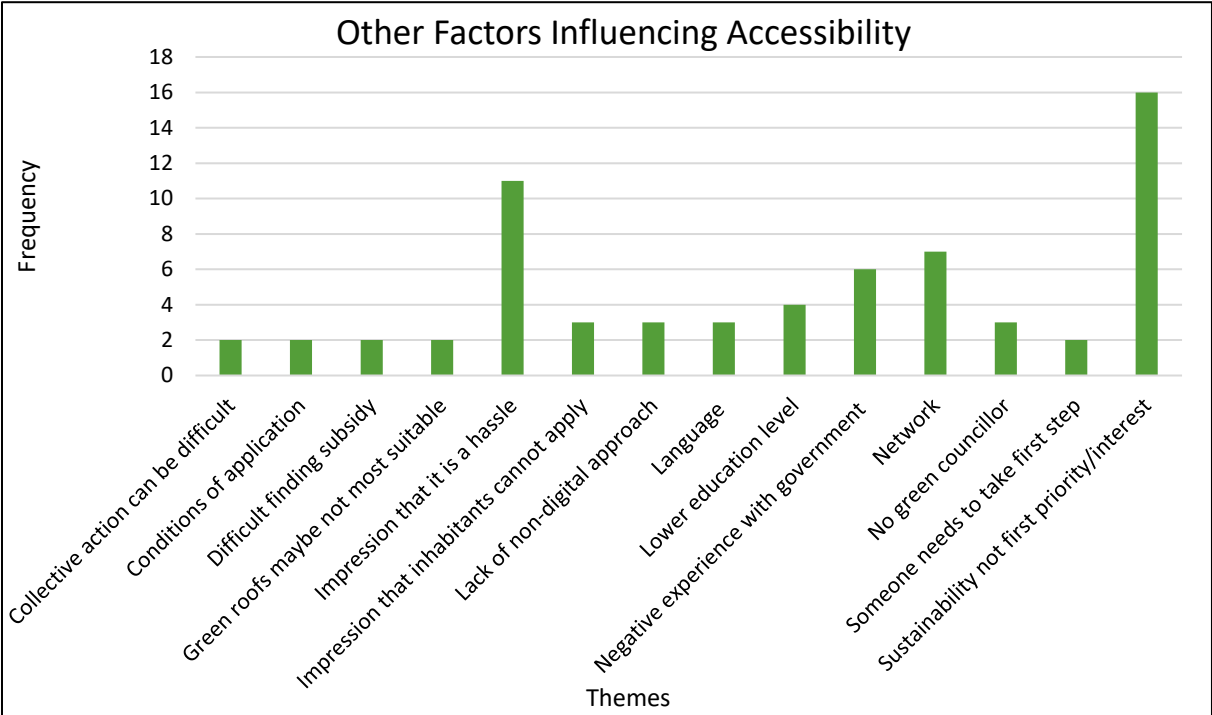


Figure 19, Themes related to perspectives on other factors that might influence accessibility of the subsidy and frequencies based on the interviews.

One of the themes stands out, ‘Sustainability not first priority/interest’, this theme is also one of the top 10 most frequently identified themes and a comparable theme was identified relating to affordability. All actors expressed this to be of influence in some way, for instance, relating to people not being open-minded towards greening or having other things to worry about. As one of the inhabitants explained: “No, myself and others who went to a public meeting, well, that is really just a few, so this indicates how little it is present in such a neighbourhood as this. Not a lot. That is a pity.”, or how the interviewee of Alwel describes it: “People are really trying to survive, so those people just have, they have other things on their minds, other than making things more sustainable or greening. So that is something we notice in a broader sense when talking about sustainability.”.

Secondly, ‘Impression that it is a hassle’ seems to influence accessibility. One of the municipality interviewees expressed the following: “So you already really need to go to Intratuin or Groenrijk, or you name it. All those horticultural companies to get the plants. So I think offering it fragmentary could

be a barrier.”. Other aspects may cause this impression, for example, when mentioning the application conditions, one of the inhabitants responded as follows: “That too” and another inhabitant mentioned: “But my husband says, no I do not want all of that, that mess on it, and that is already within one family.”, indicating that some see a green roof as a mess, making it a hassle, and that these are complications when deciding on whether or not to construct it. What stands out most is the hassle related to the forms connected to the application procedure, this is one of the sub-themes and mainly one inhabitant mentioned this to be very influential on the accessibility. Also, the province interviewee could foresee this barrier: “I mainly think the degree of complexity. If a person has to fill in 10 pages of forms before being eligible, then I can imagine that this can be a barrier, and also the justification.”, hence, for the subsidy from the province, it is not required to report on all activities after completion of the roof.

Other sub-themes were identified, see *Table 7* for the sub-themes and to which theme these relate.

Table 7, Themes with sub-themes related to other factors that might influence accessibility based on the interviews.

Theme	Sub-theme	Frequency
Impression that it is a hassle	Complicated due to forms	7
Impression that inhabitants cannot apply	Need a minimum surface	2
Lack of non-digital approach	Elderly who have no e-mail	2
Negative experience with government	Delayed action that was not satisfactory	2
Negative experience with government	No respect for inhabitants their initiatives	3
Network	Missed chances when people are not in touch	4
Network	People in a network can help each other	3

4.2.2. Understanding of Justice

Next, the understanding of justice, determined by the applied and desired principle of distribution. The regulation indicates that the activity needs to contribute to policy goals developed by the council. The subsidy is a stimulating measure with the goals of maintaining water on location, reducing water-related issues, recovering the natural water system, enhancing biodiversity, contributing to cooling and improving the air quality. The following is stated in *Article 1:8 General* of the document ‘Nadere regels subsidieverstrekking gemeente Breda 2017’: ‘Activities should be available to all citizens of Breda, starting point is as much as possible inclusive offer.’. It becomes clear that the subsidy is open to all natural persons and legal persons within the municipality. Municipal actors determined a subsidy ceiling, it is possible to apply for a subsidy and receive it until the ceiling has been reached. Based on the document analysis, the principle of equality was incorporated. This is confirmed by one of the municipality employees: “As I said, in the basis, I am going generalise and flatten it, everyone has access to the subsidy. Everyone can sit behind the laptop and apply for it.”, who also indicated that this is the case throughout the country, with differences only in budget.

The theme 'Everyone has access' was also identified. In case a municipal employee stated a fact about this setup of the subsidy, for example, the previous quote, the frequency of the theme did not increase, only when this principle of distribution is desirable from the diverse stakeholders' perspectives. Mainly the province indicated that their subsidy is open to everyone. The province aims to make the subsidy accessible by keeping it as simple as possible, but the division of where the subsidy ends up is difficult to change: "We have to open it up equally. In principle, the regulations are fair if you purely consider it as everyone can make use of it.". Also, two inhabitants expressed that it should be equal for everyone.

Furthermore, the province indicated that her subsidy is open until the subsidy ceiling is reached. As shown, this is also the case for Breda. Besides, the idea of excluding inhabitants who have an income above a certain level, possibly relating to the principles of need and priority, was expressed to be impossible. This sub-theme, 'Not possible to make subsidy available only to people under a certain income' was identified two times. As stated by the interviewee: "Because, as the government we cannot say something like, all right we exclude people with an income above x or with an education level above x. You cannot say this.". However, the Breda subsidy regulation states the following in *Article 4:1 Reasons for Denying*: 'When there are reasons to assume that the applicant can or could also without subsidy own enough money, by own means or from means of a third, to cover the costs of the activity.', which seems to imply that subsidy is not necessarily granted after an application.

One of the municipal employees indicated the possibility of extra promotion, another identified theme. The sub-theme 'Investing in people with knowledge', identified twice, came from this actor. This could be neighbourhood-specific, referring to distribution based on need or priority. Furthermore, the municipality employee expressed to be satisfied with the subsidy regulation as there are both high- and low-cost options. The sub-themes 'Good ratio of costs and subsidy for de-tiling' and 'Increased de-tiling' were both identified twice. In a way, this relates to equality with an option more accessible to inhabitants with a lower income.

Also, inhabitants expressed the possibility of extra promotion, the sub-theme 'non-digital promotion' was identified twice based on input from an actor of this stakeholder group. Another inhabitant indicated that it does not matter where the subsidy goes, referring to the principle of utility. The aim is to increase green. Based on the policy goals, this is indeed the case. Furthermore, one of the inhabitants seemed passionate about a neighbourhood budget. Moreover, other than what was indicated to be possible by the province, two inhabitants think it might be proper to draw a line at a certain income, this sub-theme was identified twice. In line with this, one inhabitant indicated that it would be pleasant if the subsidy goes to people who have no money to invest in green themselves.

The housing corporation expressed the thought of cost going down elsewhere due to higher implementation of and investment in green. An example given refers to health and possible insurance costs that can decrease. This could result in an increased subsidy ceiling or the possibility for housing corporations to apply, which is currently not possible while it could be helpful: “We cannot make use of it as corporation. Yeah, that does not feel fully fair. And something I think can help, the goal of the subsidy is of course to eventually have an increased number of green roofs. So I think it can help if it would thus also be possible for the corporations to apply for the subsidy. Because we could, for example, construct green roofs on apartment blocks.”, this seems to refer to the utility principle. On the other hand, the housing corporation is positive about the setup of the policy in the sense that it is possible for tenants to apply and as small measures are available. Besides, it was expressed that giving attention to locations where the need for more green is highest might be helpful.

The theme ‘Unburden the inhabitant’ was expressed most often, even though mainly expressed by the municipality, stakeholders see this as an approach to have a more just distribution. This theme was only not identified following the data from the housing corporation. Two sub-themes were identified. The ‘all-in package’ came forth four times, and ‘People as facilitators’ 10 times. One of the municipal employees expressed: “For some target groups you need to offer more assistance. I am not talking about the Tesla neighbourhoods, very stigmatising, but I am talking about vulnerable neighbourhoods like the southern part of Linie.”. The themes referring to these approaches for a just distribution can be seen in *Figure 20*.

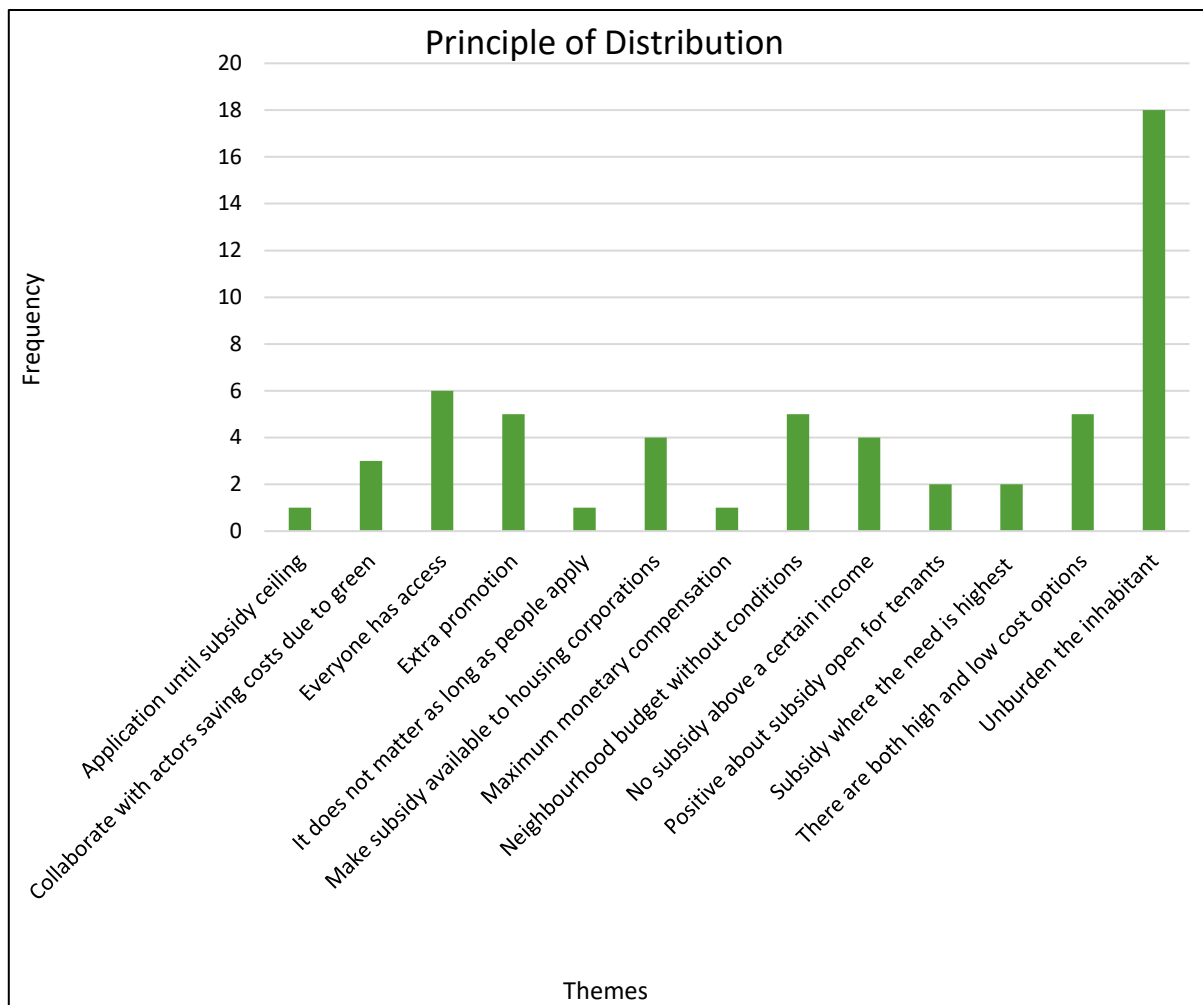


Figure 20, Themes related to perspectives on desired principles of distribution and frequencies based on the interviews.

4.2.3. Stakeholders and their Positions

Table 8 shows the stakeholders possibly involved in the green roof subsidy of Breda. These actors include the municipality, the province, inhabitants, facilitators, the housing corporation and owner associations. The housing corporation in the area is Alwel. Of the facilitators, the promotor and the garden coach are not active in Doornbos-Linie but could be in the future. The attitudes of the interviewed stakeholders will be presented below. The results follow from the stakeholder analysis, based on the interviews and the analysed documents mentioned in the methods section.

Table 8, Stakeholders and their roles based on the interviews and analysed documents.

Actors involved		Roles
The municipality of Breda	The municipality in general	<ul style="list-style-type: none"> Promotes green and has the city in the park ambition, for example, people can get big bags, collected by the tile-taxi for de-tiling. Informs inhabitants (in Dutch).
	The advice committee	<ul style="list-style-type: none"> Advises the mayor and aldermen on applications based on the subsidy regulation.
	Policymaker	<ul style="list-style-type: none"> Policy on blue and green.

	The mayor and aldermen (het college)	<ul style="list-style-type: none"> • Provision of subsidies. • Handle and decide on subsidy applications, except for subsidies from European, national or provincial policies. • Determination of subsidy ceiling per category and communicate these properly. It was possible to increase the budget for green when this was needed. • Determination of the application form. • Yearly determination of goals and application conditions. • Can develop additional regulations. • Determine within what term application needs to take place.
	Coordinator neighbourhood deals and subsidies for blue-green	<ul style="list-style-type: none"> • Judges the subsidy applications. • Ensures inhabitants can access their portal to keep track of the application. • Asks inhabitants about their motivation to de-tile and green. • Stimulates inhabitants to apply digitally. • Helps inhabitants with the application, for example, via the phone. • Informs about subsidies, for instance, via neighbourhood papers.
	Advisor climate adaptation	<ul style="list-style-type: none"> • Greens public space and is involved in larger projects. • Co-creates the design of public space with inhabitants. • Contact with inhabitants.
	Council (de raad)	<ul style="list-style-type: none"> • Determines policy goals.
The province of Noord-Brabant	The province in general	<ul style="list-style-type: none"> • Possible collaboration with the municipality. • Regulation on a higher level, further away from the inhabitants. • Cannot decide on aspects of municipal regulations.
	BrabantStad (B7)	<ul style="list-style-type: none"> • Part of an advice committee, appointed by provincial executives.
	Coordinator Nature for and by Brabant	<ul style="list-style-type: none"> • Promotes 'Buurt Natuur en Waterfonds' online and via newsletters, not involved in Breda subsidy. • Thinks along with inhabitants' initiatives.
	Cultuurfonds	<ul style="list-style-type: none"> • Executive of 'Buurt Natuur en Waterfonds'.
Inhabitants	Inhabitants in general	<ul style="list-style-type: none"> • Need to act themselves and could alternatively de-tile gardens which is easier. • Implement green (to reduce heat and for biodiversity). • Help and stimulate each other.
	Early adopters	<ul style="list-style-type: none"> • More welcoming regarding green (gardens), resulting in greener areas.
	The applicant	<ul style="list-style-type: none"> • Is required to use the application form. • Construction of the green roof no later than 13 weeks after application. • Can track the application in an online portal.
	The non-applicant	<ul style="list-style-type: none"> • Did not apply, many inhabitants are unaware of the blue-green subsidy.
Facilitators	Promoter in the neighbourhood	<ul style="list-style-type: none"> • Inhabitant with knowledge who could help others, for example after being educated. The promoter could also improve social cohesion. A 'wijkregiseur' or 'wijkmakelaar' are examples of promoters appointed by the municipality.

	Project developers and construction companies	<ul style="list-style-type: none"> • Assist in projects. • Promote and inform about green roofs on their websites with links to municipal subsidies.
	Intermediate	<ul style="list-style-type: none"> • Inhabitant who has good contact with the municipality. This is present in the form of a neighbourhood council that can answer inhabitants' questions. • Civil society organisations can help with applications. • Tenant organisations can be involved in initiative groups.
	Garden coach or gardener	<ul style="list-style-type: none"> • Helping with soil, plants, etc.
	Insurance companies	<ul style="list-style-type: none"> • Provide the option to construct green roofs to the insured, possibly reducing their future costs.
	Housing corporation (Alwel)	<ul style="list-style-type: none"> • Renovate and make houses more sustainable. • Promote green and application of green subsidies, for example via newsletters, including information on the value of green in general. • Agreed with the municipality that the application of a tenant will be forwarded to them to reduce the effort for inhabitants. • Permit green when possible. • Finance own greening initiatives. Cannot use the subsidy and therefore construct few green roofs as this is expensive. • Part of the initiatives group on climate adaptation and biodiversity, considering what information is available. • Research what are the best measures to take, also to inform inhabitants. • Refer to civil society organisations for help with applications. • Listen to inhabitants and their needs.
	Owner associations	<ul style="list-style-type: none"> • Can apply for green subsidy. • Can construct green roofs, also on apartment blocks, possibly collectively.

Based on the interviews and documents, contradictions in stakeholders' roles were not identified. The roles of the municipal actors mainly follow from the regulation documents, and the province confirmed their authority. No interviews took place with possible facilitators. Several types of facilitators could consist of enthusiastic inhabitants, as indicated by the government as a possibility. However, it cannot be fully known whether inhabitants would be willing to take this role and see this as a role for themselves. Regardless, inhabitants did express the importance of being involved, for instance, for local knowledge and for helping each other. For example, some of the inhabitants interviewed provided input to the UPSURGE project. Furthermore, the housing corporation indicated to put effort into sustainability and this was also noted as being the case and important by the municipality. However, the housing corporation cannot apply for subsidy, hence it can be questioned whether construction of green measures is seen as a role for the housing corporation or not. Contrastingly, owner associations

can apply, but as no interview with this stakeholder took place, it cannot be determined whether they see this as a role for themselves.

As for the attitudes of the stakeholders interviewed towards the distribution of the subsidy for green roofs, the municipal employees indicated that the subsidy is available to everyone but acknowledged that it is less accessible for some target groups. One of the employees stressed that the applications mainly originate from homeowners. The employees seem willing to more actively promote and facilitate inhabitants. The province also has the impression that their subsidy, Buurt Natuur en Waterfonds, was requested more often in socioeconomically stronger neighbourhoods. Adoption by inhabitants is stimulated, but the province is not as close to inhabitants as municipalities or social organisations. The province also indicated that neighbourhood assistance might be helpful, while it is most likely impossible to change the principle of distribution behind the regulation. For the housing corporation, it seems that there is less green in neighbourhoods with more social housing, however, it was not clear to what degree this relates to subsidy applications. Alwel indicated that it is required that the housing corporation permits the construction of a green roof, but give this permission when possible and thus seems supportive towards green and sustainability. However, there have been no applications so far, consequently, not much consideration has been given to the situation. The housing corporation puts effort into informing but expressed that this can be improved. Inhabitants indicated that they have the impression that some people have more difficulties finding their way, making the subsidy less accessible. This largely relates to information and lacking awareness of the existence of the subsidy, even though the majority of inhabitants interviewed were actively involved in greening.

4.3. Procedural Justice

The results relating to procedural justice will be presented below. This includes an overview of how the stakeholders influence the application conditions. Then, perspectives on what determines power in this decision-making will be shown, followed by participation preferences.

4.3.1. Stakeholders and their Influence on the Application Conditions

The stakeholder analysis included determining the influence of the actors on the subsidy. For this purpose, the influence on the application conditions was analysed as these impact accessibility. See *Table 9* for the determined influence of the four stakeholder types interviewed.

Table 9, Stakeholders and their influence based on the interviews and documents.

Stakeholder	Influence
The municipality of Breda	Based on the interview, policymakers of the municipality work on the setup of the policy. A jurist is also involved and so are municipality employees who work with the subsidy applications. The latter employee is involved in the technical part of the application conditions and shares experiences with the subsidy of inhabitants that might be important for the application conditions. Based on the documents,

	the mayor and aldermen determine the application conditions and have the authority to make decisions related to the subsidy regulation and subsidy ceiling.
The province of Noord-Brabant	The province of Noord-Brabant does not have the authority to determine the setup of municipal regulations such as this blue-green subsidy. Deliberation is possible, but the municipality sets up the regulation and the mayor and alderman or municipal council establish it.
Inhabitants	Inhabitants do not have a say in the subsidy regulation, including the application conditions. However, the municipality employee who works with the subsidy applications takes comments from inhabitants into account. The subsequent municipality employee gave an example during the interview. For a green façade, inhabitants could get 10 euros per square meter. A green façade does not need a large surface, but measures to let the plant grow upwards are required. This phenomenon was recognised and resulted in a change towards a monetary compensation of 35% of the costs instead of the 10 euros per square meter. Thus, there was an indirect influence. Inhabitants also indicated to have the impression that it is the municipality or government that decides. Two inhabitants indicated to have an influence via their voting behaviour.
Housing corporation (Alwel)	The housing corporation indicated there is good collaboration on climate adaptation and biodiversity between the housing corporation and the municipality. The municipality informed the corporation and the corporation asked about the inclusion of tenants in this regulation. As a result, tenants can apply. The corporation indicated in the interview that in the end, the municipality decides as it is their regulation.

4.3.2. Power in Decision-Making

Several factors determine power in decision-making, relating to the influence. Based on the interviews, themes referring to aspects determining this power were identified, see *Figure 21*.

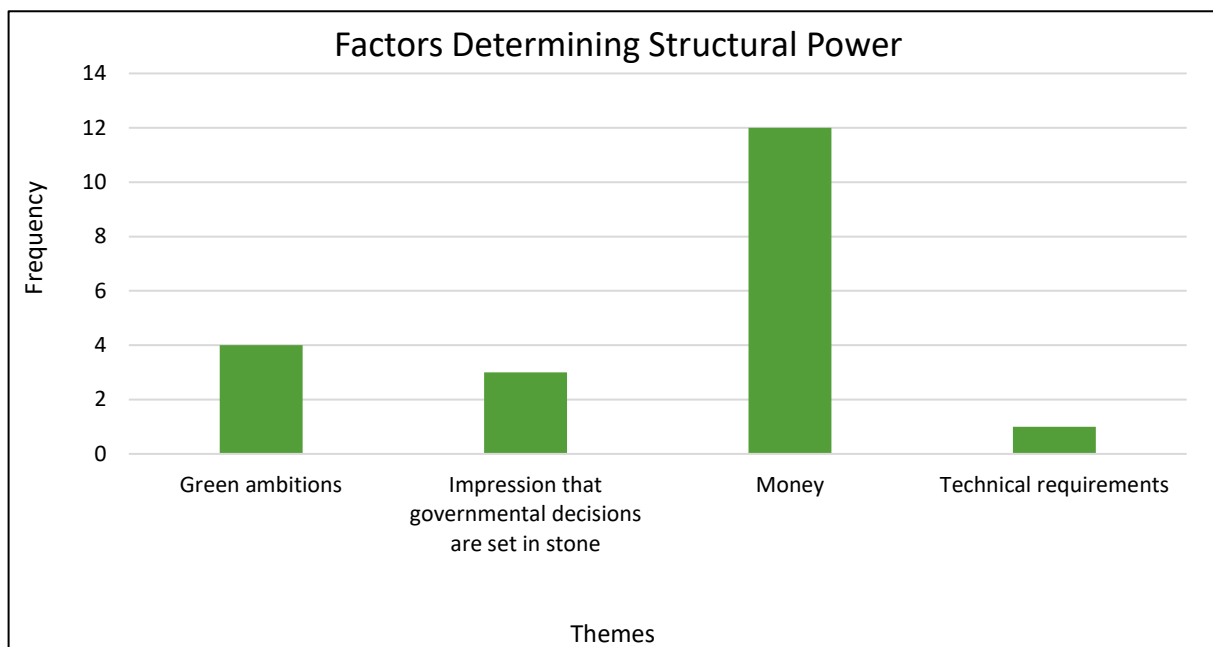


Figure 21, Themes related to factors determining structural power and frequencies based on the interviews.

The theme that stands out is 'Money'. The sub-theme 'Budget determines possibilities', identified seven times, mainly relates to points expressed by the governmental actors. As the municipality explained: "We have a limited budget, we need to use it well. And yes, you will need to put conditions in place ...",

which is in line with the description of the province: “Yes, well, there is of course always a subsidy ceiling. Because, eventually it is naturally about money. Subsidy is giving money, so you need to have a budget within your municipality or your province.”, this also follows from the regulation description. Also, one inhabitant is well aware of this factor. The other sub-theme is called ‘The actor with the money has the final say’, identified four times, expressed by the housing corporation and an inhabitant. The themes ‘Green ambitions’ and ‘Impression that governmental decisions are set in stone’ were mainly identified following the perspectives of the inhabitants. One inhabitant explained: “There are a lot of people at that office and those people decide what kinds of things will happen. While as an inhabitant, you went to the gathering last week here and many people do not agree with all the things that will happen, and it will happen regardless and they asked about it, but they simply did not listen.”. As for the green ambitions, one inhabitant expressed that voting is important, but also societal problems could influence the goals. Other inhabitants also expressed the idea that the degree to which governmental actors perceive green as important and politics are of influence. This can be confirmed by an expression of a municipal employee: “We have a yearly budget, but I have already experienced two years that there was no more budget halfway through or at two/third of the year. Then it was supplemented. Because the municipality wants to promote greening on private areas, so collecting rainwater mainly.”.

4.3.3. Participation Preferences

Two themes were identified concerning participation preferences. Firstly, the theme ‘Not always smart to involve inhabitants’, five times, with information connected to the sub-theme ‘Lot of different opinions’ following twice from the input of one of the municipal employees: “Yes, because then you have twenty inhabitants in a street and you will get twenty different opinions. So it is very hard to make something out of that.”. Also, two inhabitants acknowledge there might be downsides.

On the other hand, the theme ‘Stakeholders can have valuable input’ was identified frequently, 13 times. The municipal employees indicated that having interaction between the office and the neighbourhood is something good, the same is true for collaboration within projects. Moreover, the housing corporation is positive about being involved in initiative groups. This is a sub-theme, identified three times. The input of one inhabitant also counted relating to this theme. Another sub-theme is ‘Need people with local knowledge’, as one of the inhabitants explained: “Because the majority of the municipality actually does often not know what they are talking about. So you actually would need to put people in there with the right background and knowledge.”. This sub-theme was identified three times, following from input of the inhabitants. An example of one inhabitant about a playground that

is not used but was costly was mentioned. Preferences of the province did not fully become clear, however, based on previous indicators, the influence is likely limited, but deliberation is possible.

4.4. Recognition

Regarding the dimension of recognition, the results will be presented about to what degree stakeholders think demographics have been considered and inhabitants could express their views on a just distribution, relating to the sense of justice. Information on the expressions is not gathered, however, this can be derived from the desired principles of distribution. On top of that, the results will be shown about how inhabitants want to improve their living environment concerning green and how they were able to develop their perspective, relating to critical knowledge production.

4.4.1. Sense of Justice

Firstly, the themes regarding the impression of to what degree demographic characteristics have been considered within the regulation. The theme most frequently mentioned about this factor is 'Language barriers'. The impression that these are present also followed from the door-to-door visits. The sub-theme 'Difficult for people with limited language skills or with another limitation' was identified six times. One inhabitant expressed that there are illiterate people, but it was also indicated that understanding Dutch is difficult for some: "Look, here they have two boys, they are already in their twenties, but they were still young when they came here, I mean, they all speak Dutch and when I need to explain something to their mother, then they do that for me. So if you would go there with your programme, then 'I not understand', 'I not know'. Yes, you have a lot of that here. So you could put a letter in their mailbox. But yeah they would still not understand. They will throw it away.". Another inhabitant tried to find the information during the interview by typing something wrong and found out that in that case, you would not get the information you might be looking for on the website of Alwel. The interviewee also indicated that there are no options to have the information spoken out loud in case a potential applicant has difficulties with seeing. Another sub-theme, identified four times, is 'Only Dutch and some English'. A municipal employee indicated that it is required to communicate in Dutch, with sometimes an English option. The province also communicates in Dutch.

Inhabitants seem to hope that demographics have been included but are doubtful regarding the actual consideration thereof. This relates to the theme 'Impression that diversity has not been considered'. Governmental actors indicated this as well: "No, no no no simply put it is a stimulating contribution. One of multiple, the tile-taxi is the same, to partly compensate costs. Eventually, they need to act themselves.", as explained by a municipal employee. On the other hand, two inhabitants believe demographics have been considered, and one of the municipal employees thinks this is the case as everyone can apply, but mentioned that more attention might need to be given to vulnerable

neighbourhoods. The regulation mentions few about diversity but does include a statement that there is a Code of Diversity and Inclusivity. Furthermore, as identified previously, the elderly might not be fully considered. Moreover, different motivations for green connected to culture may exist, possibly being a source of untapped potential. The housing corporation interviewee gave an example of people with a certain culture preferring edible plants over flowers. See *Figure 22* for themes and frequencies.

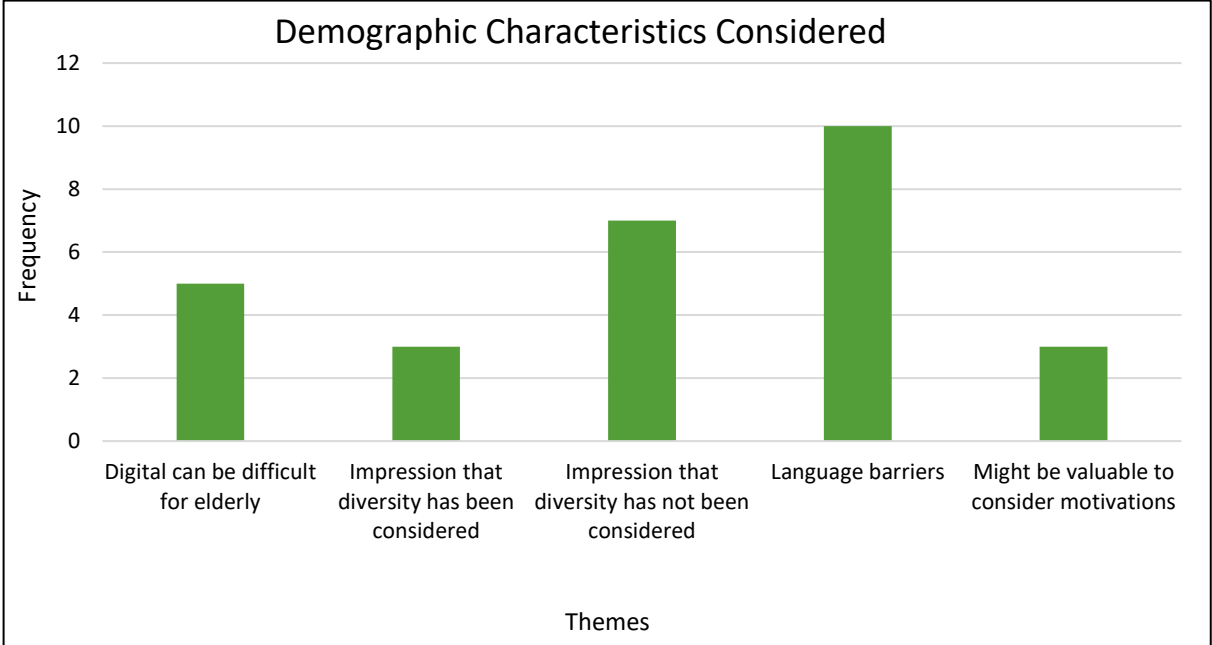


Figure 22, Themes related to diversity and demographics and frequencies based on the interviews.

Secondly, it was asked to what degree stakeholders felt that inhabitants were able to express their views on justice. The first theme is ‘Subsidy has not been evaluated’, which was identified twice based on input from one of the municipal employees and the province interviewee. Furthermore, the ‘Impression that it was possible to express views on a just distribution’ was a theme that was identified seven times. One of the municipal employees indicated to receive many questions and indications that people are satisfied with the regulation. Moreover, the housing corporation has this impression as the interviewee indicated to expect that stakeholders have been consulted in regular ways and also some inhabitants think they were able to express their views. On the other hand, the theme stating that views were not expressed has also been identified, namely nine times. As one inhabitant states: “Well, I did not even know it existed until three days ago, so no.”, something comparable was expressed by other inhabitants. The housing corporation also mentioned that inhabitants are not likely to share their views due to restricted accessibility and other concerns.

4.4.2. Critical Knowledge Production

To develop and express a view on justice, differently put, creating knowledge on this topic, information needs to be available. Hence, a question was asked to determine whether this was the case, see *Figure 23* for the results.

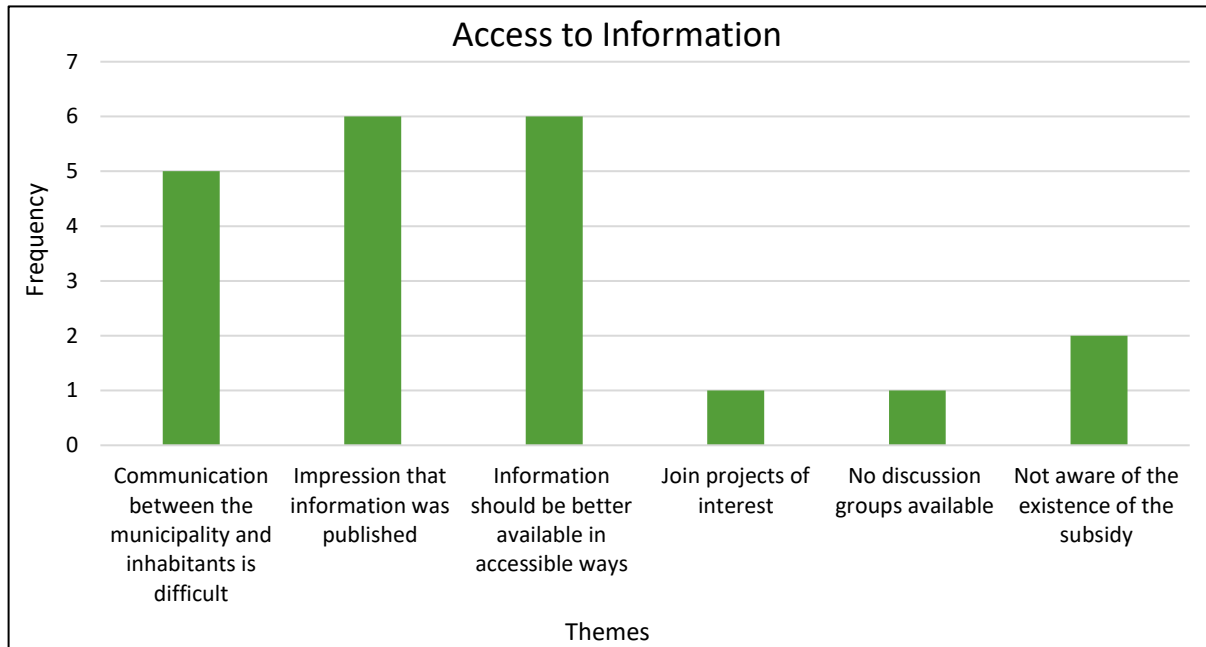


Figure 23, Themes related to access to information and frequencies based on the interviews.

Three themes stand out, starting with the theme with the highest frequency, namely ‘Information should be better available in accessible ways’. Examples that stakeholders provide are flyers or letters in the mailbox, an information board in the neighbourhood or information at locations the inhabitants visit. These approaches would respond to a problem expressed by one of the inhabitants, namely that unasked information was not provided, relating to the theme ‘Not aware of the existence of the subsidy’. The other most frequently identified theme is ‘Impression that information was published’, mainly expressed by municipal employees. However, it also came forth that communication between the municipality and inhabitants is difficult, another theme. An example mentioned during an interview with an inhabitant is the event of organising a moment in the neighbourhood to come together on a carpet where several inhabitants remained behind their windows, and only after several occasions joined. It was also expressed that not all inhabitants are open for interaction and that this can be difficult. The latter was indicated by a municipal employee: “Yes, in principle they need to get into dialogue with the municipality. Yes, you will arrive there via standard ways. Calling. (...) This is difficult. This is not only the case for this group. This is the case for all inhabitants of a municipality.”. The sub-themes identified relating to the theme about challenges with communication are ‘Inhabitants not always open to interaction’, three times, and ‘The municipality is distant’, two times.

To develop an opinion on this topic, it is important to be aware of the benefits of green. Four times it was identified that there is limited awareness, whereas it was identified 26 times that there is awareness. Several sub-themes relate to this, see *Table 10*.

Table 10, Themes with sub-themes related to the theme that there is awareness based on the interviews.

Theme	Sub-theme	Frequency
There is awareness	Biodiversity	5
There is awareness	Heat	4
There is awareness	View	2
There is awareness	Publications about the benefits of green	2

The municipality expressed that the information and publications, not only scientifically but also information in papers, became more widespread. Furthermore, two inhabitants indicated that green is also nice to see. Two benefits of green that stakeholders are specifically aware of are reducing heat and improving biodiversity. The latter was especially expressed by inhabitants, while heat was indicated by both inhabitants and the municipality. The second stakeholder explained: “A lot of people prefer to have a tiled garden. But it is increasing, people who become more aware of needing more green in their garden. And mainly because they notice that tiles give off heat.”.

It was also asked to what degree this might influence the application for subsidy. One inhabitant expressed to believe that increasing awareness is more important. The other theme identified was ‘Positive impact’, identified 10 times. A municipal employee explained that using the argument of green reducing heat is important nowadays. The employee also expressed that awareness could make a difference, especially for the smaller measures as the green roof is still a large investment. Also, the inhabitants believe that awareness is important: “Yes absolutely. If you regard something as important, then you will at least see how you can contribute.”.

Another type of knowledge that can be produced is a view on how inhabitants would like to improve their living environment. Several themes were identified, see *Figure 24*.

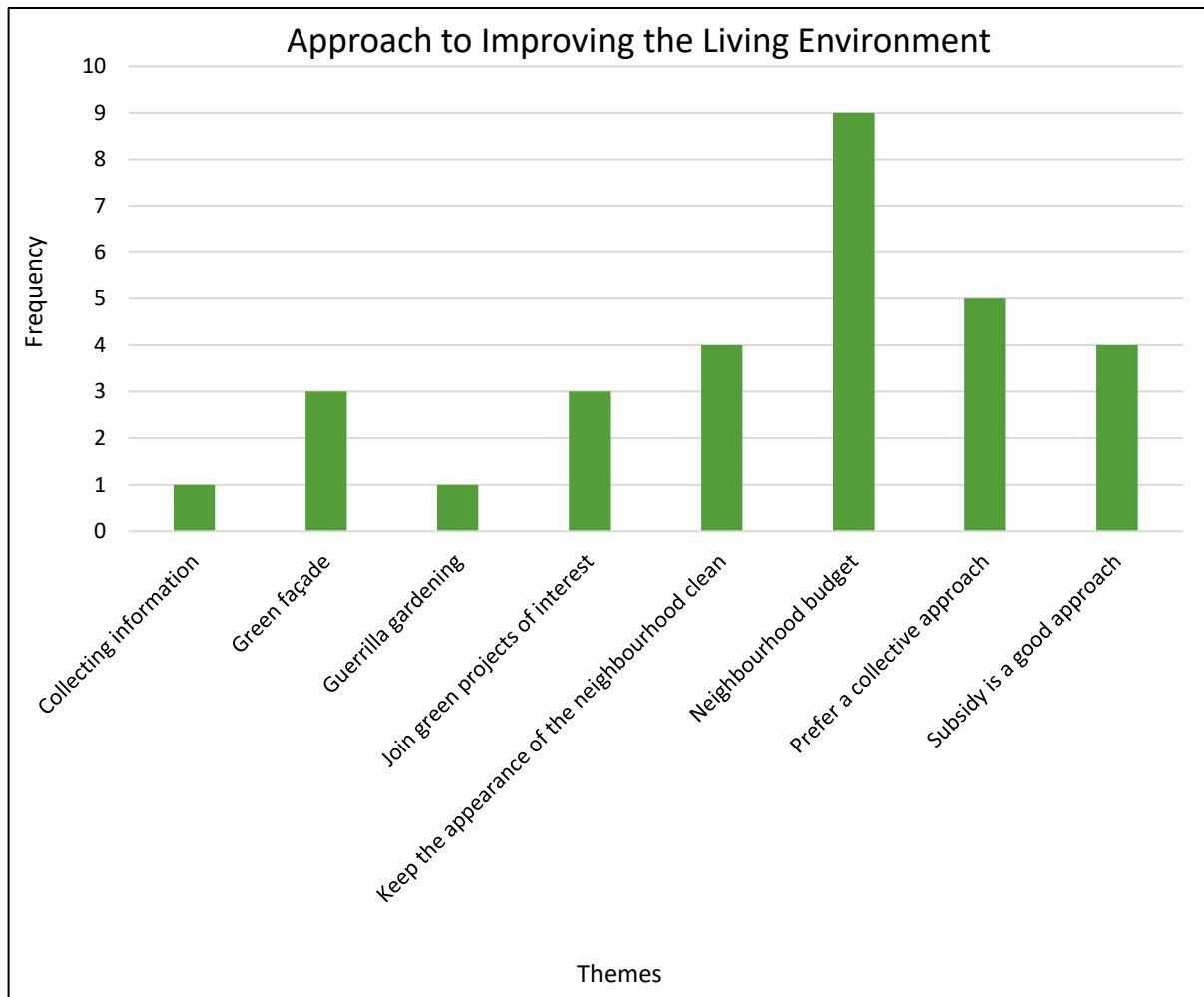


Figure 24, Themes related to approaches to improve the living environment and frequencies based on the interviews.

The most frequently identified theme, neighbourhood budget, originated from one inhabitant. There are two sub-themes, one being ‘Examples abroad’ two times, and the other ‘Inhabitants decide for themselves’, six times. The inhabitant indicated that there are examples in Belgium and Brazil. The initiative was looked up on Google Scholar and found under participatory budgeting. For example, a paper by Souza (2001) investigates the experience with the initiative in the cities of Porto Alegre and Belo Horizonte. The summary indicates some downsides, such as not being successful or poor people being excluded, but also positive aspects including the involvement of excluded groups in decision-making and monitoring, leading to building democratic institutions. Examples in Belgium are also available online, but it is beyond the scope of this research to further investigate the suitability of this approach. Autonomy in decision-making is an aspect of this approach valued by the inhabitant: “Yes unconditional budgeting, I am in favour of that. And that should be the way we should all get along with one another in the world. Yes, so basically just the same as it works for a family or household, right? You do something and you get something and you give something.”.

Other themes with sub-themes are ‘Keep the appearance of the neighbourhood clean’, with the sub-theme ‘Need to reduce trash in public space’, identified two times, and ‘Prefer a collective approach’

with the sub-theme 'Efficient', identified three times, as one of the inhabitants explained: "Let's put it this way, my little roof is quite small right? So I will not do it. And why will I not do it? Because I do not want to do it on my own. I do want to do it for the whole neighbourhood. Yes, I think that would yield something.". Furthermore, small measures such as a green façade are indeed mentioned as an approach, but also making use of a subsidy for this is regarded appropriate.

Lastly, it was asked whether inhabitants were able to express their approach. The methods for this are shown in *Figure 25*.

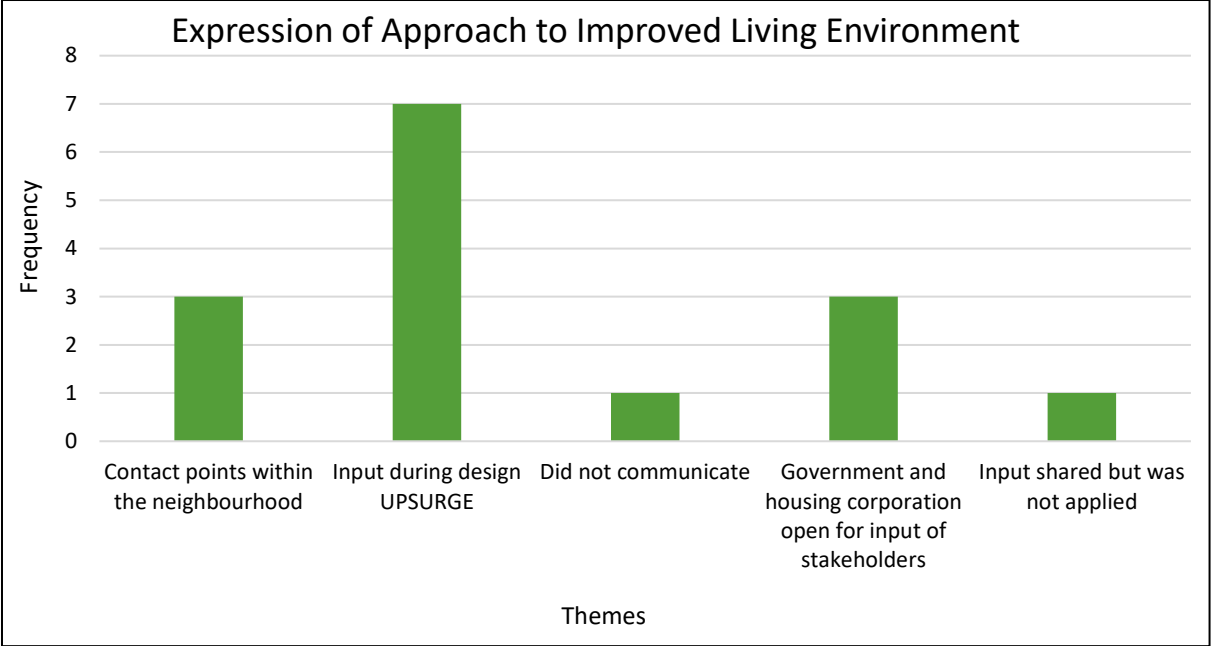


Figure 25, Themes related to the expression of the approaches to improve the living environment and frequencies based on the interviews.

As mentioned earlier, in the southern part of Doornbos-Linie, the UPSURGE project is being carried out. One of the municipal employees is involved in this project and expressed that the design process took place in collaboration with the inhabitants. The employee indicated that inhabitants had the chance in that context, specifically talking about the construction of a green façade. Also, two inhabitants expressed their involvement in the project. For example: "Because I was involved in this green project, I have also mentioned the green façades and now it is included in the project. So I am happy about that. The first time I mentioned that I wanted a green façade, they were very enthusiastic. And then they asked me whether I know more people who might want a green façade.". This is also an example of the government and housing corporation being open for input, as was a theme identified based on data from these stakeholders. Contact points within the neighbourhood can help with this, for example via the neighbourhood council in combination with a drop-in centre.

To summarise, this section showed the themes and sub-themes relating to the indicators. Regarding accessibility, the factors of affordability, homeownership, housing type and suitable information are indeed of influence, especially affordability. Other factors affecting accessibility were identified, for

instance, the impression that the application and construction are a hassle. As for the principle of distribution, even though the organisation of the subsidy according to everyone having access is standardised, the results show the possibilities for considering unburdening the inhabitants. Moreover, the results showed who is involved in the subsidy and what the influence on decision-making for the application conditions for each of the stakeholders is. It became clear that the municipality has the main say with the other actors having an indirect influence. The stakeholders believe that the budget is mainly a determinant of who has what power in decision-making. Increased participation of stakeholders could be valuable, but the data also showed that this might not always be the case. As for a sense of justice, diversity is limitedly considered, this follows, for instance, from issues with language barriers and difficulties with the digital approach for the elderly. Regarding expressing views on justice, the section showed that some indicated to do this while others did not. The latter related to inhabitants being unaware of the existence of the subsidy, which also became clear from the results on access to information needed for critical knowledge production. It was expressed that information should be better available to enable developing perspectives on justice. Still, the results indicated that there is awareness of the benefits of green, which is believed to be important for the applications. Lastly, this section showed that inhabitants can come up with diverse and potentially interesting approaches for improving the living environment. The interpretation of these results will further be considered in the next section.

5. Discussion

This section presents the interpretation of the results, in comparison to previous studies. The reflection on the research will be discussed, followed by recommendations for future research.

5.1. Interpretation of Results

The interpretation of the results will be presented below per dimension of radical EJ.

5.1.1. Distributive Justice

Starting with the results on the first dimension of radical EJ. It appears to be the case that several factors related to accessibility influence to what degree inhabitants apply for the subsidy and can benefit from the positive contribution of green in the context of climate adaptation. The factor of affordability has the largest impact. Especially as there is a large own monetary contribution involved in the construction of a green roof. Research by Kraaijvanger et al. (2023) indicated that the same is true for solar panels, requiring a large initial investment that cannot be paid by everyone, excluding people from the energy transition. This is an important aspect as inhabitants of neighbourhoods of lower SES have more trouble making ends meet, which also became clear from the data analysis. As can be expected, in combination with these factors, the relative expensiveness of green roofs compared to other sustainable blue-green measures makes it less attractive. Therefore, it might be suitable to mainly offer lower-cost options to this target group, such as de-tiling or a green façade. These options are also available, hence, a principle of distribution can be identified consisting of offering both low-cost and high-cost measures.

Also, homeownership influences accessibility. However, perhaps more limitedly so than was expected. The paper on solar panel adoption by Kraaijvanger et al. (2023) indicated that there might be a legal limitation in case the roof is not owned, whereas this study showed that tenants could apply for a green roof subsidy with permission from the housing corporation. Other greening measures do not require this permission. It was the impression that this would result in a barrier, but, even though it requires an extra step, this is most likely not a large limitation. The housing corporation indicated granting permission when possible. Contrastingly, the study on solar panel adoption showed that access to the measure depends on the initiative taken by the housing corporation in the case of a social rental home. The study mentioned that there is also a dependency for people in the private sector in a multi-family building, namely on the owner association. Solar panel adoption by owner associations in the case of The Hague was low, relating to complexities such as dividing the roof, insurance and engaging the majority, but also lack of support to jointly go through the process. On the other hand, based on the results of this research, collective action via the owner association seems to be an opportunity. A similarity between the studies is the identification of split incentives as a possible barrier and that

inhabitants living in private single-family residential buildings do not experience these limitations. The applications for a green roof originated from the homeowners as was expected after the preparatory research. Based on the themes identified, this likely relates to homeowners having fewer choice restrictions and, as assumed by the housing corporation, possibilities of earning back costs from selling the home when moving out. This does not apply to tenants.

Housing type seems less influential as well, but the suitability of apartment blocks is questioned, as was expected based on the previous research on solar panels, indicating that shared ownership makes the process more complex. The adoption of solar panels was lower for apartment blocks. However, for the green roofs, people also see it as an opportunity to work together. This is interesting as some inhabitants indicated to prefer collective action. Once again, owners have an advantage, applications can be organised via owner associations, whereas the housing corporation cannot apply. The housing corporation indicated that, relating to the principle of distribution, it might be suitable, also in light of having as many green roofs as possible to achieve policy goals, to make subsidies available to the housing corporation so they could take a role in constructing green roofs on apartment blocks. This is now limitedly done due to high investment requirements. The main limitation impacting access concerning this factor is concerns about the suitability of the roof in connection to the firmness.

This also relates to the availability of important information, which seems to have a large impact on the number of applications, especially as it became clear that inhabitants are unaware of the existence of the subsidy for green and that they can apply for it. Information is mainly important for knowing what is needed but also costs and instructions for finding assistance are deemed important. This was expected as inhabitants living in neighbourhoods with lower SES are often characterised as having a lower income and education level, also relating to identification of several uncertainties. Moreover, information is mainly available online, this has advantages, such as the links to the municipal subsidy on websites of external parties, but also disadvantages. As the demographic characteristics that were mainly focused on were income, education and diversity, age was not taken into account from the beginning, while it appeared that the elderly are interested in green and might have difficulties with the digital approach. Also connected to suitable information are the support mechanisms. Facilitating could be improved to reduce burdens and worries from the inhabitants. This could be a special treatment for inhabitants having more difficulties in acting themselves. Approaches could include an all-in package or facilitators in the neighbourhood. The construction advice and application roadmap are suitable mechanisms available, but only useful after deciding to want to construct the green roof. Kraaijvanger et al. (2023) investigated this factor with the assumption that language will be a barrier. This also followed as a barrier from this research in relation to information, but mainly in connection to other factors not previously identified by research on access to sustainability subsidies.

These other factors are quite diverse. The main factor seems closely related to affordability, namely that sustainability is not the priority. On top of that, inhabitants have the impression that a green roof and the application with its connected forms to be filled in are a hassle. Good information about the procedure and benefits are thus important, also available in a language accessible to a community with a highly diverse background. Again, the facilitating approach could be helpful, this also became clear from the desired principle of distribution, unburden the inhabitant stood out. As it seems unlikely to change the principle of distribution since the government needs to have the option open to everyone, this and extra promotion might be aspects on which differentiation according to priority or need can have a valuable impact.

The indication that the principle of everyone having access cannot be changed followed from the perspective of the province, also the municipality expressed that this setup is quite standardised across the country. The province has no authority regarding the setup of the regulation, as this subsidy is a municipal measure, but collaboration is possible. The province and several stakeholders indicated the presence of facilitators in the neighbourhood to respond to untapped potential as an option. This role and other facilitating measures could be taken by the municipality in collaboration with stakeholders. The governmental actors and housing corporation have a role in informing and assisting, whereas the inhabitants need to take action. Assisting them can thus result in more green in neighbourhoods of lower SES so these areas neither fall behind nor are vulnerable to climate change. Contrastingly, the study on solar panels advocates for equitable adoption by specifically targeting groups with lower access. The same is true for the study by Rigolon et al. (2020), also indicating that planners should employ equity instead of equality. On the other hand, the Dutch research by De Vries, Buijs and Snep in 2020 states that justice would mean equal access to everyone.

5.1.2. Procedural Justice

Then, the second dimension, procedural justice, with a focus on the application conditions since these were expected to influence access to the subsidies as well. The application conditions are determined by the municipality. Other stakeholders interviewed can have an impact on these decisions. For example, it became clear that comments from inhabitants, in this case about the compensation of a green façade, to the municipal employee working with the applications are communicated to others within the municipality, possibly indirectly influencing decisions on the regulation. Also, the housing corporation is part of an initiative group on climate adaptation and biodiversity, which resulted in the subsidy being open for tenants. Hence, the input of these actors has increased the accessibility of the regulation. As indicated, the province does not have the legal authority to decide on the application conditions of this or another municipal regulation. However, deliberation is possible. Collaboration on more aspects could be helpful. For example, the province indicated it needs the municipality or other

organisations to reach inhabitants as these organisations are closer to inhabitants. Based on some inhabitants preferring collective action and this being one of the criteria of the blue-green subsidy from the province, the municipality could put the link to the provincial subsidies on their website, comparable to the way construction companies link to the municipal subsidy.

It was also questioned what factors determined who has what influence, relating to structural power. The impression of all stakeholders seemed to be that money is the most influential, as was expected because Svarstad and Benjaminsen (2020) referred to structural power as economic-structural power. The impression that the government decides is also of influence, this seems to be an established situation. Additionally, green ambitions play a role, these relate to policy goals and voting behaviour. Even though the focus was placed on structural power, the implications for actor-oriented power can also shortly be discussed. When there is a high budget, governmental actors can achieve their goals, and more budget could be available to inhabitants. Hence, this factor has a positive impact on both actors' actions. However, housing corporations cannot apply for subsidies because this would result in the budget going down rapidly. This actor is thus less able to achieve goals. Green ambitions are also of influence. In this case, the municipality aims to be the city in the park, indicating that green is important. This helps other stakeholders to achieve goals in case these relate to green. About inhabitants having the impression that governmental actors have the power to decide, it was indicated that inhabitants can still have valuable input regularly, as followed, for example, from the change in monetary compensation for the green façade and the inclusion thereof within the UPSURGE project.

Inhabitants were involved in the design of this project, referring to partnership, quite high on the ladder of participation of Arnstein, as follows from the research by Lane (2005). However, inhabitants got the impression that input was not considered as the decisions were felt to be set in stone. Hence, the occurrence of tokenisms seems to be present. Regardless, inhabitants seem willing to participate, but a direct influence on application conditions is not organised and desirability is still questioned. As for the housing corporation, their input, for example, regarding the inclusion of tenants, was also taken into account. Consequently, there is a partnership there as well. This approach is valued by the actors. The same is true for the province, for example via the B7, but this can most likely be improved. Other levels of participation are informing, this is done but can be better. Downsides of participation were identified, as was expected based on past research, for instance, by Svarstad and Benjaminsen (2020).

5.1.3. Recognition

Following the results, diversity has limitedly been recognised within the regulation. This became, for example, clear from limitations due to language barriers, which was expected based on the door-to-door visits and perspectives obtained from others working in fields with interaction with inhabitants.

Improvements can be made by having the information available in multiple languages, having a mechanism that provides suggestions for a search online after misspelling a word, having the option to have the information spoken out loud, making the text larger, or communicating via images. These options are not standardised but could enable people with a language barrier or other limitations to have increased access, at least to information. Having non-digital options available might result in more fragmentation but could make the subsidy more accessible, especially for the elderly. On top of that, there might be some untapped potential in different motivations to adopt green following from diverse cultural backgrounds, the housing corporation expressed some people prefer plants a person can eat over flowers. It might be interesting to look into different motivations and make options available that correspond to inhabitants' diverse preferences.

Furthermore, it became clear that some actors believe inhabitants can share what they regard as just, while others believe this is not the case. Interestingly, inhabitants indicated they did not communicate their perspective as they were unaware of this subsidy until recently. Consequently, there is a lot to gain from making inhabitants aware of the existence of the regulation. For example, it was indicated that information should be better available in accessible ways. As was often expressed, without looking for the subsidy specifically, the awareness of it being there was non-existent. Therefore, only getting the information when looking for it online seems insufficient. Other approaches, as followed from the data, could be a board, flyer or information at a local place commonly visited.

On the other hand, there is awareness of the benefits of green. It is remarkable that regardless, the subsidy was unknown. The main benefits mentioned are biodiversity and cooling. It is believed that this awareness would influence the applications. Inhabitants also expressed their preferences regarding measures to take. It becomes clear that these are quite diverse, indicating that inhabitants have ideas themselves that might be valuable to consider, which closely relates to paying attention to different motivations to green as expressed before. For example, one of the inhabitants is very passionate about a neighbourhood budget, or participatory budgeting following the term of previous research by Souza (2001). Investigating the options and after careful consideration putting up pilot projects might increase green in the surroundings as it could create enthusiasm for that new approach to greening or inspire inhabitants to come up with and communicate their ideas. Guerrilla gardening, as an inhabitant mentioned, is such an approach. Still, a subsidy is regarded as a good measure, as this would reduce costs for inhabitants, which remains an important factor.

5.2. Reflection on the Results

This research led to interesting findings. First of all, the results are quite in line with the research on accessibility to solar panel subsidy, while it became clear what factors are important specifically for

green roofs subsidy and green subsidy more generally as information on subsidy for other greening measures was also gathered. Hence, a quite complete view of good approaches to increase the implementation of NBS in neighbourhoods of lower SES via subsidies was the result, making it possible to develop concrete actions for improvement, also concerning the principles of distribution, the procedure of decision-making and how to reach inhabitants with high diversity in backgrounds.

Even though only one inhabitant with a migration background was spoken to and the majority of interviewees of the stakeholder group inhabitants were above the age of 65 years old, it became clear what steps can be taken to involve inhabitants, relating to their diversity. Respondents represented diversity limitedly, but interesting points were raised, also by the other stakeholders, for example, the housing corporation indicating the potential of enquiring about different motivations for green. Another stakeholder group of which the perspective is not covered is the owner association. This research implies that the stakeholder group has access and shows that the collective characteristic is seen as an opportunity, while this seems to be different for solar panel research.

Furthermore, the preparatory research enabled researching a relevant topic in the Dutch context. For this research, being brought in contact with the B7 network enabled identifying what type of issue about access to benefits of green, and justice in that regard, to focus on. It is a finding in itself to conclude that green gentrification is not an issue noticed and possibly less of a risk in the Netherlands. However, it should not be dismissed totally as was in a way the case in this research as it was not investigated further. Still, it seems to have been a proper decision not to focus on green gentrification, also because researching this topic would benefit from investigating change over time, which would not have been possible within the limited timespan of this Master's thesis. Besides, this topic of accessibility to subsidies seems to be increasingly noticed by governmental actors, making it important to research. On top of that, the topic is quite novel, it seems to be a quite recent phenomenon about which different actors are still looking for their role in dealing with the problem and how to investigate it. Consequently, filling research gaps and opening options for future research was achieved.

Moreover, it was indicated that reaching the target group of inhabitants living in neighbourhoods of lower SES is challenging. This was experienced during the data collection. The initial aim was to collect data from inhabitants via organising focus groups, however, it was assumed to be a larger barrier to participate in this activity in comparison to an individual interview. This was noticed quite soon during the door-to-door visits as well. Hence, it was decided to offer inhabitants the choice from the beginning to prevent ending up with no participants. This resulted in the need to let go of the focus group approach, however, the decision enabled the conduction of six interviews with inhabitants and ensured there was no delay.

Lastly, as was also mentioned in the methodology, there are limitations related to the data collection and analysis approach. In case the research would have consisted of analysing results of focus groups, individual interviews and documents, the data triangulation would have been stronger, resulting in a higher research quality. Regardless, 10 interviews were conducted, providing useful information, including different perspectives. These were also of use for cross-checking. Additionally, the analysis was executed in multiple steps, including the ordering of the results according to the measure. This enabled checking themes. As a result, the trustworthiness was improved, however, allocating information to themes will remain slightly arbitrary and dependent on the researcher. Nonetheless, results are in line with previous findings and expectations, next to there being new points of interest. Subsequently, there are several recommendations for future research.

5.3. Future Research

Following the reflection above, several recommendations for future research can result in valuable input to further improve the accessibility to green subsidies to ensure a just division of the benefits of green. First of all, another attempt to reach inhabitants with different backgrounds could bring to light more and other barriers and show opportunities regarding what type of greening would be of interest as it became clear that already the participants in this research have quite some diverse ideas.

On top of that, researching other justice issues relating to access to green might be required. For example, green gentrification could occur in the future. The UPSURGE project in Doornbos-Linie might prove to be an interesting case study, but with a focus on green gentrification as the situation on a first glance seems to be in line with previous instances of green gentrification. Next to green gentrification, also more research on the topic of access to subsidies can provide valuable insights. The focus was placed on green roofs, however, a focus on other greening measures is likely interesting, for example, those measures requiring less own monetary contribution. Also, a different context such as a neighbourhood in another municipality might be relevant, for example, for identify whether comparable results arise or different conclusions might be drawn. A more elaborate study might also be useful, as this could increase the robustness of the research. More interviews, including interviews with someone from an owner association, or an approach including individual interviews and focus groups could be interesting to consider. Lastly, a clear idea of how to incorporate the different principles of distribution according to what is appropriate, possible and desirable in what situation might be slightly lacking in this research. This can be expected to have quite a determining influence on how justice is aimed for. Researching this would thus be important to have a better understanding of the whole topic.

6. Conclusion

This research addresses the societal problem of the need to respond to climate change as the impacts thereof are increasing in frequency and severity in the future. Hence, inhabitants benefit from reducing vulnerability to these consequences, for example, via implementing NBS such as green roofs. The additional societal problem is that some areas might be better adapted than others, for example, neighbourhoods of lower SES. Consequently, this research investigated how this problem can be prevented and limited as inequalities are already occurring. Recommendations will be given to respond to this challenge based on the results of this research, which builds on the environmental justice framework and data from stakeholders and documents. Research questions will be answered, responding to research gaps as there is limited to no research on the accessibility of blue-green subsidies and associated justice problems.

Starting with the first sub-question. Stakeholders have different interpretations of what a just distribution would entail. Currently, governmental actors indicate that the subsidy is open for everyone, and this is most likely not easy to change regardless of the need to reduce acknowledged barriers that make the subsidy less accessible to some target groups, namely, inhabitants living in neighbourhoods of lower SES. The goal of the regulation is to increase green in private areas and to encourage inhabitants to take measures. The approach to reach vulnerable populations that seems most likely possible in practice is providing extra attention to the target groups and areas where green is still lacking as these areas are more at risk of climate change. This can be achieved by facilitating and reducing the burdens of the inhabitants. Examples of approaches include facilitators in the neighbourhood and an all-in package. These options can be explored alongside extra promotion as awareness of the benefits of green most likely has a positive impact on applications, but also because inhabitants seem now largely unaware of the possibility of applying for a subsidy. Moreover, the subsidy targets individual inhabitants. However, collective action is sometimes desired and might be required when living in an apartment block. Collective action is a criterion of the blue-green subsidy of the province, hence, collaboration with this actor might be fruitful. On top of that, making subsidies available for housing corporations, possibly under the condition that it is used for apartment blocks or expensive measures such as a green roof, could contribute to the policy goals and make the measure more accessible. This is now not possible due to budget limitations. Collaborations with other actors in other fields such as health might be needed, these fields could save costs due to increased green, leading to freeing budget. The importance of money follows from this description, but also because own monetary contribution of inhabitants is of substantial influence. However, the subsidy is organised

as including high-cost measures, such as green roofs, and low-cost measures, such as a green façade. Consequently, it might be useful to target the promotion accordingly.

Secondly, the decision-making is organised by municipal employees setting up the policy for blue-green and the council, aldermen and mayor deciding on application conditions and the subsidy ceiling, considering the available budget. The other stakeholders can have an indirect input on this regulation. The housing corporation is included in initiative groups, leading to the inclusion of tenants. The inhabitants can have indirect input via municipality employees, which has led to a change in the monetary compensation for constructing a green façade. The province has no legal authority to decide on aspects of the municipal regulation but can give advice, for example via B7. The province needs the municipality or societal organisations for the execution of their blue-green subsidy. Hence, collaboration is important but could be improved. This procedure seems to be desirable, however, input of inhabitants in the way currently organised can be considered by this stakeholder group as tokenism as the impression is there that decisions have already been made. The subsidy regulations throughout the country are quite standardised and this has not been evaluated. More input of initiative groups can be beneficial, as again, exemplified by the input of the housing corporation. However, the usefulness of this with the inclusion of inhabitants might need some extra consideration.

As for the last sub-question, diversity in interest, values and views has limitedly been considered. This mainly follows from the information being communicated in a way less accessible to people with a language barrier or disability. Also, the digital approach forms a limitation for the elderly. Additionally, inhabitants indicated not being aware of the existence of the subsidy, which also seems to relate to the sole availability of information online, meaning that the information does not reach the inhabitants when they did not look for it specifically even though it became clear that the inhabitants spoken to, and most likely inhabitants in general as publications become more widespread, are aware of the benefits of green. Furthermore, inhabitants have ideas of their own on how to improve the living environment in this context. Collecting these ideas and investigating the potential thereof might create enthusiasm for inhabitants to take action and inspire others. The ideas collected during this research are quite diverse, hence, increasing the consideration of diversity could be achieved by looking into and implementing this approach.

These answers are useful input for answering the research question. Deciding on what is just remains difficult to answer, however, the current setup referring to everyone having access seems most desirable. Nonetheless, not everyone has access due to several barriers. Responding to these barriers via facilitating, promoting and unburdening based on need or priority can be a means to achieve more widespread implementation of NBS following subsidy applications. In that sense, it might be wise to focus on smaller measures in neighbourhoods of lower SES as affordability is an influential factor,

making a green roof too expensive. Green roofs could be implemented by housing corporations, however, these organisations are also in need of financial assistance to be able to do this. Providing information on the benefits of green is important, as the expectation is that awareness will contribute positively to the number of applications. However, the majority of inhabitants interviewed are aware of this, while being unaware of the existence of the subsidy. Therefore, making the existence known is of great importance. Hence, a context-specific facilitating approach can result in more green in the neighbourhood, reducing vulnerability to climate change so the neighbourhoods are not left behind. This would hopefully ensure that such a flood due to heavy precipitation as the one in 2021 does not more severely impact neighbourhoods of lower SES.

To achieve this widespread implementation of NBS, several recommendations have been developed.

- 1. Give more attention to more accessible green measures in neighbourhoods of lower SES:** A green roof is a relatively expensive measure, hence it might be more fruitful to put effort into promoting and facilitating the construction of a green façade or de-tiling as the ratio own monetary contribution and compensation is more accessible for inhabitants with a lower income. This is an action the municipality could take.
- 2. Make blue-green subsidy available for housing corporations:** The subsidy is currently not available to the housing corporations because there is too little budget for this. However, more implementation of green could follow from money being available to this actor. The condition that subsidy would only be available for large high-cost measures that inhabitants cannot pay for themselves, such as a green roof, could be considered. Collaboration with multiple actors is required as this is a question of making budget available, including involvement of the municipality, the province, the state and insurance companies as increased green might reduce costs in fields such as health.
- 3. Make inhabitants aware of the existence of the subsidy for green:** Inhabitants are largely unaware of the subsidy, information becomes available and knowledge of the existence only follows from actively looking for subsidy by themselves. Therefore, distributing letters, flyers and making information available at local contact points such as a community centre is important. This activity can be performed by the municipality and the housing corporation, but also by enthusiastic inhabitants themselves.
- 4. Set up and maintain an online network:** Links to the municipal subsidy on external websites are useful, an additional link to the website of the subsidy of the province might result in more green. As some of the inhabitants prefer collective action, the subsidy of the province might be especially suitable as this is one of the application conditions of the Buurt Natuur Waterfonds. The

municipality could put a link to this on their website, and so could the housing corporation, already doing this for the municipal subsidy.

- 5. Give more attention to inhabitants in neighbourhoods of lower SES:** The principle of distribution 'open to everyone' seems difficult to change and it might also not be desirable as all applications contribute to the policy goals of storing water, reducing heat, etc. On the other hand, more attention can be given to inhabitants in neighbourhoods of lower SES, either based on priority following from vulnerability to climate change or need as some inhabitants are confronted with more limitations to act on their own. This can be organised by providing an all-in package, promotion and facilitators for construction and application. The municipality would mainly be the actor taking a role in this approach.
- 6. Determine what is just and have conversations about this:** Stakeholders being aware of the different principles of distribution, see *Table 1*, is advised so it can be determined what distribution is desired and thus how justice is understood and aimed to achieve. It is important to have conversations about this to become aware of the implications and properly include the topic of justice in climate adaptation goals and strategies. This could be different per topic and context.
- 7. Ask inhabitants how they envision improving their living environment:** Asking inhabitants about their approach to an improved living environment can result in multiple creative approaches. Research and pilot projects aimed at implementing these approaches could be set up by the municipality and the housing corporation, a possible novel approach that could be stimulated by the province.

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Appendices

Appendix I: Dutch Summary

Niemand achterlaten – Het verzekeren van de implementatie van de op-de-natuur-gebaseerde oplossingen op een manier dat de voordelen van groen op een rechtvaardige wijze toegankelijk zijn

De gevolgen van klimaatverandering zullen naar verwachting vaker en in extremere mate voorkomen, ook in Nederland. Het stedelijk gebied speelt een rol als oorzaak en omdat steden worden geconfronteerd met de gevolgen (Filho et al., 2021). Aangezien Nederland geurbaniseerd is, is het van belang om klimaatadaptatie strategieën toe te passen. Daarnaast komen de gevolgen vaak terecht bij relatief kwetsbare inwoners, dit wordt beschreven met de term 'climate gap' (Morello-Frosch & Obasogie, 2023). Het is noodzakelijk dat klimaatadaptatie door middel van het implementeren van op-de-natuur-gebaseerde oplossingen plaatsvindt op een inclusieve manier zodat kwetsbare inwoners niet worden achtergelaten (De Vries, Buijs & Snep, 2020). De volgende onderzoeksvraag staat centraal:

Hoe kunnen op-de-natuur-gebaseerde oplossingen worden geïmplementeerd als klimaatadaptatie maatregel op een manier dat de toegang tot deze maatregelen volgens belanghebbenden rechtvaardig is zodat de 'climate gap' kan worden beperkt?

Uit het literatuuronderzoek is gebleken dat er uitdagingen liggen op het gebied van rechtvaardige toegang tot de voordelen van groen. Meerdere studies hebben zich gericht op klimaatadaptatie in de openbare ruimte en hebben aangetoond dat dit kan leiden tot green gentrification (Anguelovski et al., 2022). Kleinschalige maatregelen voor klimaatadaptatie, die inwoners zelf uit kunnen voeren, zijn gekoppeld aan rechtvaardigheid mindere tot niet onderzocht. Echter zijn uitdagingen gerelateerd aan participatie en verantwoordelijkheid in klimaatadaptatie wel aangegeven (Doorn, Brackel & Vermeulen, 2021). Om inwoners te stimuleren om zelf actie te ondernemen worden blauwgroen subsidies verleend. Uit eigen voorbereidend onderzoek is gebleken dat gemeentes merken dat subsidies vaker terecht komen bij inwoners met een hoger inkomen en/of eigen woning. Dit voorbereidend onderzoek bestond uit vijf ongestructureerde interviews met gemeente, provincie en waterschap medewerkers. Gekoppeld aan subsidies zijn alleen maatregelen voor klimaatmitigatie zoals zonnepanelen (Kraaijvanger et al, 2023) in beperkte mate onderzocht. Het is daarom relevant om dit probleem te onderzoeken vanuit het perspectief van klimaatadaptatie.

De casus

De casus was als volgt: inwoners en organisaties betrokken in de aanvraag voor groene daken subsidie van de gemeente Breda in het zuidelijke deel van de wijk Doorbos-Linie. Interviews zijn gehouden met inwoners, medewerkers van de gemeente Breda, een medewerker van provincie Noord-Brabant en een medewerker van de woningbouwvereniging Alwel. De interviews en relevante documenten zijn geanalyseerd door het uitvoeren van een thematische en stakeholder analyse.

Dit onderzoek is gekoppeld aan de theorie radical environmental justice, ontwikkeld onder invloed van Schlosberg. Deze theorie vormt typisch de basis van onderzoek rondom rechtvaardigheid in relatie tot milieuproblematiek en op drie dimensies is verder ingegaan. De eerste refereert naar de verdeling van voor- en nadelen van een interventie, de tweede draait om wie is meegenomen, betrokken is en invloed heeft op het maken van beslissingen en de laatste benadrukt het meenemen van verschillende belangen, waardes en perspectieven (Svarstad & Benjaminsen, 2020). Deelvragen verbonden aan deze dimensies zijn opgesteld, waaraan gekoppeld de resultaten zullen worden gepresenteerd.

Verdeling: *Bij het meenemen van de barrières tot toegankelijkheid, hoe kan de volgens belanghebbenden beoogde verdeling van de voordelen van de op-de-natuur-gebaseerde oplossingen maatregel worden bereikt?*

Voor toegankelijkheid is gekeken naar factoren die van invloed zijn geweest bij de zonnepanelen subsidie (Kraaijvanger et al., 2023). De factor betaalbaarheid is van grote invloed, de eigen bijdragen werd regelmatig benoemd. Daarnaast is een groen dak een relatief dure maatregel, wat alternatieven zoals ont-tegelen beter toegankelijk maken. De tweede factor is het woningbezit. De gemeente gaf al aan dat het merendeel van de aanvragen vanuit huiseigenaren komt, de impressie bestaat ook dat subsidie aanvragen en aanpassingen doen aan de woning makkelijker is voor huiseigenaren dan voor huurders. Wat de factor 'type woning' betreft, er zijn onzekerheden over de geschiktheid van het dak. Appartementen werden uitgelicht als een woning type met aan de ene kant nadelen en aan de andere kant mogelijkheden zoals een collectieve aanpak. Daarnaast is het belangrijk dat de juiste informatie beschikbaar is, kosten en bewustwording van noodzakelijke onderdelen werden benadrukt. Verder wordt de subsidie meer bekend, bijvoorbeeld door links naar de subsidie op websites van externe partijen. Toch bleek dat veel inwoners geen weet hadden van het bestaan van subsidie voor groen.

Als volgt is er gekeken naar het verdelingsprincipe (Svarstad & Benjaminsen, 2020; Wijsman & Berbés-Blázquez, 2022) en wat hierin wenselijk is. De betrokkenen vanuit de overheid hebben aangegeven dat de subsidie is opgezet vanuit gelijkwaardigheid, met toegang voor iedereen. Wel herkennen zij dat factoren ervoor kunnen zorgen dat de toegankelijkheid beperkt is voor sommigen. Echter is een verandering hierin lastig. Wat wel als mogelijkheid wordt gezien is het inzetten op ontlasten van de inwoners. Daarnaast is het niet mogelijk voor de woningbouwvereniging om subsidie aan te vragen in verband met budget, terwijl zij wel grootschalige veranderingen kunnen maken.

Gebaseerd op de stakeholder analyse, de gemeente maakt de regeling. Het implementeren van maatregelen in de private ruimte blijft de verantwoordelijkheid van de bewoners, maar andere partijen zoals de woningvereniging en gemeente hebben een rol in het verstrekken van informatie en hulp.

Proces: *In hoeverre is het proces van wie welke rol heeft op het gebied van het maken van beslissingen voor de aanvraagvoorwaardes voor de op-de-natuur-gebaseerde oplossingen maatregel wenselijk vanuit de perspectieven van de belanghebbenden?*

De gemeente heeft de autoriteit over de regeling en de daaronder vallende aanvraagvoorwaardes. De andere actoren hebben een indirecte invloed. De geïnterviewden gaven met name aan dat deze invloed wordt bepaald door wie het geld heeft. Toch denken inwoners dat veel beslissingen voor hen worden gemaakt terwijl zij ook aangeven dat participatie kan leiden tot creatieve en lokaal-belangrijke input. De actoren gaven de voordelen van participatie, maar veelal ook uitdagingen, aan.

Herkenning: *In hoeverre zijn de belangen, waardes en perspectieven van inwoners wonend in relatief kwetsbaardere wijken herkend en meegenomen in het mogelijk maken van de toegang tot de op-de-natuur-gebaseerde oplossingen maatregel?*

Demografische kenmerken zijn beperkt meegenomen. Dit blijkt uit taalbarrières en de digitale aanpak. Sommigen gaven wel aan dat zij het idee hebben en hopen dat diversiteit is meegenomen. Ook het uitdrukken van perspectieven op rechtvaardigheid denken sommigen wel te doen en anderen niet.

Informatie noodzakelijk voor het ontwikkelen van een perspectief op wat rechtvaardig is was volgens sommigen gepubliceerd, terwijl informatie ook beter toegankelijk zou moeten zijn. Toch is er bewustzijn van de voordelen van groen. Daarnaast komen inwoners met ideeën wanneer je hen vraag hoe zij de leefomgeving zouden verbeteren. Desondanks blijven subsidies van belang.

Conclusie

Het uitgangspunt 'toegankelijk voor iedereen' lijkt stand te houden, maar dit kan mogelijk worden aangevuld met acties gekoppeld aan ontzorgen. Met de huidige opzet is het noodzakelijk om met de barrières rekening te houden. Dit onderzoek heeft tot de volgende aanbevelingen geleid:

1. Zet in kwetsbare wijken vooral in op de beter toegankelijke groenmaatregelen



Een groen dak is een relatief dure maatregel. Meer groen kan het gevolg zijn van aandacht besteden aan het promoten en faciliteren van de constructie van een geveltuin of het ont-tegelen aangezien de verhouding eigen bijdrage en subsidie beter toegankelijk is voor inwoners met een lager inkomen. Dit is een actie die de gemeente kan ondernemen.

3. Maak inwoners bewust van het bestaan van subsidie voor groen



Inwoners zijn grotendeels niet op de hoogte van het bestaan van subsidie voor groen, informatie en kennis volgen alleen van het zelf actief zoeken naar de subsidie. Daarom zou het verspreiden van brieven, flyers en het beschikbaar maken van informatie op lokale plaatsen zoals een buurthuis van belang kunnen zijn. Dit kan worden gedaan door de gemeente, woningbouwvereniging, en enthousiaste inwoners.

5. Meer aandacht naar inwoners in kwetsbare wijken



Het lijkt moeilijk om het verdelingsprincipe 'open voor iedereen' achter de subsidie te veranderen, en dit is mogelijk ook niet wenselijk aangezien alle aanvragen bijdragen aan de doelen van het vasthouden van water, hitte verlagen, etc. Aan de andere kant kan meer aandacht worden gegeven aan inwoners in kwetsbare wijken, dit kan worden gebaseerd op prioriteit als gevolg van kwetsbaarheid voor klimaatverandering of behoefte aangezien sommigen meer uitdagingen hebben om zelf actie te kunnen ondernemen. Dit kan worden georganiseerd via een all-in pakket, promotie en hulpverleners voor aanleg en aanvraag. De gemeente zal hier met name een rol in hebben.

7. Vraag inwoners hoe zij de leefomgeving willen verbeteren



Vraag om input van inwoners over hun aanpak om de leefomgeving te verbeteren. Dit kan resulteren in verschillende creatieve aanpakken. Onderzoek en pilot projecten gericht op het implementeren van de genoemde aanpakken kunnen worden opgezet door de woningbouwvereniging en de gemeente. Deze mogelijk nieuwe aanpak kan worden gestimuleerd door de provincie.

2. Maak blauwgroen subsidie beschikbaar voor woningbouwverenigingen



De subsidie is momenteel niet beschikbaar voor woningbouwverenigingen omdat daar te weinig budget voor is. Meer groen kan het gevolg zijn van het beschikbaar stellen van budget voor de woningbouwvereniging, mogelijk met de voorwaarde dat dit alleen beschikbaar is voor relatief dure maatregelen waar inwoners zelf geen geld voor hebben, zoals een groen dak. Samenwerken met meerdere partijen is nodig aangezien dit een opgave is van meer budget beschikbaar maken, hieronder vallen de gemeente, provincie, het rijk, en verzekeringsmaatschappijen aangezien meer groen ook kosten kan verlagen, bijvoorbeeld op het gebied van gezondheid.

4. Zorg voor een online netwerk



Een link naar de subsidie van de gemeente op de websites van externen is nuttig, een aanvullende link naar de website van de subsidie voor groen vanuit de provincie kan voor meer groen zorgen. Aangezien sommige inwoners een collectieve actie prefereren kan deze subsidie expliciet geschikt zijn, het collectief aanvragen is een voorwaarde van het Buurt Natuur Waterfonds. De gemeente kan een link naar deze subsidie op de website zetten, hetzelfde geldt voor de woningbouwvereniging, dit wordt voor de subsidie van de gemeente al gedaan.

6. Achterhaal wat rechtvaardig is en ga hierover in gesprek



Het is aan te raden om bewustwording te creëren van de verschillende verdelingsprincipes, zie *Tabel 1*, om vast te kunnen stellen wat wenselijk is en dus hoe rechtvaardigheid is gedefinieerd en hoe hiernaar wordt gestreefd. Het is van belang om hierover in gesprek te gaan om bewust te worden van gevolgen en zodat het onderwerp rechtvaardigheid op de juiste manier kan worden opgenomen in klimaatadaptatie doelen en strategieën. Dit kan verschillen per onderwerp en context.

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Appendix II: Green Roof Subsidy Applications and Neighbourhood Data

The municipality of Breda provided data on blue-green subsidy applications for the year 2023. First, it was determined how many applications there were per neighbourhood. The neighbourhoods were ordered from highest to lowest connected to the factors income, ethnicity and education. Data was gathered from Allecijfers.nl. Also, data on inhabitants per neighbourhood. The tables below show the data as registered in Microsoft Excel.

Green roof subsidy applications per neighbourhood, inhabitants per neighbourhood and share of inhabitants who applied per neighbourhood for 2023

Neighbourhood	Number of (green roof subsidy) applications 2023	Inhabitants 2023	Number of (green roof subsidy) applications per inhabitant 2023
Mastbos	1	830	0.120
Heilaar	1	635	0.157
Ruitersbos	6	2,565	0.234
Ginneken	9	5,460	0.165
Zandberg	6	5,120	0.117
Nieuw Wolfslaar	2	2,365	0.085
Sportpark	1	3,415	0.029
Chassé	1	3,360	0.030
Ulvenhout	2	4,725	0.042
Buitengebied Bavel	0	555	0.000
Boeimeer	4	5,790	0.069
Buitengebied Ulvenhout	0	300	0.000
Buitengebied Teteringen	0	165	0.000
Hagebeemd	2	220	0.909
Vuchtpolder	0	110	0.000
Liesbos	0	770	0.000
Overakker	1	3,275	0.031
Teteringen	12	8,570	0.140
Bavel	4	5,565	0.072
Station	1	2,345	0.043
Blauwe Kei	2	3,875	0.052
Effen-Rith	1	890	0.112
Buitengebied Prinsenbeek	2	875	0.229
Princenhage	10	8,910	0.112
Belcrum	9	4,190	0.215
Waterdonken	0	1,285	0.000
City	1	2,630	0.038
Westerpark	4	3,420	0.117
Kroeten	2	2,270	0.088
Heksenwiel	4	4,335	0.092
Valkenberg	0	2,395	0.000
Overkroeten	1	3,110	0.032
Schorsmolen	0	3,480	0.000
Prinsenbeek	5	11,455	0.044

Krogten	0	180	0.000
Ypelaar	2	5,990	0.033
Kievitsloop	1	4,150	0.024
Muizenberg	1	2,870	0.035
Gageldonk	4	4,605	0.087
Heusdenhout	0	5,150	0.000
Brabantpark	5	10,480	0.048
Heuvel	4	7,660	0.052
Steenakker	1	485	0.206
Doornbos-Linie	10	4,580	0.218
Kesteren	0	3,745	0.000
Haagpoort	1	2,185	0.046
Tuinzicht	3	7,695	0.039
Fellenoord	3	1,580	0.190
Biesdonk	0	4,935	0.000
Wisselaar	1	4,215	0.024
Geeren-noord	0	2,690	0.000
Geeren-zuid	1	3,770	0.027
Emer	0	65	0.000
Hazeldonk	0	55	0.000
Hoogeind	0	50	0.000
Moleneind-oost	0	55	0.000
Total	131	186,450	0.070

Order of the neighbourhoods sorted from highest to lowest average income in 2021 and number of green roof subsidy applications in 2023

Neighbourhoods sorted from highest to lowest average income 2021	Number of (green roof subsidy) applications 2023
1: Heilaar	1
2: Ruitersbos	6
3: Mastbos	1
4: Ginneken	9
5: Zandberg	6
6: Nieuw Wolfslaar	2
7: Buitengebied Bavel	0
8: Buitengebied Ulvenhout	0
9: Buitengebied Teteringen	0
10: Hagebeemd	2
11: Sportpark	1
12: Chassé	1
13: Ulvenhout	2
14: Boeimeer	4
15: Buitengebied Prinsenbeek	2
16: Liesbos	0
17: Effen-Rith	1
18: Station	1
19: Teteringen	12
20: Overakker	1

21: Bavel	4
22: City	1
23: Waterdonken	0
24: Blauwe Kei	2
25: Prinsenbeek	5
26: Kroeten	2
27: Belcrum	9
28: Westerpark	4
29: Valkenberg	0
30: Heksenwiel	4
31: Overkroeten	1
32: Krogten	0
33: Vuchtpolder	0
34: Schorsmolen	0
35: Princenhage	10
36: Ypelaar	2
37: Kievitsloop	1
38: Muizenberg	1
39: Gageldonk	4
40: Heusdenhout	0
41: Brabantpark	5
42: Heuvel	4
43: Doornbos-Linie	10
44: Haagpoort	1
45: Steenakker	1
46: Kesteren	0
47: Tuinzigt	3
48: Fellenoord	3
49: Biesdonk	0
50: Wisselaar	1
51: Geeren-noord	0
52: Geeren-zuid	1
Unknown: Emer	0
Unknown: Hazeldonk	0
Unknown: Hoogeind	0
Unknown: Moleneind-oost	0

Order of the neighbourhoods sorted from highest to lowest average income in 2021 and number of applications per inhabitant in 2023

Neighbourhoods sorted from highest to lowest average income 2021	Number of applications per inhabitant 2023
1: Heilaar	0.157
2: Ruitersbos	0.234
3: Mastbos	0.120
4: Ginneken	0.165
5: Zandberg	0.117
6: Nieuw Wolfslaar	0.085
7: Buitengebied Bavel	0.000

8: Buitengebied Ulvenhout	0.000
9: Buitengebied Teteringen	0.000
10: Hagebeemd	0.909
11: Sportpark	0.029
12: Chassé	0.030
13: Ulvenhout	0.042
14: Boeimeer	0.069
15: Buitengebied Prinsenbeek	0.229
16: Liesbos	0.000
17: Effen-Rith	0.112
18: Station	0.043
19: Teteringen	0.140
20: Overakker	0.031
21: Bavel	0.072
22: City	0.038
23: Waterdonken	0.000
24: Blauwe Kei	0.052
25: Prinsenbeek	0.044
26: Kroeten	0.088
27: Belcru	0.215
28: Westerpark	0.117
29: Valkenberg	0.000
30: Heksenwiel	0.092
31: Overkroeten	0.032
32: Krogten	0.000
33: Vuchtpolder	0.000
34: Schorsmolen	0.000
35: Princenhage	0.112
36: Ypelaar	0.033
37: Kievitsloop	0.024
38: Muizenberg	0.035
39: Gageldonk	0.087
40: Heusdenhout	0.000
41: Brabantpark	0.048
42: Heuvel	0.052
43: Doornbos-Linie	0.218
44: Haagpoort	0.046
45: Steenakker	0.206
46: Kesteren	0.000
47: Tuinzigt	0.039
48: Fellenoord	0.190
49: Biesdonk	0.000
50: Wisselaar	0.024
51: Geeren-noord	0.000
52: Geeren-zuid	0.027
Unknown: Emer	0.000
Unknown: Hazeldonk	0.000
Unknown: Hoogeind	0.000
Unknown: Moleneind-oost	0.000

Order of the neighbourhoods sorted from highest to lowest share of inhabitants without migration background in 2022 and number of green roof subsidy applications in 2023

Neighbourhoods sorted from highest to lowest share of inhabitants without migration background 2022	Number of (green roof subsidy) applications 2023
1: Vuchtpolder	0
2: Buitengebied Prinsenbeek	2
3: Moleneind-oost	0
4: Hagebeemd	2
4: Liesbos	0
5: Buitengebied Ulvenhout	0
5: Prinsenbeek	5
6: Bavel	4
6: Effen-Rith	1
7: Nieuw Wolfslaar	2
8: Buitengebied Bavel	0
8: Sportpark	1
9: Overakker	1
9: Ulvenhout	2
10: Blauwe Kei	2
10: Ginneken	9
10: Ruitersbos	6
10: Teteringen	12
11: Boeimeer	4
11: Krogten	0
12: Mastbos	1
12: Zandberg	6
13: Belcrom	9
13: Heilaar	1
13: Princenhage	10
14: Emer	0
14: Hazeldonk	0
14: Steenakker	1
14: Westerpark	4
15: Chassé	1
15: Gageldonk	4
15: Hoogeind	0
15: Overkroeten	1
15: Ypelaar	2
16: Buitengebied Teteringen	0
16: Heksenwiel	4
17: Kievitsloop	1
18: City	1
19: Heusdenhout	0
20: Valkenberg	0
21: Waterdonken	0
22: Kroeten	2
22: Muizenberg	1
23: Schorsmolen	0

24: Heuvel	4
25: Haagpoort	1
25: Station	1
25: Tuinzigt	3
26: Brabantpark	5
27: Fellenoord	3
28: Kesteren	0
29: Doornbos-Linie	10
30: Wisselaar	1
31: Biesdonk	0
32: Geeren-zuid	1
33: Geeren-noord	0

Order of the neighbourhoods sorted from highest to lowest share of inhabitants without migration background in 2022 and the number of green roof subsidy applications per inhabitant in 2023

Neighbourhoods sorted from highest to lowest share of inhabitants without migration background 2022	Number of (green roof subsidy) applications per inhabitant 2023
1: Vuchtpolder	0.000
2: Buitengebied Prinsenbeek	0.229
3: Moleneind-oost	0.000
4: Hagebeemd	0.909
4: Liesbos	0.000
5: Buitengebied Ulvenhout	0.000
5: Prinsenbeek	0.044
6: Bavel	0.072
6: Effen-Rith	0.112
7: Nieuw Wolfslaar	0.085
8: Buitengebied Bavel	0.000
8: Sportpark	0.029
9: Overakker	0.031
9: Ulvenhout	0.042
10: Blauwe Kei	0.052
10: Ginneken	0.165
10: Ruitersbos	0.234
10: Teteringen	0.140
11: Boeimeer	0.069
11: Krogten	0.000
12: Mastbos	0.120
12: Zandberg	0.117
13: Belcrum	0.215
13: Heilaar	0.157
13: Princenhage	0.112
14: Emer	0.000
14: Hazeldonk	0.000
14: Steenakker	0.206
14: Westerpark	0.117
15: Chassé	0.030

15: Gageldonk	0.087
15: Hoogeind	0.000
15: Overkroeten	0.032
15: Ypelaar	0.033
16: Buitengebied Teteringen	0.000
16: Heksenwiel	0.092
17: Kievitsloop	0.024
18: City	0.038
19: Heusdenhout	0.000
20: Valkenberg	0.000
21: Waterdonken	0.000
22: Kroeten	0.088
22: Muizenberg	0.035
23: Schorsmolen	0.000
24: Heuvel	0.052
25: Haagpoort	0.046
25: Station	0.043
25: Tuinzigt	0.039
26: Brabantpark	0.048
27: Fellenoord	0.190
28: Kesteren	0.000
29: Doornbos-Linie	0.218
30: Wisselaar	0.024
31: Biesdonk	0.000
32: Geeren-zuid	0.027
33: Geeren-noord	0.000

Order of the neighbourhoods sorted from lowest to highest share of inhabitants with a low education level in 2021 and number of green roof subsidy applications in 2023 and percentages of a low education level in 2023 per neighbourhood

Neighbourhoods sorted from lowest to highest share of inhabitants with a low education level 2021	Number of (green roof subsidy) applications 2023	Percentage of inhabitants with a low education level 2021
1: Moleneind-oost	0	0.0%
2: Waterdonken	0	8.5%
3: City	1	9.1%
4: Steenakker	1	9.3%
5: Zandberg	6	9.5%
6: Station	1	12.0%
7: Sportpark	1	12.1%
8: Chassé	1	12.4%
9: Valkenberg	0	12.9%
10: Ginneken	9	13.7%
11: Schorsmolen	0	14.3%
12: Boeimeer	4	14.9%

13: Blauwe Kei	2	16.1%
14: Belcrum	9	16.9%
15: Overakker	1	17.0%
16: Ruitersbos	6	17.3%
17: Buitengebied Prinsenbeek	2	17.9%
18: Ulvenhout	2	18.0%
19: Buitengebied Ulvenhout	0	18.2%
20: Heilaar	1	18.4%
21: Kroeten	2	19.2%
22: Overkroeten	1	19.8%
23: Teteringen	12	20.1%
24: Bavel	4	20.2%
25: Effen-Rith	1	21.2%
26: Nieuw Wolfslaar	2	21.4%
26: Prinsenbeek	5	21.4%
28: Liesbos	0	21.8%
29: Gageldonk	4	22.2%
30: Westerpark	4	22.4%
31: Brabantpark	5	22.5%
32: Ypelaar	2	23.2%
33: Buitengebied Bavel	0	23.4%
34: Hagebeemd	2	23.5%
35: Mastbos	1	24.2%
36: Kievitsloop	1	24.4%
37: Hoogeind	0	25.0%
37: Vuchtpolder	0	25.0%
39: Princenhage	10	25.6%
40: Heksenwiel	4	26.2%
41: Heusdenhout	0	26.5%
42: Doornbos-Linie	10	27.6%
43: Muizenberg	1	29.3%
44: Kesteren	0	30.4%
45: Tuinzigt	3	31.0%
46: Krogten	0	31.3%
47: Fellenoord	3	31.9%
48: Haagpoort	1	35.4%
48: Heuvel	4	35.4%
50: Geeren-noord	0	37.1%
51: Biesdonk	0	38.9%
52: Wisselaar	1	39.1%
53: Geeren-zuid	1	40.8%
54: Buitengebied Teteringen	0	50.0%
Unknown: Emer	0	Unknown
Unknown: Hazeldonk	0	Unknown

Order of the neighbourhoods sorted from lowest to highest share of inhabitants with a low education level in 2021 and the number of green roof subsidy applications per inhabitant in 2023

Neighbourhoods sorted from lowest to highest share of inhabitants with a low education level 2021	Number of (green roof subsidy) applications per inhabitant 2023
1: Moleneind-oost	0.000
2: Waterdonken	0.000
3: City	0.038
4: Steenakker	0.206
5: Zandberg	0.117
6: Station	0.043
7: Sportpark	0.029
8: Chassé	0.030
9: Valkenberg	0.000
10: Ginneken	0.165
11: Schorsmolen	0.000
12: Boeimeer	0.069
13: Blauwe Kei	0.052
14: Belcram	0.215
15: Overakker	0.031
16: Ruitersbos	0.234
17: Buitengebied Prinsenbeek	0.229
18: Ulvenhout	0.042
19: Buitengebied Ulvenhout	0.000
20: Heilaar	0.157
21: Kroeten	0.088
22: Overkroeten	0.032
23: Teteringen	0.140
24: Bavel	0.072
25: Effen-Rith	0.112
26: Nieuw Wolfslaar	0.085
26: Prinsenbeek	0.044
28: Liesbos	0.000
29: Gageldonk	0.087
30: Westerpark	0.117
31: Brabantpark	0.048
32: Ypelaar	0.033
33: Buitengebied Bavel	0.000
34: Hagebeemd	0.909
35: Mastbos	0.120
36: Kievitsloop	0.024
37: Hoogeind	0.000
37: Vuchtpolder	0.000
39: Princenhage	0.112
40: Heksenwiel	0.092
41: Heusdenhout	0.000
42: Doornbos-Linie	0.218
43: Muizenberg	0.035
44: Kesteren	0.000

45: Tuinzigt	0.039
46: Krogten	0.000
47: Fellenoord	0.190
48: Haagpoort	0.046
48: Heuvel	0.052
50: Geeren-noord	0.000
51: Biesdonk	0.000
52: Wisselaar	0.024
53: Geeren-zuid	0.027
54: Buitengebied Teteringen	0.000
Unknown: Emer	0.000
Unknown: Hazeldonk	0.000

Appendix III: Short Information Flyer

This is the short information flyer used during the door-to-door visits and on the third of April. It was also displayed at Buurtsalon. This short flyer was used to ask inhabitants to participate in the focus groups with inhabitants who did not apply for the subsidy and to reach out to inhabitants who did apply who might be open for participation in an interview.

The short information flyer in Dutch:



Beste inwoner van Doornbos-Linie,

Mijn naam is Esmee de Haan en ik doe onderzoek voor mijn studie om af te studeren.

Voor dit onderzoek kijk ik naar de vergroening en verbetering van de leefomgeving. Ik onderzoek waarom iemand wel of niet subsidie heeft aangevraagd voor een groen dak.

Om deze reden organiseer ik groepsinterviews met inwoners van uw buurt.

Het helpt mij ontzettend als u mee wilt doen en u bij mij aan wilt melden voor een van de data!

**Zaterdag 13 april
11.00-12.30**

**Dinsdag 16 april
18.30-20.00**

Of voor een individueel interview, zowel als u wel als geen subsidie voor een groen dak heeft aangevraagd.

Er is koffie en thee met iets lekkers voor wie wil.

Buurtsalon, Edisonplein 3 4816 BK, Breda

EdHaan@brabant.nl of [private e-mail address]

Alleerlingen
Bredamaaktmijbij
tuinhoutzeeland
GroenOpDak

The short information flyer in English:

Dear inhabitant of Doornbos-Linie,

My name is Esmee de Haan, and I am doing research for my study to graduate.

For this research, I look at greening and improving the living environment. I research why someone did or did not apply for the subsidy to for a green roof.

For this reason, I organise focus groups with inhabitants of your neighbourhood.

It would help me tremendously if you would be willing to participate and if you would sign up for one of these dates!

Saturday the 13th of April 11.00-12.30

Tuesday the 16th of April 18.30-20.00

Or for an individual interview, in case you either did or did not apply for the subsidy for a green roof.

Buurtsalon, Edisonplein 3 4816 BK, Breda

EdHaan@brabant.nl or [private e-mail address]

There is coffee and tea and something to eat for who wants this.

Appendix IV: E-mail to Potential Participants After Door-To-Door Visit

This e-mail was sent to inhabitants of Doornbos-Linie who indicated to be open for participation after the door-to-door visit.

Invitation e-mail in Dutch

Beste [naam],

Goede middag, eerder vandaag ben ik bij u aan de deur geweest om u uit te nodigen voor deelname aan een interview voor mijn afstudeeronderzoek. U heeft aangegeven dat u hiervoor open staat en dat helpt mij ontzettend. Daarom bij deze hartelijk bedankt. Mijn naam is Esmee de Haan en ik ben aan het einde van mijn opleiding (ruimtelijke ordening) gekomen en doe daarvoor nu onderzoek waarvoor uw input van enorme toegevoegde waarde is. Hiervoor loop ik ook stage bij provincie Noord-Brabant.

Voor dit onderzoek kijk ik naar de vergroening en verbetering van de leefomgeving via een groen dak. Ik onderzoek waarom iemand wel of niet subsidie heeft aangevraagd voor een groen dak. Hierbij zijn verschillende partijen betrokken, waaronder u. In de bijlage vindt u meer informatie.

Ik stuur u deze mail om een afspraak te maken voor een interview. Het interview zal ongeveer 30 minuten duren. U kunt uw voorkeur aangeven door op deze mail te reageren (EdHaan@brabant.nl) zodat we een datum en plaats af kunnen spreken. In de ideale situatie vindt het interview plaats tussen 4 april en 16 april. Ik ben flexibel wat de exacte datum betreft en hoor graag uw voorkeur.

Eventueel zou ik ook een groepsinterview kunnen organiseren in de Buurtsalon, dit zou dan kunnen op zaterdag 13 april 11.00-12.30 of dinsdag 16 april 18.30-20.00, dit is echter afhankelijk van of er genoeg mensen voor open staan om deel te nemen aan een groepsinterview.

Ik hoor daarom graag van u of uw voorkeur uitgaat naar een individueel interview en of u online of op een andere locatie af wilt spreken en wanneer dit voor u uitkomt. Als u daarnaast aan zou willen geven of u wel of niet openstaat voor het groepsinterview en in het geval dat u er wel voor open staat op welke van de twee benoemde momenten u zou kunnen, zou dat heel erg fijn zijn.

De resultaten van de interviews zullen worden gebruikt voor dit afstudeeronderzoek waaruit aanbevelingen voor provincie Noord-Brabant rondom dit onderwerp zullen komen. Deelname is vrijwillig en u kunt zich altijd terugtrekken. Uw naam zal in het verslag niet worden genoemd.

Alvast hartelijk dank voor uw tijd. Voor vragen kunt u mij mailen: EdHaan@brabant.nl of [private e-mail address]. Mocht u buurtgenoten kennen wie mogelijk openstaan voor deelname, deel mijn verzoek dan vooral, uw buurtgenoten kunnen mij bereiken door te mailen naar eerder benoemde e-mailadressen.

Ik hoor graag van u.

Met vriendelijke groet,

Esmee de Haan

Studente Spatial Planning Universiteit Utrecht

Stagiaire provincie Noord-Brabant

Invitation e-mail in English

Dear [name],

Good afternoon, earlier today I visited you at the door to invite you to participate in an interview for my thesis. You indicated that you would be willing to participate, and this helps me tremendously. For that reason, I would like to thank you. My name is Esmee de Haan and I am at the end of my study (Spatial Planning) and therefore I am now doing research for which your input is of enormous value. For this I am an intern at the province of Noord-Brabant.

For this research I am looking at greening and improving the living environment via a green roof. I research why someone did or did not apply for the subsidy for a green roof. Several diverse parties are involved, including you. Attached you can find more information.

I send you this e-mail to make an appointment for an interview. The interview will take approximately 30 minutes. You can indicate your preference via responding to this mail (EdHaan@brabant.nl) so we can agree on a date and location. In the ideal situation, the interview will take place between the 4th of April and the 16th of April. I am flexible regarding the exact date, and I would like to hear your preference.

I could also organise a focus group in Buurtsalon, this could be organised on Saturday the 13th of April 11.00-12.30, or Tuesday the 16th of April 18.30-20.00, this however, depends on whether enough people are willing to participate in a focus group.

I would like to hear from you whether you would prefer an individual interview and whether you would like to meet online or at another location and when will suit you best. If you would also indicate whether or not you would be open for participation in a focus group, and in case you are willing to participate on which one of the two mentioned moments you would be available. This would be helpful.

The results of the interviews will be used for this thesis that will result in recommendations for the province of Noord-Brabant around this topic. Participation is voluntary and you can always retreat from participation. Your name will not be mentioned within the report.

Thank you in advance for your time. In case you have questions, you can send me an e-mail: EdHaan@brabant.nl or [private e-mail address]. In case you know neighbours who might be willing to participate, please share my invitation. Your neighbours can reach me via sending an e-mail to the aforementioned e-mail addresses.

I would like to hear from you soon.

Yours sincerely,

Esmee de Haan

Student Spatial Planning at Utrecht University

Intern at the Province of Noord-Brabant

Appendix V: Longer Information Flyer

This information flyer for inhabitants is more detailed. It was included in the e-mail to participants that provided information about the organisation of the focus groups or to inhabitants open for participation in an individual interview. On top of that, this longer information letter was available at Buurtsalon next to the registration form for additional information.

The longer information flyer in Dutch:



Beste inwoner van Doornbos-Linie,

Mijn naam is Esmee de Haan (studente) en ik ben aan het einde van mijn opleiding ruimtelijke ordening gekomen. Daarvoor doe ik nu onderzoek waarvoor uw input van enorme toegevoegde waarde is!

Voor dit onderzoek kijk ik naar de vergroening en verbetering van de leefomgeving via een groen dak. Er zal worden onderzocht waarom iemand wel of niet subsidie heeft aangevraagd voor een groen dak.

Om deze reden organiseer ik begin april:

- Groepsinterviews van ongeveer 1,5 uur in de Buurtsalon met inwoners van uw buurt die geen subsidie hebben aangevraagd;
- Individuele interviews met inwoners die geen subsidie hebben aangevraagd;
- Individuele interviews met inwoners die wel subsidie hebben aangevraagd.

De resultaten gebruik ik voor mijn afstudeeronderzoek waaruit aanbevelingen voor provincie Noord-Brabant zullen komen.

Deelname is vrijwillig en u kunt zich altijd terugtrekken. Uw naam zal in het verslag niet worden genoemd.

Het helpt mij ontzettend als u mee wilt doen met mijn onderzoek. Hartelijk dank voor uw tijd. Voor vragen kunt u mij mailen.

Er is koffie en thee met iets lekkers voor wie wil tijdens de groepsinterviews in de Buurtsalon

Buurtsalon, Edisonplein 3 4816 BK, Breda

EdHaan@brabant.nl of [private e-mail address]

Afbeeldingen: Bredamaakmilieu; tuinhoutzeeland; GroenOpDak

The longer information flyer in English:

Dear inhabitant of Doornbos-Linie,

My name is Esmee de Haan (student) and I am at the end of my study spatial planning. Hence, I am now doing research for which your input is of tremendous value!

For this research, I look at greening and improving the living environment via a green roof. I research why someone did or did not apply for the subsidy for a green roof.

For this reason, I organise at the beginning of April:

- Focus groups of around 1.5 hour in Buurtsalon with inhabitants of your neighbourhood who did not apply for the subsidy;
- Individual interviews with inhabitants who did not apply for the subsidy;
- Individual interviews with inhabitants who did apply for the subsidy.

The results will be used for my thesis that will lead to recommendations for the province of Noord-Brabant.

Participation is voluntary and you can always retreat from participation. Your name will not be mentioned within the report.

It would help me tremendously if you would be willing to participate in my research. Thank you for your time. In case you have questions, you can send me an e-mail.

Buurtsalon, Edisonplein 3 4816 BK, Breda

EdHaan@brabant.nl or [private e-mail address]

There is coffee and tea and something to eat for who wants this during the focus groups organised at de Buurtsalon.

Appendix VI: Interview Information Letter

Information letter for an individual interview in Dutch:

Beste [naam persoon],

Mijn naam is Esmee de Haan en ik ben aan het einde van mijn opleiding (ruimtelijke ordening) gekomen en doe daarvoor nu onderzoek waarvoor uw input van enorme toegevoegde waarde is. U bent uitgenodigd voor een interview omdat u heeft aangegeven dat u ervoor open staat om hieraan deel te nemen/omdat [naam persoon] mij uw contactgegevens heeft gegeven omdat uw invalshoek relevant is voor mijn onderzoek.

Voor dit onderzoek kijk ik naar de vergroening en verbetering van de leefomgeving via een groen dak. Er zal worden onderzocht waarom iemand wel of niet subsidie heeft aangevraagd voor een groen dak. Hierbij zijn verschillende partijen betrokken, waaronder u.

Ik zou u graag willen uitnodigen voor een interview online of op locatie. Als u ervoor open staat om deel te nemen, laat het mijn dan alstublieft weten door op deze e-mail te reageren (EdHaan@brabant.nl) zodat we een datum en plaats af kunnen spreken. In de ideale situatie vindt het interview plaats tussen 26 maart en 16 april. Ik ben flexibel wat de exacte datum betreft en hoor graag uw voorkeur.

De resultaten van de interviews zullen worden gebruikt voor dit afstudeeronderzoek waaruit aanbevelingen voor provincie Noord-Brabant rondom dit onderwerp zullen komen. Deelname is vrijwillig en u kunt zich altijd terugtrekken. Uw naam zal in het verslag niet worden genoemd.

Het helpt mij ontzettend als u mee zou willen doen met mijn onderzoek. Hartelijk dank voor uw tijd. Voor vragen kunt u mij mailen: EdHaan@brabant.nl of [private e-mail address]

Met vriendelijke groet,

Esmee de Haan

Studente Spatial Planning Universiteit Utrecht

Stagiaire provincie Noord-Brabant

Information letter for an individual interview in English:

Dear [name person],

My name is Esmee de Haan and I am approaching the end of my education (spatial planning) and for that reasons I am doing research for which your input is of enormous value. You are invited for an interview because you indicated to be open for participation/because [name person] provided me with your contact information because your perspective is relevant for my research.

For this research, I look at greening and improving the living environment via a green roof. It will be researched why someone did or did not apply for the subsidy for a green roof. Several stakeholders are involved, including you.

I would like to invite you to an interview online or in person. If you are open for participation, please let me know via responding to this e-mail (EdHaan@brabant.nl) so we can agree on a date and location. In the ideal situation, the interview would be organised between the 26th of March and the 16th of April. I am flexible regarding the exact date and would like to hear your preference.

The results of the interviews will be used for this thesis that will lead to recommendations for the province of Noord-Brabant around this topic. Participation is fully voluntary, and you can always retreat from participation. Your name will not be mentioned within the report.

It would help me tremendously if you would be willing to participate in my research. Thank you for your time. In case you have any questions, you can send me an e-mail: EdHaan@brabant.nl or [private e-mail address]

Yours sincerely,

Esmee de Haan

Student Spatial Planning at Utrecht University

Intern at the province of Noord-Brabant

Appendix VII: Interview Guide Semi-Structured Interviews

Hartelijk dank voor het deelnemen aan dit onderzoek voor mijn master scriptie. Voordat we beginnen wil ik u vragen of u toestemming wilt geven voor het opnemen van dit interview en of u het geïnformeerde toestemmingsformulier wilt ondertekenen/Bedankt dat u het geïnformeerde toestemmingsformulier wat ik u had gemaïld heeft getekend en terug heeft gestuurd/Zou u deze QR-code willen scannen voor het toestemmingsformulier met informatie over hoe ik de informatie gebruik en een korte vragenlijst?

Thank you for being open for participation in this research for my master thesis. Before we begin, I want to ask you if you give permission to record the interview and to sign the informed consent form/Thank you for filling in the informed consent form I e-mailed to you and for signing it and sending it back/Could you please scan the QR-code for the informed consent form and information about data usage and a short survey?

Ik zal eerst het onderwerp van mijn onderzoek introduceren. Om een prettige leefomgeving te creëren kan groen zoals tuinen met beplanting en groene daken een positieve bijdragen leveren. Een voorbeeld is dat groen in staat is om hitte gerelateerde problemen zoals hittegolven die tot gezondheidsproblemen kunnen leiden te verminderen. Bewoners zijn belangrijk in het realiseren van deze prettige en groene leefomgeving en daarom zijn subsidies geïntroduceerd om bewoners te helpen met het groen maken van hun thuis. Echter lijkt het erop dat sommige mensen meer toegang hebben tot deze subsidies en dus de voordelen van groen dan anderen. Dit onderzoek gaat over de groene daken subsidie in Breda. Zijn er voorafgaand vragen? We gaan nu beginnen met de eerste vraag.

I will first introduce the topic of my research. In order to create a pleasant living environment, greenspace such as gardens with vegetation and green roofs can positively contribute to this. An example is greenspace being able to reduce heat-related issues such as heatwaves that may cause health impacts. Inhabitants are important actors in realising this pleasant and green living environment and therefore subsidies have been introduced to help inhabitants with greening their home. However, some people seem to have more access to the subsidies and thus the benefits of green than others. This study considers the green roof subsidy in Breda. Are there any questions preceding the interview? We will now go to the first question.

1. Heeft u het idee dat sommige mensen inderdaad meer toegang hebben tot de voordelen van groen dan anderen en waarom? En in hoeverre heeft dit met subsidies te maken?

Do you have the idea that some people do indeed have more access to benefits of green than others and why? And how does this relate to the subsidies?

2. Een aantal factoren zijn van invloed op de toegang van inwoners tot de subsidie. De eerste factor is betaalbaarheid. Op wat voor manier heeft betaalbaarheid een rol gespeeld in de

subsidieaanvraag? Hoeveel invloed heeft deze factor gehad op de toegankelijkheid van de subsidie?

Several factors are of influence on access of inhabitants to the subsidy. The first factor is affordability. In what way did affordability play a role in subsidy application? How influential was this factor in the ability to access the subsidy?

3. De volgende factor is woningbezit, dus of het huis waarin u/iemand woont een koophuis is, sociale huur of particuliere huur. Op wat voor manier heeft woningbezit een rol gespeeld in de subsidieaanvraag van inwoners? Hoeveel invloed heeft deze factor gehad op de toegankelijkheid van de subsidie?

The next factor is homeownership, so whether the home is owner-occupied, social housing or private rental. In what way did homeownership play a role in subsidy application of inhabitants? How influential was this factor in the ability to access the subsidy?

4. De derde factor is het type huis, dit betekent of u/iemand in een appartement woont of in een ander type huis. Op wat voor manier heeft het type huis een rol gespeeld in de subsidieaanvraag van inwoners? Hoeveel invloed heeft deze factor gehad op de toegankelijkheid van de subsidie?

The third factor is housing type, meaning for instance, an apartment or any other type of home. In what way did housing type play a role in subsidy application of inhabitants? How influential was this factor in the ability to access the subsidy?

5. De laatste factor is geschikte informatie, dus welke informatie is nodig om een beslissing te maken en welke mechanismen hadden of hebben (u) hierbij kunnen helpen. Op wat voor manier heeft geschikte informatie een rol gespeeld in de subsidieaanvraag van inwoners? Hoeveel invloed heeft deze factor gehad op de toegankelijkheid van de subsidie?

- Welke informatie had u/hebben mensen nodig? Was deze informatie beschikbaar? Welke mechanismen zijn er die mensen helpen met het maken van hun beslissing?

The next factor is suitable information, so what information is needed to make a decision and what mechanisms helped or could have helped you with this. In what way did information play a role in the subsidy application of inhabitants? How influential was this factor in the ability to access the subsidy?

- *What information did you/inhabitants need? Was this information available? What mechanisms are there to help people with making their decision?*

6. Zijn er andere factoren die invloed hebben gehad op de toegankelijkheid van de subsidie?

Are there any other factors of influence on accessing the subsidy?

7. Wat is volgens u/vanuit uw organisatie een rechtvaardige of eerlijke verdeling van groen en subsidies voor groen? Is de subsidie volgens dit principe opgezet?

What do you think would be a just or fair distribution of green and subsidies for green? Has the subsidy been developed according to this principle?

8. Wie moet een rol nemen in het creëren van deze verdeling en waarom?

Who would need to take a role in creating this distribution and why?

9. Er zijn voorwaarden die aangeven wie de subsidie aan kan vragen, wie maken deze beslissingen en wie heeft deze beslissingen niet gemaakt?

There are conditions that determine who can apply, who made these decisions and who did not make these decisions?

10. Hoe neemt u deel aan het maken van deze beslissingen?

How do you participate in making these decisions?

11. Hoe zou u graag deel willen nemen aan het maken van deze beslissingen? Wie zou hier wat uithalen?

How would you like to participate in making these decisions? Who would gain what from this?

12. Welke factoren beïnvloeden wie welke 'macht' heeft in het maken van beslissingen?

What factors do you think determine who has what power in the decision-making?

13. Denkt u dat de diversiteit of het verschil in demografische kenmerken meegenomen is in het proces van het maken van de beslissingen over wie zich kan aanmelden voor de subsidie, op welke manier en in hoeverre?

Do you think diversity or differences in demographic characteristics has been considered in the decision-making on who can apply for the subsidy, in what way and to what degree?

14. Was u/Zijn inwoners wonend in buurten met een lagere sociaaleconomische status in staat gesteld om hun/uw perspectief op wat een rechtvaardige verdeling inhoudt uit te drukken? Hoe?

Were you/inhabitants living in a neighbourhood of low socioeconomic status able to express their/your views on what a just distribution would entail according to them/you? How?

15. Was u/Zijn inwoners wonend in buurten met een lagere sociaaleconomische status in staat om informatie te verkrijgen die u/zij begrijpt/begrijpen zodat u/zij een perspectief heeft kunnen/kunnen ontwikkelen en uitdrukken wat een rechtvaardige verdeling voor u/hen betekent?

Were you/inhabitants living in a neighbourhood of low socioeconomic status able to access information that you/they can understand in order to develop and express your/their perspectives on a just distribution?

16. Ben u/Zijn inwoners zich bewust van de redenen die de noodzaak tot meer groen verantwoorden, en hoe heeft dit de aanvraag beïnvloed?

Are you/inhabitants aware of the reasons why green should be implemented and how did this influence the application?

17. Hoe wilt u/willen inwoners wonend in buurten met een lagere sociaaleconomische status ervoor zorgen dat u/zij in een prettige leefomgeving wonen? Heeft u/Hebben deze inwoners de mogelijkheid gehad om hun aanpak kenbaar te maken? Zou u/Zouden zij voor een andere strategie dan subsidies kiezen?

How do you/inhabitants living in a neighbourhood of low socioeconomic status want to ensure a pleasant living environment? Have you/these inhabitants been able to express this approach? Would you/Would they chose another strategy than subsidies?

Bedankt voor uw deelname en uw tijd. Zijn er nog aanvullende opmerkingen of vragen die u zou willen stellen? Dit is het einde van het interview. Ik ga de opname nu beëindigen.

Thank you for your participation and your time. Are there any additional remarks you would like to make or questions you would like to ask? This is the end of the interview. I will now end the recording.

The questions were asked to employees of the municipality of Breda, inhabitants of Doorbos-Linie, an employee of housing corporation in Breda and of the province of Noord-Brabant. When asking the questions to the latter stakeholder, the questions applied to either their own subsidies or both their own subsidies and the green roof subsidy of Breda.

Appendix VIII: Informed Consent Form

The informed consent form in Dutch:

Dit (onderdeel van de vragenlijst) betreft de geïnformeerde toestemming van de deelnemer wie is gevraagd om deel te nemen aan een interview voor het afstudeerproject van een Master studente aan Universiteit Utrecht (en het invullen van deze algemene vragenlijst).

Als interviewer,

Ik verklaar hierbij dat ik de deelnemer voldoende heb geïnformeerd over het onderzoek. Als er tijdens het onderzoek informatie bekend wordt die de toestemming van de deelnemer zou kunnen beïnvloeden, dan breng ik hem/haar daarvan tijdig op de hoogte op een wijze waardoor ik er zeker van ben dat de informatie de deelnemer bereikt heeft.

Als geïnterviewde,

Ik heb de informatie in de informatiebrief met het verzoek voor een interview gelezen en de mogelijkheid gehad om vragen te stellen. Mijn vragen zijn beantwoord en ik had genoeg tijd om mijn beslissing over deelname te maken.

Ik ben me ervan bewust dat deelname volledig vrijwillig is en dat ik op elk moment kan beslissen om niet mee te doen. Hier hoeft ik geen reden voor te geven.

Ik weet dat sommige mensen mijn gegevens kunnen zien (studente). Zelf heb ik het recht om mijn gegevens zoals opgeslagen te zien. Ik ben me ervan bewust dat ik anoniem zal blijven wanneer resultaten worden verwerkt, gebruikt en worden opgenomen in een openbaar toegankelijk verslag.

Ik geef toestemming om mijn gegevens te gebruiken, voor de doelen eerder vermeld. Mocht er aanleiding zijn om de gegevens te gebruiken voor een ander onderzoeksdoel dan zal opnieuw toestemming aan mij worden gevraagd.

Ik geef toestemming voor het opnemen van dit interview.

Alleen van toepassing in het geval u mentale ondersteuning nodig heeft: Mijn begeleider en/of verzorger heeft de deelname goedgekeurd.

Ik ga akkoord met deelname aan dit onderzoek

Ik ga niet akkoord

Datum:

Deelnemer (functie):

The informed consent form in English:

This (part of the questionnaire) contains the informed consent of the participant who has been asked to participate in an interview for the thesis of a master student at Utrecht University (and filling in the general questions of the questionnaire).

As interviewer,

Hereby I announce that I have informed the participant sufficiently about the research. In case information becomes apparent during the research that might influence the permission of the participants, I will inform him/her about this in a way that I am sure that the information has reached the participant.

As interviewee,

I have read the information in the information letter with the request for an interview and I have had the opportunity to ask questions. My questions have been answered and I have had sufficient time to make a decision about my participation.

I am aware of the participation being voluntary and that I can decide to retreat from participation any moment. I do not need to give a reason for this.

I know that some people can see my personal information (student). I have myself the right to see my information the way it is registered and saved. I am aware that I will remain anonymous when results are being processed, used and included in a publicly accessible report.

I give permission for using my data for purposes mentioned earlier. In case there might be reasons to use my data for other research purposes, I will be asked again to give permission.

I give permission to record this interview.

Only applicable in case you need mental assistance: My supervisor/caretaker has approved participation.

I agree with participating in this research

I do not agree

Date:

Participant (function):

Appendix IX: Survey Demographic Characteristics

When scanning the QR-codes, a questionnaire made in Qualtrics appeared including the informed consent form and several questions about demographic characteristics. Inhabitants who participated were asked to fill this in.

Questionnaire in Dutch:

Default Question Block

Q2

Beste bewoner van Doornbos-Linie,

Welkom bij dit interview. Hartelijk dank voor uw deelname en het invullen van dit formulier.

Deze korte enquête bevat eerst informatie over uw deelname en de vraag of u toestemming wilt geven om de verzamelde informatie te mogen gebruiken. Daarna volgen een aantal algemene vragen.

Als u vragen heeft, stel deze dan vooral. Ik help u graag.

Nogmaals bedankt!

Page Break

Q15

Skip to

End of Block if Ik ga niet akkoord Is Selected

Dit onderdeel van de vragenlijst betreft de geïnformeerde toestemming van de deelnemer wie is gevraagd om deel te nemen aan een interview voor het afstudeerproject van een Master studente aan Universiteit Utrecht en het invullen van deze algemene vragenlijst.

Als interviewer,

Ik verklaar hierbij dat ik de deelnemer voldoende heb geïnformeerd over het onderzoek. Als er tijdens het onderzoek informatie bekend wordt die de toestemming van de deelnemer zou kunnen beïnvloeden, dan breng ik hem/haar daarvan tijdig op de hoogte op een wijze waardoor ik er zeker van ben dat de informatie de deelnemer bereikt heeft.

Als geïnterviewde,

Ik heb de informatie in de informatiebrief met het verzoek voor een groepsinterview gelezen en de mogelijkheid gehad om vragen te stellen. Mijn vragen zijn beantwoord en ik had genoeg tijd om mijn beslissing over deelname te maken.

Ik ben me ervan bewust dat deelname volledig vrijwillig is en dat ik op elk moment kan beslissen om niet mee te doen. Hier hoeft ik geen reden voor te geven.

Ik weet dat sommige mensen mijn gegevens kunnen zien (studente). Zelf heb ik het recht om mijn gegevens zoals opgeslagen te zien. Ik ben me ervan bewust dat ik anoniem zal blijven wanneer resultaten worden verwerkt, gebruikt en worden opgenomen in een openbaar toegankelijk verslag.

Ik geef toestemming om mijn gegevens te gebruiken, voor de doelen eerder vermeld. Mocht er aanleiding zijn om de gegevens te gebruiken voor een ander onderzoeksdoel dan zal opnieuw toestemming aan mij worden gevraagd.

Ik geef toestemming voor het opnemen van dit interview.

Alleen van toepassing in het geval u mentale ondersteuning nodig heeft: Mijn begeleider en/of verzorger heeft de deelname goedgekeurd.

Ik ga akkoord met deelname aan dit onderzoek

Ik ga niet akkoord

Page Break



Q13

*

Ik heb de subsidie voor een groen dak aangevraagd

- Ja
- Nee

Q7

*

Ik woon in Doorbos-Linie

- Ja
- Nee

Q16

*

Ik woon in

- Een koopwoning
- Een sociale huurwoning
- Een particuliere huurwoning
- Anders, namelijk
- Deze vraag wil ik niet beantwoorden



Q14

*

Ik ben de hoofdbewoner

- Ja
- Nee



Q8

*

Ik woon in Doorbos-Linie voor

- 1 jaar of minder
- 2-5 jaar
- 6-10 jaar
- 11-15 jaar
- 16-20 jaar
- 21-25 jaar
- 26 jaar of meer
- Deze vraag wil ik niet beantwoorden

Q9

★

Mijn opleidingsniveau is

- Basisonderwijs
- VMBO
- De eerste 3 leerjaren HAVO of VWO
- Entreeopleiding
- MBO1
- Praktijkonderwijs
- Bovenbouw HAVO of VWO
- MBO2
- MBO3
- MBO4
- HBO
- WO
- Deze vraag wil ik niet beantwoorden

Q10

★

Mijn inkomen valt in de categorie

- < 21.000 per jaar
- 21.000-25.000 per jaar
- 25.000-29.000 per jaar
- 29.000-34.000 per jaar
- > 34.000 per jaar
- Deze vraag wil ik niet beantwoorden

Q11

★

Mijn leeftijd is

Q12

★

Ik heb een migratieachtergrond

- Nee
- Ja, namelijk
- Deze vraag wil ik niet beantwoorden

----- Page Break -----

Q14



In het geval u nu deelneemt aan het groepsinterview (anders kunt u deze vraag overslaan), ik sta open voor een individueel interview op een later moment.

- Ja ik zal deelnemen aan het groepsinterview en ik sta ervoor open om op een later moment ook deel te nemen aan een individueel interview
- Nee ik zal deelnemen aan het groepsinterview maar niet aan een aanvullend individueel interview

Q5



Als u 'ja' heeft beantwoord op de vorige vraag, mijn e-mail adres is:

Q17



In het geval u deelneemt aan een individueel interview (anders kunt u deze vraag overslaan), ik sta open voor een groepsinterview op een ander moment.

- Ja, namelijk op zaterdag 13 april 11.00-12.30
- Ja, namelijk op dinsdag 16 april 18.30-20.00
- Nee ik zal deelnemen aan het individuele interview maar niet aan een groepsinterview

Q18



Als u 'ja' heeft beantwoord op de vorige vraag, mijn e-mail adres is:

Page Break

Q3



Bedankt voor het invullen. In het geval u open staat voor een aanvullend interview zal ik contact met u opnemen.

Esmee de Haan

Import from library

Add new question

Add Block

End of Survey

Bedankt voor de tijd die u heeft genomen om aan deze enquête deel te nemen.

Uw antwoord is geregistreerd.

Questionnaire in English:

Dear inhabitant of Doorbos-Linie,

Welcome to this interview. Thank you very much for your participation and filling in this form.

This short questionnaire includes information about your participation and the question of whether you would give permission to use the collected information. After that, several general questions will be asked.

If you have any questions, please ask. I am happy to help.

Thanks again!

Question 1 → See *Appendix VIII* as this question consists of the informed consent.

Question 2: I have applied for the subsidy for a green roof

Yes No

Question 3: I live in Doornbos-Linie

Yes No

Question 4: I live in a

Owner-occupied home Social rental home Private rental home Other, namely:

I do not want to answer this question

Question 5: I am the main inhabitant of my home

Yes No

Question 6: I have lived in Doornbos-Linie for

1 year or less 2-5 years 6-10 years 11-15 years 16-20 years 21-25 years

26 years or more I do not want to answer this question

Question 7: My level of education is

Primary education Vocational college (VMBO) The first three years of senior general secondary education (HAVO) or pre-university education (VWO) Entrance education The first year of vocational college (MBO1) Practical education The last two or three years of senior general secondary education (HAVO) or pre-university education (VWO) The second year of vocational college (MBO2) The third year of vocational college (MBO3) The fourth year of vocational college (MBO4) Higher professional education (HBO) University (WO) I do not want to answer this question

Question 8: My income falls in the category

< 21.000 per year 21.000 – 25.000 per year 25.000 – 29.000 per year

29.000 – 34.000 per year I do not want to answer this question

Question 9: My age is

Question 10: I have a migration background

No Yes, namely: I do not want to answer this question

Question 11: In case you are now participating in the focus group (otherwise you can skip this question), I am open for an individual interview at a later moment

Yes I will participate in this focus group and I am willing to participate in an individual interview at a later moment No I will participate in this focus group but I will not participate in an additional individual interview

Question 12: In case you answered 'Yes' to the previous question, my e-mail address is

Question 13: In case you are participating in an individual interview (otherwise you can skip this question), I am open for a group interview at a later moment

Yes, namely on Saturday 13th of April 11.00-12.30 Yes, namely on Tuesday the 16th of April 18.30-20.00 No, I will participate in this individual interview but not in a group interview

Question 14: In case you answered 'Yes' to the previous question, my e-mail address is

Thank you for filling this in. In case you are open for participation in an additional interview, I will contact you.

Esmee de Haan.

Thank you for taking the time to fill in this questionnaire.

Your answer has been saved.

Appendix X: Quotes in Dutch and in English

Dutch quote	English translation
Ik denk dat het voor mij een grote invloed heeft, want de informatie die ik zag, dan zou het op dit moment voor mij eigenlijk niet betaalbaar zijn, want er blijft een groot eigen deel over als ik het begrepen heb.	I think it has a large influence for me, because the information I saw, it would actually not be affordable for me at this moment, because a large own monetary contribution would remain if I understood correctly.
En het is een stimulerende bijdrage. Het is geen kosteloos stelling dus er zal altijd een deel eigen bijdrage in zitten.	And it is a stimulating contribution. It is not meant to set fully free of charges, so there will always be part consisting of the own monetary contribution.
... subsidies is nooit 100.	... subsidy is never 100%.
Mensen met een koopwoning zitten meestal beter bij kas dan mensen met een sociale huurwoning. Ja ja, de eindjes aan elkaar knopen, als je in een sociale huurwoning zit, dan zijn alle extra's gewoon een no go zone.	People living in an owner-occupied home have more money than people living in social rental homes. For making ends meet if you live in a social rental home, then all extras are simply a no-go zone.
Ja, omdat die vergoeding ten opzichte van de uitgaven goed te compenseren zijn. Dus ja, daar ben ik wel blij om dit te zien dat onttegenstelling behoorlijk toeneemt.	Yes, because the compensation in comparison to the costs is well compensated. So yes, I am happy to see that de-tiling is becoming more common.
Ik heb ook zonnepanelen d'rop liggen. ... Het ging redelijk makkelijk, maar ik moest wel stappen ondernemen via de woningbouw of dat ik het mocht hè? Dat ging heel soepel.	I also have solar panels on the roof. ... It went quite easily, but I had to take steps via the housing corporation whether I was allowed right? That went very flexibly.
Dus dat kan me voorstellen als je een eigenaar bent van de woning en misschien is die woning ook wel wat meer waard als je er een groen dak op hebt bijvoorbeeld. En dan verdien je dat natuurlijk terug bij de verkoop. Een huurder heeft dat natuurlijk niet, dus dat zou ook nog mee kunnen spelen.	So I can imagine that when you are a homeowner and maybe that home will increase in value when you put a green roof on it for example. And when you sell it, you will earn it back of course. A tenant naturally does not have that, so that could also be of influence.
Kijk, want wij hebben een schuurtje daar zou sedum op komen, maar die is te zwak. En het meeste is gewoon bouwval wat hier staat. Dus je kunt alleen maar een groen dak maken en dan groene subsidie aanvragen als je al een stevige, ja, woning of schuur hebt.	Look, we have a shed, sedum would be placed on it, but it is too weak. And most of what we have here is a ruin. So, you can only construct a green roof and apply for a green subsidy when you have a firm, yeah, house or shed.
De toegang voor de subsidie niet, maar als je het hebt over een groen dak, als jij in een appartement woont dan heb je niet zo heel veel dak en dan heb je ook nog burens waar je rekening mee moet houden. Dus ik denk dat daar het probleem ligt.	Not the access to the subsidy, but when you are talking about a green roof, if you live in an apartment, then you do not have that much roof and then you also have neighbours you need to consider. So I think that there is a problem there.
Ja, ik zou me nog voor kunnen stellen als je met velen in een flat complex woont of zo. ... Dan zou ik nog kunnen denken van ja, samen sterk zeg maar.	Yes, I can imagine that when you live with many people in an apartment block or something ... Then you could think, stronger together, so to say.

Ik denk dus het bekend maken vooral van, nou ja, van waar mensen terecht kunnen om het zo laagdrempelig mogelijk te maken.	So I think that mainly making it known, like, where can people go to make the barriers as low as possible.
Ik zou heel duidelijk willen weten wat er mag. Zodat je niet dadelijk ineens met allerlei gedoe zit.	I would like to know very clearly what is allowed. So you would not be confronted with all kinds of hassle.
Nou, ik vind wel dat wij slecht worden geïnformeerd. We worden wel geïnformeerd, maar ik heb toch vaak de indruk dat ze denken dat we een stel onnozele halzen zijn hier. Dus je krijgt een beetje informatie, maar niet voldoende om een goed besluit te kunnen nemen.	Well, I think that we are poorly informed. We are informed, but I often have the impression that they think we are a couple of silly people over here. So you get a little bit of information, but not enough to be able to make a good decision.
Het is in ieder geval wel opmerkelijk, ik denk dat ik heel erg goed op de hoogte ben van lokaal en wereldnieuws, dat ik eigenlijk over dit onderwerp helemaal niets gelezen heb, wat in ieder geval door de woningbouwvereniging of door de gemeente mij, en dan bedoel ik middels schriftelijk, onder ogen is gebracht. Het kan wel zijn dat ze daar links voor klaar hebben liggen, maar daar heb ik niet naar gekeken. Dus ongevraagd heb ik niets gezien.	In any case, it is remarkable, I think I am very well aware of local and global news, that I actually did not read anything about this topic that was by the housing corporation or by the municipality, meaning written, shown to me. There may be links ready, but I did not look for them. So unasked I did not see anything.
Het punt is, ik wist niet dat er subsidie was tot dat bord hier bij mij in de wijk stond, terwijl ik wel heel erg bezig ben met mijn tuin en groen en welke planten ik erin wil en dat ik wil dat er biodiversiteit is, heb ik geen seconde gedacht dat daar subsidie voor zou zijn.	The point is, I did not know that there was a subsidy until this board was here in the neighbourhood, while I am very occupied with my garden and green and which plants I want to have in there and that I want there to be biodiversity, I did not think for a second that there might be a subsidy for this.
Het is ja dat jij daarmee aan de deur kwam. Ik had er nog nooit van gehoord. Ja, wel dat je subsidie hebt, maar dan denk ik ja, dat is niet voor ons.	You visited me at the door with it. I had never heard of it. Yeah, I heard there is a subsidy, but then I think, that is not for us.
We hebben een aantal sub-sites bij de gemeente, op de stad in het park en andere sites het over vergroening gaat. Die zetten de link tegenwoordig neer op hun site om door te linken naar subsidie water en groen. Dus we krijgen steeds meer bekendheid.	We have a number of sub-sites from the municipality, on the city in the park and other sites referring to greening. Those nowadays put a link on their website towards the subsidy water and green. So we become more known.
Ontlasten en ontzorgen.	Reduce burdens and worries.
Wat is dan een duurzaam dak? Hoe hoog moet de zandlaag zijn? Wat moet eronder, wat voor plantjes, wat voor sedum? Ik denk ook wel dat je daar een soort werkpakketten voor kan aanbieden.	What is a sustainable roof? How high should the layer of sand be? What has to go underneath, what type of plants, what type of sedum? I think it would be possible to offer a package for this.
Nee, ik en diegenen die is een keer op zo'n bijeenkomst zijn geweest, nou dat zijn zo weinig mensen, dus dan zie je wel hoe dat leeft eigenlijk in zo'n wijk. Eigenlijk niet veel. Dat is jammer.	No, myself and others who went to a public meeting, well, that is really just a few, so this indicates how little it is present in such a neighbourhood as this. Not a lot. That is a pity.

Mensen zijn echt aan het overleven, dus die hebben gewoon ook, die zijn met hele andere dingen bezig dan met verduurzamen of vergroenen. Dus dat is ook iets wat we breder zeg maar merken als het gaat om verduurzamen.	People are really trying to survive, so those people just have, they have other things on their minds, other than making things more sustainable or greening. So that is something we notice in a broader sense when talking about sustainability.
Dus je moet dan echt naar Intratuin of Groenrijk, of noem ze maar op. Alle tuinbouwbedrijven waar je planten moet halen. Dus ik denk dat gefragmenteerd aanleveren wel een barrière kan zijn.	So you already really need to go to Intratuin or Groenrijk, or you name it. All those horticultural companies to get the plants. So I think offering it fragmentary could be a barrier.
Ook dat nog.	That too.
Maar mijn man zegt nee dat hoef ik allemaal niet hoor die rotzooi erop dus dan zit je al in een gezin.	But my husband says, no I do not want all of that, that mess on it, and that is already within one family.
Ik denk vooral de mate van ingewikkeldheid. Als mensen tien pagina's aan formulieren in moeten vullen voordat ze ergens voor in aanmerking komen, kan ik me voorstellen dat dat soms een drempel kan zijn en ook verantwoording.	I mainly think the degree of complexity. If a person has to fill in 10 pages of forms before being eligible, then I can imagine that this can be a barrier, and also the justification.
Activiteiten moeten beschikbaar zijn voor alle inwoners van Breda, uitgangspunt is zoveel mogelijk inclusief aanbod.	Activities should be available to all citizens of Breda, starting point is as much as possible inclusive offer.
Ik zei al ik in de basis, dan ga ik hem even heel generaliserend platslaan, heeft iedereen toegang tot subsidie. Iedereen kan achter de laptop gaan zitten en het aanvragen.	As I said, in the basis, I am going generalise and flatten it, everyone has access to the subsidy. Everyone can sit behind the laptop and apply for it.
We moeten dat gewoon gelijk openstellen. In principe zijn de regelingen eerlijk als je het puur bekijkt vanuit: Iedereen kan er gebruik van maken.	We have to open it up equally. In principle, the regulations are fair if you purely consider it as everyone can make use of it.
Want wij kunnen als overheid niet zeggen van oké, we sluiten mensen uit met een inkomen boven de of met een opleidingsniveau boven de. Dat kun je niet zeggen.	Because, as the government we cannot say something like, all right we exclude people with an income above x or with an education level above x. You cannot say this.
Als redenen bestaan om aan te nemen dat de aanvrager ook zonder de gevraagde subsidie over voldoende gelden, hetzij uit eigen middelen, hetzij uit middelen van derden kan of heeft kunnen beschikken om de kosten van de activiteiten te dekken.	When there are reasons to assume that the applicant can or could also without subsidy own enough money, by own means or from means of a third, to cover the costs of the activity.
Wij kunnen daar dus geen gebruik van maken als corporatie. Ja, dat voelt niet helemaal eerlijk dus. En wat denk ik wel kan helpen als doel van de subsidie wil je natuurlijk denk ik toch dat er uiteindelijk meer groene daken komen. Dan denk ik dat het wel kan helpen als er ook dus een mogelijkheid zou zijn voor corporaties om die subsidie aan te vragen. Omdat wij inderdaad dan wel bijvoorbeeld op	We cannot make use of it as corporation. Yeah, that does not feel fully fair. And something I think can help, the goal of the subsidy is of course to eventually have an increased number of green roofs. So I think it can help if it would thus also be possible for the corporations to apply for the subsidy. Because we could, for example, construct green roofs on apartment blocks.

appartementencomplexen bijvoorbeeld meer groene daken zouden kunnen aanleggen.	
Voor sommige doelgroepen moet je meer ondersteuning bieden. En dan heb ik het niet over de Tesla wijken, heel stigmatiserend, maar wel over de kwetsbare wijken zoals Linie Zuid.	For some target groups you need to offer more assistance. I am not talking about the Tesla neighbourhoods, very stigmatising, but I am talking about vulnerable neighbourhoods like the southern part of Linie.
We hebben een beperkt budget, die moeten we goed inzetten. En ja, je zult wel voorwaarden moeten stellen...	We have a limited budget, we need to use it well. And yes, you will need to put conditions in place ...
Ja, nou ja, er is natuurlijk altijd een subsidieplafond. Want uiteindelijk draait het natuurlijk om geld. Subsidie is geld geven, dus je moet wel budget hebben binnen je gemeente of binnen je provincie.	Yes, well, there is of course always a subsidy ceiling. Because, eventually it is naturally about money. Subsidy is giving money, so you need to have a budget within your municipality or your province.
Daar zitten zoveel mensen daar op dat kantoor en die beslissen allemaal welke dingen er gaan gebeuren. Terwijl als bewoner, je bent ook op die bijeenkomst geweest vorige week hier en daar zijn een heleboel mensen die het daar niet mee eens zijn wat er allemaal gaat gebeuren hier, en het gaat toch gebeuren en daar hebben ze dan wel naar gevraagd, maar gewoon niet naar geluisterd.	There are a lot of people at that office and those people decide what kinds of things will happen. While as an inhabitant, you went to the gathering last week here and many people do not agree with all the things that will happen, and it will happen regardless and they asked about it, but they simply did not listen.
Dus we hebben een jaarlijks budget, maar ik heb al twee jaar meegemaakt dat halverwege of twee 2/3 van het jaar op was. Toen werd ie alsnog aangevuld. Want vanuit de gemeente willen we toch vooral promoten het vergroening in de private grond, dus opvangen van regenwater vooral.	We have a yearly budget, but I have already experienced two years that there was no more budget halfway through or at two/third of the year. Then it was supplemented. Because the municipality wants to promote greening on private areas, so collecting rainwater mainly.
Ja, want je hebt twintig bewoners in een straat en je krijgt twintig verschillende meningen. Dus dat is wel heel moeilijk om daar iets van te maken.	Yes, because then you have twenty inhabitants in a street and you will get twenty different opinions. So it is very hard to make something out of that.
Omdat het merendeel van de gemeente eigenlijk vaak niet weet waar ze over praten. Dus eigenlijk moet je mensen er in zetten met een gedegen achtergrond en kennis van zaken.	Because the majority of the municipality actually does often not know what they are talking about. So you actually would need to put people in there with the right background and knowledge.
Kijk want zij hebben ook twee knullen en die zijn al in de twintig, maar die waren nog maar klein toen ze hier kwamen, ik bedoel die spreken allemaal in het Nederlands en als ik iets uit moet leggen tegen de moeder dan doen zij dat voor mij. Dus als jij daaraan komt met je programma, dan 'Ik niet verstaan', 'ik niet weten'. Ja, dat heb je best wel veel. Dus dan kun je ook een brief in de bus douwen. Maar ja, dan snappen ze het nog niet. Dan gooien ze het ook weg.	Look, here they have two boys, they are already in their twenties, but they were still young when they came here, I mean, they all speak Dutch and when I need to explain something to their mother, then they do that for me. So if you would go there with your programme, then 'I not understand', 'I not know'. Yes, you have a lot of that here. So you could put a letter in their mailbox. But yeah they would still not understand. They will throw it away.

Nee, nee nee nee het is plat gezegd een stimulerende bijdrage. Één van de, tegeltje-taxi is hetzelfde, om mensen toch een deel van de kosten te vergoeden. Uiteindelijk zullen ze het zelf moeten doen.	No, no no no simply put it is a stimulating contribution. One of multiple, the tile-taxi is the same, to partly compensate costs. Eventually, they need to act themselves.
Joh ik wist tot drie dagen geleden niet eens dat het er was, dus nee.	Well, I did not even know it existed until three days ago, so no.
Ja, en dan moeten ze in principe een dialoog voeren met de gemeente. Ja, dan kom je via de standaard kanalen. Bellen. (...) Dat is lastig. En dat geldt niet alleen voor deze groep. Dat geldt voor iedere inwoner van een gemeente.	Yes, in principle they need to get into dialogue with the municipality. Yes, you will arrive there via standard ways. Calling. (...) This is difficult. This is not only the case for this group. This is the case for all inhabitants of a municipality.
Heel veel mensen hebben het liefst toch ook een stenen tuin. Maar dat wordt steeds meer, mensen die bewust zijn om meer groen in de tuin te hebben. En vooral ook omdat ze merken dat tegels veel warmte afgeven.	A lot of people prefer to have a tiled garden. But it is increasing, people who become more aware of needing more green in their garden. And mainly because they notice that tiles give off heat.
Ja, zeker weten. Als je iets belangrijk vindt, dan ga je in ieder geval kijken of je eraan kunt meewerken.	Yes absolutely. If you regard something as important, then you will at least see how you can contribute.
Ja, onvoorwaardelijke budgettering, daar ben ik van. En zo zou de hele wereld met elkaar om moeten gaan. Ja, dat is eigenlijk ook wat je gewoon in een familie- of in gezinsverband hebt, toch? Je doet iets en je krijgt iets en je geeft iets.	Yes unconditional budgeting, I am in favour of that. And that should be the way we should all get along with one another in the world. Yes, so basically just the same as it works for a family or household, right? You do something and you get something and you give something.
Laat ik het zo zeggen met m'n dakje dat is vrij klein hè? Dat ga ik niet doen. En waarom ga ik dat niet doen? Omdat ik dat niet als eenling wil doen. Maar ik wil het wel voor heel de wijk doen. Ja, dat vind ik dan wel iets opleveren.	Let's put it this way, my little roof is quite small right? So I will not do it. And why will I not do it? Because I do not want to do it on my own. I do want to do it for the whole neighbourhood. Yes, I think that would yield something.
Omdat ik betrokken werd bij dit groen project heb ik ook geopperd over de geveltuintjes en het is nu wel in het project meegenomen. Dus wat dat aangaat denk ik van nou leuk. De eerste keer dat ik benoemde dat ik een geveltuintje wilde waren ze heel enthousiast. En toen vroegen ze aan mij van goh, weet je toevallig of er meer mensen zijn die een geveltuintje willen?	Because I am was involved in this green project, I have also mentioned the green façades and now it is included in the project. So I am happy about that. The first time I mentioned that I wanted a green façade, they were very enthusiastic. And then they asked me whether I know more people who might want a green façade.

Appendix XI: Results

Results from the analysis in NVivo were put in Microsoft Excel. This resulted in seven sheets with data. This appendix shows all the tables that were created with themes and frequencies, also for the sub-themes.

Top 10 Themes

Top 10 Themes	Frequency
There is awareness	26
Unburden the inhabitant	18
Sustainability not first priority/interest	16
Facilitating	16
Green roof relatively expensive	16
Suitability of the roof	15
Own monetary contribution plays a role	15
People are unaware of subsidy for green	14
Tenants need permission for green roofs	14
Stakeholders can have valuable input	13

Accessibility

Affordability Themes	Frequency
Good investment new buildings	2
Green or sustainable is not the first priority	6
Green roof relatively expensive	16
Impression that owning is required	1
Only possible when there are no costs for inhabitants	6
Own monetary contribution plays a role	15
People already have trouble making ends meet	10

Theme	Sub-theme	Frequency
A green roof is a relatively expensive measure	There are cheaper sustainable measures	4

Theme	Sub-theme	Frequency
Own monetary contribution plays a role	Always part of a subsidy	5

Home Ownership Themes	Frequency
Applications mainly from homeowners	7
Housing corporations cannot apply	1
Impression that homeowners more actively look for subsidies	3

Impression that implementation is easier for homeowners	7
No difference motivation between owners and tenants	2
People invest less in rental homes	5
Tenants do not need permission for all green measures	2
Tenants need permission for green roofs	14

Theme	Sub-theme	Frequency
Impression that implementation is easier for homeowners	Less choice restrictions	4

Theme	Sub-theme	Frequency
People invest less in rental homes	Cannot benefit from the investment when moving out	3

Theme	Sub-themes	Frequency
Tenants need permission for green roofs	Extra step but not very limiting	3
Tenants need permission for green roofs	Roof maintenance is of influence	3

Housing Type Themes	Frequency
Collective application apartment blocks	6
Impression that a minimum surface is required	1
Impression that apartment blocks are more challenging	9
Impression that housing type is not a very influential factor	3
Interest in green roof on a shed	4
Suitability of the roof	15

Theme	Sub-theme	Frequency
Collective application apartment blocks	Via owner association	4

Theme	Sub-themes	Frequency
Impression that apartment blocks are more challenging	Difficult to develop a shared vision	3
Impression that apartment blocks are more challenging	Technical challenges	3

Theme	Sub-themes	Frequency
Suitability of the roof	Roof carrying capacity and firmness	7

Suitability of the roof	Roof slope	4
Suitability of the roof	Timing of roof maintenance requirement	2

Suitable Information	Themes	Frequency
Perspectives on what is important for decision-making	Costs	5
Perspectives on what is important for decision-making	Instructions finding extra information/help	6
Perspectives on what is important for decision-making	Knowing maintenance requirements	4
Perspectives on what is important for decision-making	Knowing subsidy exists	2
Perspectives on what is important for decision-making	Knowing what is allowed	4
Perspectives on what is important for decision-making	Knowing what is needed	8
Perspectives on what is important for decision-making	Network	1
Perspectives on what is important for decision-making	Suitability of roof	3
Perspectives on what is important for decision-making	Understanding benefits of green	2

Theme	Sub-themes	Frequency
Instructions finding extra information/help	Help with construction	2
Instructions finding extra information/help	Help with the subsidy	4

Theme	Sub-theme	Frequency
Knowing what is allowed	To avoid unwanted consequences	3

Theme	Sub-themes	Frequency
Knowing what is needed	Plants	4
Knowing what is needed	Soil	2

Suitable Information	Themes	Frequency
Perspectives on the availability of important information	Digital as a disadvantage	6
Perspectives on the availability of important information	Digital as an advantage	12
Perspectives on the availability of important information	Existence subsidy becomes more known	10
Perspectives on the availability of important information	Information about benefits of green	3

Perspectives on the availability of important information	Less information in case of a language barrier	3
Perspectives on the availability of important information	Less information when not in a network	2
Perspectives on the availability of important information	Mainly text and little visual information	2
Perspectives on the availability of important information	Need more promotion	4
Perspectives on the availability of important information	Need to look for information yourself	3
Perspectives on the availability of important information	Newsletters	6
Perspectives on the availability of important information	People are unaware of subsidy for green	14
Perspectives on the availability of important information	Too complicated to find/use	5
Perspectives on the availability of important information	Uncertainties	12

Theme	Sub-themes	Frequency
Digital as a disadvantage	Elderly have difficulties	3
Digital as a disadvantage	Information is difficult to find online	3

Theme	Sub-themes	Frequency
Digital as an advantage	Good application platform	2
Digital as an advantage	Information mainly online	4
Digital as an advantage	Links to subsidy on multiple websites	5

Theme	Sub-themes	Frequency
Newsletters	Newsletters are desired	3
Newsletters	Newsletters are used	3

Theme	Sub-themes	Frequency
Uncertainties	Information gaps	7
Uncertainties	Technical uncertainties	5

Suitable Information	Themes	Frequency
Support mechanisms	Campaigns	1
Support mechanisms	Construction calculation	2
Support mechanisms	Facilitating	16
Support mechanisms	Inhabitants need to take action themselves	4

Support mechanisms	Online	4
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Theme	Sub-themes	Frequency
Facilitating	All-in package	3
Facilitating	Facilitator	4
Facilitating	Plants	2
Facilitating	Tile-taxi	3

Theme	Sub-theme	Frequency
Inhabitants need to take action themselves	Otherwise do not know what is there	2

Theme	Sub-themes	Frequency
Online	Link to municipal subsidy on websites	2
Online	Online portal	2

Additional Factors Themes	Frequency
Collective action can be difficult	2
Conditions of application	2
Difficult finding subsidy	2
Green roofs maybe not most suitable	2
Impression that it is a hassle	11
Impression that inhabitants cannot apply	3
Lack of non-digital approach	3
Language	3
Lower education level	4
Negative experience with government	6
Network	7
No green councillor	3
Someone needs to take first step	2
Sustainability not first priority/interest	16

Theme	Sub-theme	Frequency
Impression that it is a hassle	Complicated due to forms	7

Theme	Sub-theme	Frequency
Impression that inhabitants cannot apply	Need a minimum surface	2

Theme	Sub-theme	Frequency
Lack of non-digital approach	Elderly who have no e-mail	2

Theme	Sub-themes	Frequency
Negative experience with government	Delayed action that was not satisfactory	2
Negative experience with government	No respect for inhabitants their initiatives	3

Theme	Sub-themes	Frequency
Network	Missed chances when people are not in touch	4
Network	People in a network can help each other	3

Justice

Principle of Distribution Themes	Frequency
Application until subsidy ceiling	1
Collaborate with actors saving costs due to green	3
Everyone has access	6
Extra promotion	5
It does not matter as long as people apply	1
Make subsidy available to housing corporations	4
Maximum monetary compensation	1
Neighbourhood budget without conditions	5
No subsidy above a certain income	4
Positive about subsidy open for tenants	2
Subsidy where the need is highest	2
There are both high and low cost options	5
Unburden the inhabitant	18

Theme	Sub-themes	Frequency
Extra promotion	Investing in people with knowledge	2
Extra promotion	Non-digital promotion	2

Theme	Sub-themes	Frequency
No subsidy above a certain income	Draw a line at a certain income	2
No subsidy above a certain income	Not possible to make subsidy available only to people under a certain income	2

Theme	Sub-themes	Frequency
There are both high cost (green roofs) and low cost (de-tile) options	Good ratio of costs and subsidy for de-tiling	2
There are both high cost (green roofs) and low cost (de-tile) options	Increased de-tiling	2

Theme	Sub-themes	Frequency
Unburden the inhabitant	All-in package	4

Unburden the inhabitant	People as facilitators	10
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Structural Power

Factors Determining Structural Power Themes	Frequency
Green ambitions	4
Impression that governmental decisions are set in stone	3
Money	12
Technical requirements	1

Theme	Sub-themes	Frequency
Money	Budget determines possibilities	7
Money	The actor with the money has the final say	4

Participation

Participation Preferences Themes	Frequency
Not always smart to involve inhabitants	5
Stakeholders can have valuable input	13

Theme	Sub-theme	Frequency
Not always smart to involve inhabitants	Lot of different opinions	2

Theme	Sub-themes	Frequency
Stakeholder can have valuable input	Good contact via initiative groups	3
Stakeholder can have valuable input	Need people with local knowledge	3

Sense of Justice

Consideration of Demographic Characteristics and Diversity Themes	Frequency
Digital can be difficult for elderly	5
Impression that diversity has been considered	3
Impression that diversity has not been considered	7
Language barriers	10
Might be valuable to consider motivations	3

Theme	Sub-themes	Frequency
Language barriers	Difficult for people with limited language skills or with another limitation	6
Language barriers	Only Dutch and some English	4

Expression of Views on Justice by Inhabitants Living in Neighbourhoods of Lower SES Themes	Frequency
Impression that it was possible to express views on a just distribution	7
Inhabitants did not express their views on a just distribution	9
Subsidy has not been evaluated	2

Critical Knowledge Production

Access to Information to Develop and Express Views on Justice Themes	Frequency
Communication between the municipality and inhabitants is difficult	5
Impression that information was published	6
Information should be better available in accessible ways	6
Join projects of interest	1
No discussion groups available	1
Not aware of the existence of the subsidy	2

Theme	Sub-themes	Frequency
Communication between the municipality and inhabitants is difficult	Inhabitants not always open to interaction	3
Communication between the municipality and inhabitants is difficult	The municipality is distant	2

Awareness	Themes	Frequency
Degree of awareness	Limited awareness	4
Degree of awareness	There is awareness	26

Theme	Sub-themes	Frequency
There is awareness	Biodiversity	5
There is awareness	Heat	4
There is awareness	View	2
There is awareness	Publications about the benefits of green	2

Awareness	Themes	Frequency
Influence of awareness on application	Impression that increasing awareness is more important	1
Influence of awareness on application	Positive impact	10

Expression of Perspectives	Themes	Frequency
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Approach to improving the living environment	Collecting information	1
Approach to improving the living environment	Green façade	3
Approach to improving the living environment	Guerrilla gardening	1
Approach to improving the living environment	Join green projects of interest	3
Approach to improving the living environment	Keep the appearance of the neighbourhood clean	4
Approach to improving the living environment	Neighbourhood budget	9
Approach to improving the living environment	Prefer a collective approach	5
Approach to improving the living environment	Subsidy is a good approach	4

Theme	Sub-theme	Frequency
Keep the appearance of the neighbourhood clean	Need to reduce trash in public space	2

Theme	Sub-themes	Frequency
Neighbourhood budget	Examples abroad	2
Neighbourhood budget	Inhabitants decide for themselves	6

Theme	Sub-theme	Frequency
Prefer a collective approach	Efficient	3