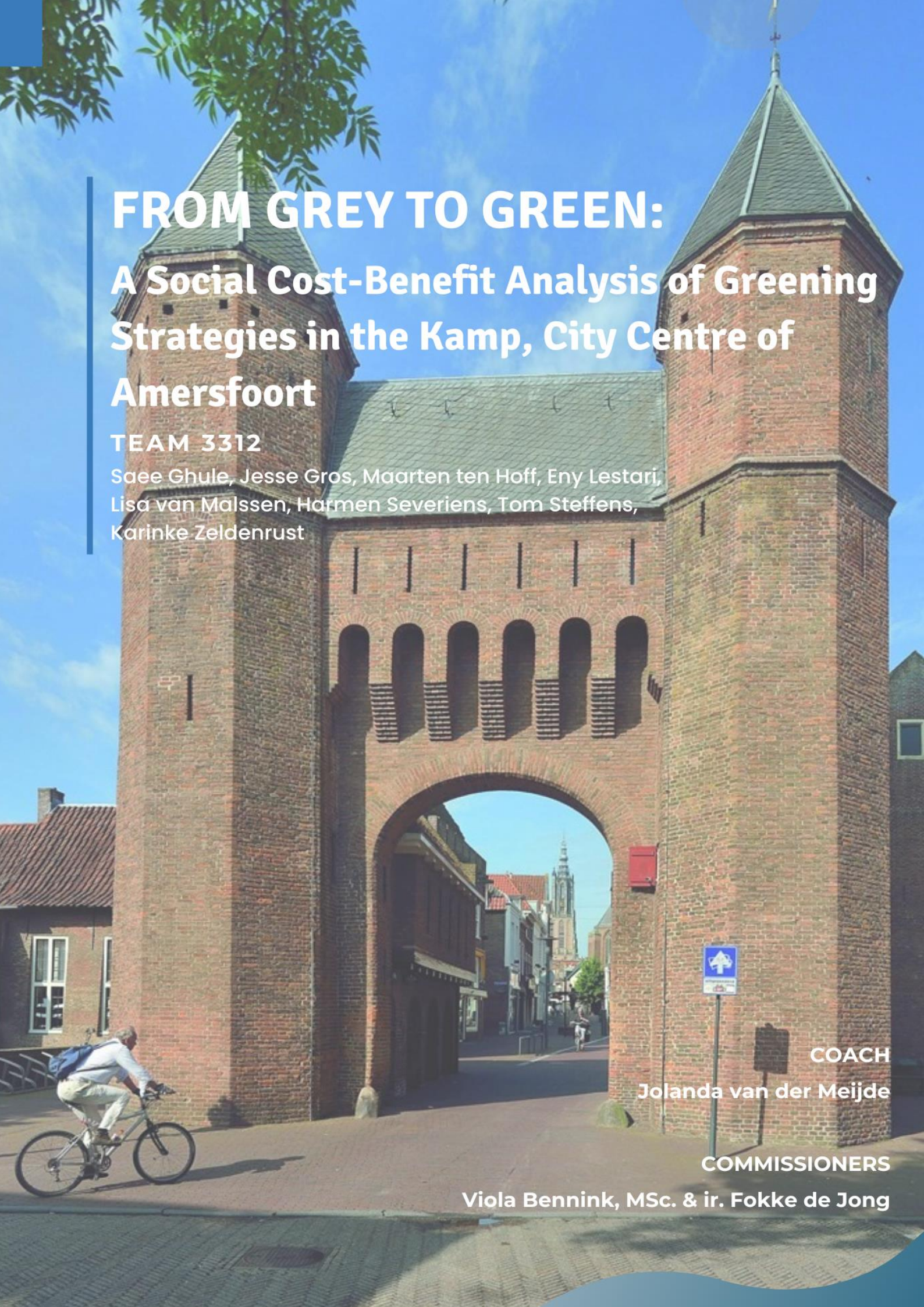


FROM GREY TO GREEN:

A Social Cost-Benefit Analysis of Greening Strategies in the Kamp, City Centre of Amersfoort

TEAM 3312

Saee Ghule, Jesse Gros, Maarten ten Hoff, Eny Lestari, Lisa van Malssen, Harmen Severiens, Tom Steffens, Karinke Zeldenrust

COACH

Jolanda van der Meijde

COMMISSIONERS

Viola Bennink, MSc. & ir. Fokke de Jong

Contact detail commissioner :
Ir. Fokke de Jong
Email: fokke.dejong@wur.nl

Contact details secretary :
Karinke Zeldenrust
Email: Karinke.zeldenrust@wur.nl

Cover picture retrieved from :
Kamperbinnenpoort. (n.d.). VVV Amersfoort.
https://www.vvvamersfoort.nl/nl/locaties/1590/kamperbinnenpoort

In collaboration with

ONDERNEMERS
BINNENSTAD AMERSFOORT

Nelen & Schuurmans

Executive summary

In recent years, the world has seen a shift from offline physical shopping to online shopping due to the rise of e-commerce. This seriously affects the small and medium enterprises that only have physical shops. As they form an integral part of the economy, this shift in turn, affects the local economy. Studies have previously shown that shoppers today look for 'experiences' while shopping rather than just material goods. Thus, the attractiveness of the shopping area also contributes to the trends in physical shopping frequency. Apart from that, the world is suffering from climate change, leading to an increased frequency of extreme weather events, causing problems in cities such as flooding and heat stress. A lack of climate resiliency can seriously affect people's shopping experiences.

The area surrounding the street of the Kamp in the city centre of Amersfoort is facing similar problems regarding less frequent physical shoppers and an insufficient adaptation to climate change. This report explores the possibilities of greening the Kamp to increase its attractiveness to visitors and improve its adaptation to climate change. We used surveys and interviews to get a better understanding of the stakeholders' attitudes regarding greening strategies, and a social cost-benefit analysis to investigate the viability of greening the area surrounding the Kamp.

To understand the stakeholders' perspectives, 14 entrepreneurs in the area were interviewed, and a questionnaire was provided to shoppers and visitors which totalled 60 respondents. Both the surveys and interviews indicated that the current situation in the Kamp is not attractive to the stakeholders and that greening the street would significantly add to the local economy of the area. 43% of the entrepreneurs believed that greening the area would increase their profits, while 70% of the questionnaire respondents indicated that they would be willing to spend more time in the area, which could lead to higher spending.

Based on previous studies and literature, a tentative plan for greening the Kamp was designed, based on which the effects on heat stress and water management of the area were investigated using the Climate Resilient Cities Tool by Deltares and the Hittestress tool by Nelen & Schuurmans. The results indicated that the plan would reduce the air temperature of the area by 0.27°C whilst increasing the water retention capacity of the area by 1,014 m^3.

Finally, a comprehensive cost-benefit analysis was conducted based on the created design. The ecosystem services framework was used to identify and quantify the benefits of greening of the Kamp, while the TEEB City Tool, was used to monetise the benefits. The overall cost-benefit analysis indicated a Benefit-Cost Ratio (BCR) of 4.74, which can be interpreted as an indication of the economic viability of greening the Kamp (BCR greater than 1).

While the tentative plan we created was not designed to be a proposal for implementation, the positive effects on heat stress and water management, the obtained BCR of greater than 1, and the results of entrepreneurs' interviews and survey of shoppers & visitors do make a strong case for the initiative of greening in the Kamp. Apart from improvements in the local economy and climate adaptation, urban greening is also known to have positive effects on the citizens' mental and physical health. It improves air quality and creates a place for recreation and social cohesion, making the study area a place to be rather than just a place to buy.

This project was executed as a part of the course Academic Consultancy Training, by a group of eight graduate students with a wide range of expertise.

Table of Contents

INTRODUCTION

1. Introduction

1.1 Background

Climate change has led to an increase in extreme weather event, causing problems around the globe including flooding, forest fires and other natural disasters (Clarke et al., 2022). One of the most important elements of climate change is a globally increasing temperature. In the Netherlands, the expected year-round temperature change for 2050 compared to 1991-2020 is an increase of 0.9 °C to 1.6 °C, with an increase of 1.2 °C to 2.2 °C for the average daily maximum in summer according to the latest KNMI climate scenarios (KNMI, 2023). These temperature ranges make use of all four defined scenarios by the KNMI.

Cities are particularly susceptible to the effects of climate change (While & Whitehead, 2013). In cities all over the world the air and surface temperatrures observed are higher compared to the more rural surrounding areas as stated in Coseo and Larsen (2014). This makes these cities more susceptible to extreme temperatures in the future due to climate change (Marando et al., 2022). The difference between the higher temperatures in cities and lower temperatures in rural areas is defined as the urban heat island (UHI) (Coseo & Larsen, 2014). Furthermore, the difference in temperature within the city compared to rural areas also has an influence on the perceived temperature by humans, which is expressed as the physiological equivalent temperature (PET) (Matzarakis et al., 1999). Factors associated with urban areas i.e., buildings, roads and areas with relatively low amounts of greenery increase the PET values, leading to a higher grade of heat stress for humans (Matzarakis et al., 1999).

Since heat stress is one of the most important causes of mortality due to weather, it is important to limit future heat stress as much as possible (Oleson et al., 2015). According to the World Health Organization (2024), almost 500,000 heat-related deaths occur each year.

Another problem that is enhanced by climate change is the frequency of extreme precipitation (>25 mm/hr or >50 mm/d). In the scenarios with stronger climate change, the frequency of extreme precipitation is expected to increase, especially in relatively small convective systems that produce a lot of precipitation in a relatively short period (~1hr) (KNMI, 2023). This has the potential to cause changes in rainfall patterns; resulting in unusually high amounts of rainfall and subsequently, flooding.

In cities in the Netherlands, shopping streets, which are usually located within the compact city centre, are not well-adapted to the aforementioned effects of climate change (Hersbach, 2022). The lack of climate-resilient infrastructure can negatively affect people's shopping experiences, for example on hot summer days when visitors may experience heat stress. Climate change is likely to increase heat stress if no changes are made to the street design, forming a possible threat to shops. Simultaneously, with the emergence of e-commerce, a shift in consumer behaviour from shopping in physical stores to online shopping has been observed. This trend seriously affects the physical shops in the Dutch city centres as well. Since these shops are an integral part of the economy, there is a need to revive the physical shopping experience in Dutch city centres. It has been well documented that consumers look for 'experiences' along with material goods while shopping in physical stores (Smits, 2023). The attractiveness of the neighbourhood also contributes to the experience of shopping (Smits, 2023).

A relatively simple measure that could decrease both problems would be to incorporate greenery in the city centres. This can decrease the effects of climate change such as heat stress and flooding, whilst improving people's shopping experience by making the city centres more attractive.

In general, the attractiveness of a city centre can be broken down into three factors: shopping attractiveness (variety and number of shops), leisure attractiveness (atmosphere, environment for recreational shopping), and accessibility (ability to visit the centre by foot, car, bike, or public transport) (Maat & Konings, 2018). Urban greening is a way to make the city centre a more attractive place to be; greening can provide psychological benefits, opportunities for recreation, and aesthetic appeal for visitors. Urban parks and gardens provide space for physical activity, social interaction, recreation, and promoting healthier lifestyles. Incorporating greenery into the urban landscape through street trees, green roofs, or living walls enhances the visual appeal, making them a more desirable place to reside (Knight et al., 2021). Overall, the benefits of greening design could stimulate people to shop offline rather than online. Offline stores offer an irreplaceable buying experience where people can interact with and experience a product physically before purchasing (Tse & Tung, 2016).

1.2 Context

The city of Amersfoort, a city with over 160,000 inhabitants and a historic medieval city centre, is one of the Dutch cities affected by climate change (Amersfoort in cijfers, 2024) . The two main effects in Amersfoort are increased temperatures in the city centre, leading to heat stress, and difficulties with drainage of water after heavy rainfalls (Hersbach, 2022). These factors may have contributed to the shift from physical shopping to online shopping(Van Ekeren et al., 2024). The heat stress in the city causes an environment that is not attractive for visitors, tourists and shoppers (Figure 1). The decreased number of visitors, tourists and shoppers in the city centre of Amersfoort is not beneficial for the entrepreneurs in this area (Hersbach, 2022). Shops and restaurants face economic threats due to this decreased number of visitors. For example, according to Hersbach (2022), café-restaurant owners in Amersfoort even had to close their establishments due to an extreme heat event. Additionally, the attractiveness is decreased by a number of unoccupied buildings in the city centre.

One solution that has been proposed to deal with the effects of climate change in the city of Amersfoort is the greening of the city centre. Previous research has shown that the greening of a city centre can decrease the temperature by 5-7°C in tree-shade (Armson et al., 2012). Placing trees and plants is also beneficial for the disposal of excess water after heavy rainfalls (Van Ekeren et al., 2024). A review by Venhari et al. (2017) concluded that vegetated areas, especially areas with trees, could make the microclimate more comfortable for people. This is realised by shading, as well as by increased evapotranspiration. A more pleasurable perceived temperature and improved water management can positively influence the number of visitors, tourists and shoppers in the city centre of Amersfoort. Thus, the city centre can become not only a place to buy but also to spend time.

This project will research the costs and benefits of possible strategies for greening the city centre on behalf of the entrepreneur's association 'Ondernemers Binnenstad Amersfoort' (OBA), which represents the interests of the entrepreneurs in Amersfoort. This will be done using a social cost-benefit analysis (hereafter: CBA). The focus will be on solutions that can tackle heat stress and lack of greening, which will increase the number of physical shoppers.

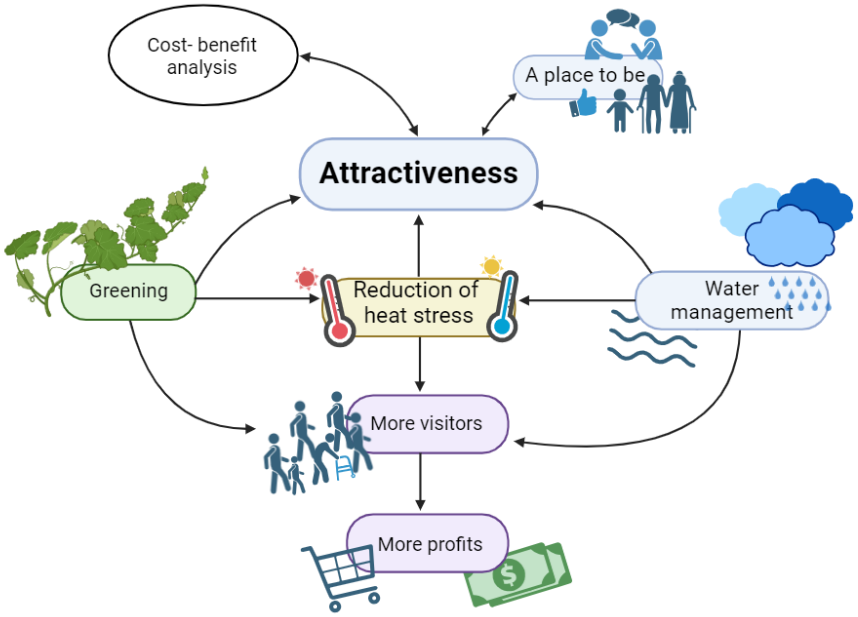


Figure 1 A graphical overview of the background and context of this project, focusing on the CBA of greening the Kamp in Amersfoort

1.3 Social benefits of greening

The entrepreneurs in an area are directly affected by changes in the environment they are located in. There are several benefits or costs that these changes can bring to the entrepreneurs.
First, a review by Lee and Maheswaran (2011) shows that both children and adults use green spaces for leisure-time physical activities more often when access is more convenient and easier. The authors also stated that good access to attractive green spaces increases the likelihood of people using those green spaces. Another study found that access to attractive, large public open spaces is associated with higher levels of walking (Giles-Corti et al., 2005). Additionally, Schetke et al. (2016) found that the main reason for visiting green spaces is walking and spending time with friends. Assuming that most people visiting a city centre are pedestrians and cyclists who are there for shopping reasons or because they want to spend time with family and friends, one can say that a greener city centre attracts more people. This leads to more customers for the entrepreneurs and restaurants in the city centre.

Second, Nicholls and Alexander (2007) found that one of the main factors that limit the quality of life in Europe is heat stress because of local climate conditions. However, several green solutions can mitigate heat stress, especially in urban environments (Li et al., 2005). Examples of green solutions are city parks, rooftop gardens and vertical greening on buildings. Moreover, according to a study on the heat coping mechanisms of elderly people, these elderly people would visit green spaces if they provide shade, are cooler than their own homes and are easily accessible(Arnberger et al., 2017). Although this study was only conducted on elderly people, this may also apply to younger people. Based on the above findings, one can assume that greening the city centre can decrease heat stress and therefore attract more people. This can result in more customers for the shops and restaurants.

Third, research by Lottrup et al. (2013) suggests that the workplace outdoor environment is an asset for the well-being and stress levels of employees. Decreased stress levels also decrease sick leave and stress-related healthcare costs. Additionally, research by Samaranayake and De Silva (2010) showed that employees believe their performances improved after the implementation of a green workplace environment. Additionally, they perceived that their absence rate was reduced after implementing a green working environment. This all leads to increased profits for the company.
All in all, there are several benefits for the stakeholders in The Kamp regarding the implementation of a greening plan.

PROJECT DESCRIPTION

2. Project Description

2.1 Study Area

Figure 2 A map of the city of Amersfoort, where the focus area of this project is highlighted with a higher colour intensity. The focus area of the previous project (Van Ekeren et al., 2024) is indicated with a lower colour intensity . The parts in the map with a grey overlay are not the focus area.

The study area of this project encompasses a street in the city centre of Amersfoort namely the Kamp, from the Kamperbinnenpoort until the roundabout with the artwork "De Stier". Furthermore, it includes the following side streets: Coninckstraat, Kreupelstraat, Grote Sint Jansstraat, and Oliesteeg, all until the first intersection.

2.2 Purpose of the study

Shop owners in the city centre of Amersfoort noticed a shift from physical to online shopping, so the Entrepreneurs Association of Amersfoort (OBA) aims to transform the city centre, and the Kamp in particular. The OBA's goal for the Kamp is to make it a place to be as well as a place to buy by improving its attractiveness with green infrastructure. Currently, there is little insight into the costs and benefits that can be expected from greening the Kamp.
The purpose of this research is to provide an overview of the costs and benefits of the greening plan of the Kamp main street and side streets in the area between the 'Kamperbinnenpoort' and the former 'Kamperbuitenpoort.' The CBA for greening the city centre will provide the shop owners, the municipality and other stakeholders with an insight into the benefits of implementing the greening plan.

2.3 Problem statement

2.3.1 Context

The main street Kamp and side streets in the area between the 'Kamperbinnenpoort' and the former 'Kamperbuitenpoort' are currently heavily used by traffic. This intensive use combined with a subsurface designed primarily for traffic objectives presents significant challenges for greening and proper water management (De Jong, 2024). Simultaneously, a shift from offline to online shopping was observed by the shop owners, which increased during the COVID-19 pandemic (Centraal Bureau voor de Statistiek, 2018). To combat this trend, shop owners call for a transformation of the city, so it becomes a place to be besides a place to buy. This can be done by making the city centre more attractive for visitors; a proposed solution has been to implement greening (De Jong, 2024). The existing infrastructure and the costs associated with redevelopment complicate the implementation of effective greening and water management solutions in the area.

However, when redevelopment is planned in several places within the city centre it creates an opportunity to redesign the area as a whole.

2.3.2. Problem overview

The content and scope of this project can be described as follows:

- Impact: The city of Amersfoort has been experiencing environmental issues such as heat stress and urban flooding. These issues are expected to increase in frequency or intensity in the future as a consequence of climate change. The issues will have increased negative effects on the residents and the city centre's attractiveness for visitors and businesses.
- Evidence: In comparable Dutch cities (such as Zwolle) redevelopment projects proved to be successful in providing social, economic and environmental benefits by integrating green spaces (Gemeente Zwolle, n.d.; Kennisportaal Klimaatadaptatie, n.d.; RIVM, 2021).
- Scope: The focus of this research will be on the Kamp main street and its side streets within the 'Kamperbinnenpoort' and 'Kamperbuitenpoort' areas. The study aims to evaluate the costs and benefits of greening these specific locations.
- Desired outcome: The goal is to conduct a comprehensive social CBA for the greening of the Kamp and its side streets. Our analysis will provide stakeholders with the necessary data to make informed investment decisions, ultimately leading to a more attractive city centre and improving visitors and profits.

2.4 Stakeholder analysis

A comprehensive stakeholder analysis resulted in the following most important. The full list of stakeholder descriptions can be found in the appendix B .

- Municipality of Amersfoort
- Ondernemersvereniging Binnenstad Amersfoort (OBA, association of entrepreneurs in the city centre)
- Entrepreneurs in the area
- Shoppers
- Tourists
- Residents
- NGOs
- Waterboard 'Vallei en Veluwe'
- Owners of underground infrastructure

Based on the description and roles, all the stakeholders were placed in a power-interest matrix (figure 3).

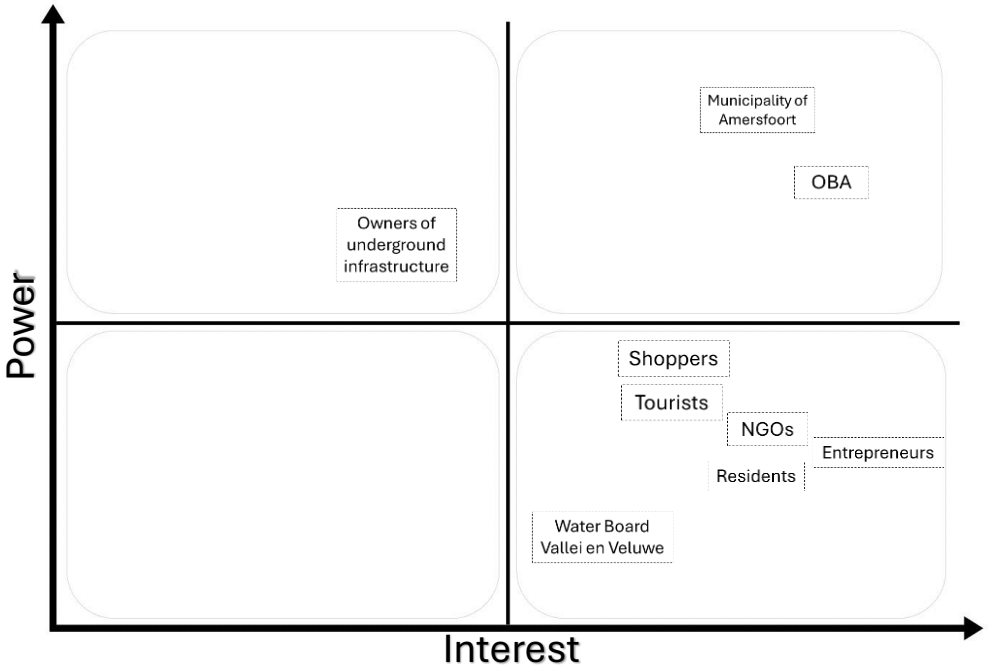


Figure 3 Power vs. Interest matrix for stakeholder analysis

Thereafter, stakeholder groups and relationships were identified using an onion diagram (figure 4). The concentric circles represent spheres of influence or power, with the innermost circle representing the highest influence. Two stakeholder groups were identified: (1) Businesses in the area, which includes entrepreneurs and their association OBA and (2) Shoppers and tourists, which have similar interests and can overlap, shoppers can be tourists and tourists can be shoppers. Apart from shoppers and tourists, all the other stakeholders seem to be connected to the municipality as most of them comprise of people residing in Amersfoort. Stakeholders that are expected to have low influence or power in this project were not included since this report does not provide a concrete plan but only presents an overview of expected costs and benefits.

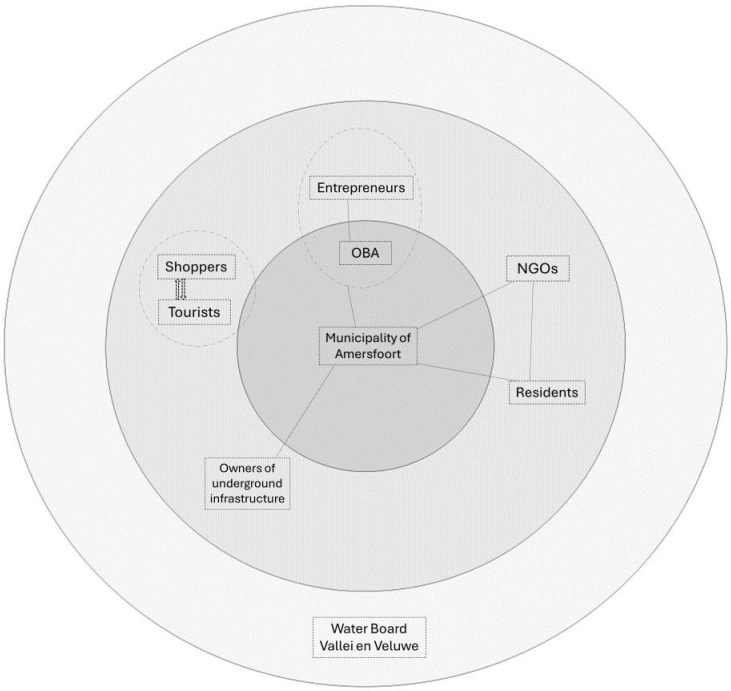


Figure 4 Stakeholder groups and relationships

2.5 Research Questions

Following the problem definition and purpose, a general research question (RQ) and four subquestions (SQ) have been developed:

RQ: How can greening strategies be implemented in the Kamp to enhance its attractiveness, mitigate heat stress, and improve water management, based on a social cost-benefit analysis?

SQ1: What are the attitudes of different stakeholders towards greening the Kamp?

SQ2: Which greening strategies can be implemented in the Kamp to increase attractiveness?

SQ3: What are the effects of greening the Kamp on heat stress and water management?

SQ4: What are the expected costs and benefits of implementing the greening strategies in the Kamp?

METHODOLOGY

3. Methodology

3.1 Social perspectives

3.1.1 Motivation for selection of social methods

At the moment, stakeholder participation and user involvement in the physical design audit and planning standards are often absent (Evans, 2009). For example, this can mean that the users of a street are not sufficiently involved in making the space accessible to everyone. It was considered important to include the perception and opinion of both the entrepreneurs of shops located in the street and of people visiting the city centre of Amersfoort. This provided a more complete overview of what visitors and entrepreneurs perceived as costs and opportunities regarding the greening of the Kamp. Including the opinions, needs, wishes and perspectives of the entrepreneurs was also beneficial for the support of the entrepreneurs in the project. It can be expected that the entrepreneurs are more likely to support the project if they feel that their opinions are heard (Turnhout & Elands, 2009).

One way to involve stakeholders in the process of greening The Kamp is by asking for their opinions, needs, wishes and perspectives. An example of how to do this is by interviewing entrepreneurs about this subject. The main reason we decided to do interviews is because of the depth and detail that can be achieved. The flexible nature of an interview can help in filtering the important parts for the particular interviewee. Interviews also provide the option for clarification if questions are unclear.

Involving entrepreneurs in the greening process

To gain insight into the social perspectives playing a role in the Kamp, interviews were held with 14 entrepreneurs and with a representative of the municipality, and a questionnaire was distributed to visitors and inhabitants of the Kamp and Amersfoort in general. These stakeholders were selected based on their importance considering either the need for their cooperation, their input or their diversity of perspectives. The entrepreneurs were considered important because their support was needed for the eventual implementation of a greening plan. This requires their participation in the development process of plans for greening the Kamp. The entrepreneurs were interviewed since this method can provide deep insights into and understanding of the interviewees' ideas, needs, and values. Other important stakeholders are the Kamp's visitors, residents, tourists, and shoppers since they provide income for the entrepreneurs. Insight into their opinions, views and perceptions is gained via a questionnaire since this method can provide a broader overview for larger quantities of people.

Interviews

As mentioned above, getting insights into the perceptions, needs and opinions of the stakeholders was beneficial for the greening project in The Kamp. An effective method to gain these insights is by conducting interviews with the entrepreneurs. According to Fontana and Frey (2005) unstructured or semi-structured interview attempts to understand the complex behaviour of members of society without imposing any a priori categorisation that may limit the field of inquiry. Likewise, Adeoye - Olatunde and Olenik (2021) consider it beneficial that semi-structured interviews enable interviews to be focused while still giving the investigator the autonomy to explore pertinent ideas that may come up in the course of the interview, enhancing the investigator's understanding of the subject. They further add that this method should be used when the researcher's goal is to better understand the respondents' unique perspectives rather than a generalised understanding of a phenomenon.

Therefore, semi-structured interviews were selected as a method, as they provided a setting in which we could ask about the subjects of interest. Simultaneously, we could elaborate on subjects that the entrepreneurs considered important and it allowed the entrepreneurs to bring in new subjects that we as researchers did not think of yet. By combining the results of the interviews, the individual experiences provided an overview of the entrepreneurs' perception of the greening of The Kamp.

Furthermore, involvement in and social support for the greening project in The Kamp were created by getting to know the opinions, needs and views of the entrepreneurs. In their research into

social support and involvement in nature policy,Turnhout and Elands (2009) argue that social support is created by actively involving people in the development process. When entrepreneurs are involved, they are more likely to participate in the greening process and are more likely willing to contribute to, for example, the maintenance of the green spaces. It can also avoid the social costs of angry entrepreneurs, who perharps do not feel heard and who lose trust in the municipality.

All in all, the semi-structured interviews can help create social support for the project, unveil unforeseen risks and challenges and create a more complete view of the entrepreneurs on a greening plan.

Involving other stakeholders by using a questionnaire

Another important group of stakeholders in the greening plan were the visitors, tourists, residents and shoppers that use the Kamp. It was therefore also important to get to know the opinions, perceptions and needs of the visitors, tourists, residents and shoppers. Although interviews would provide more in-depht insights from this group too, the attitudes of this group were analysed using a questionnaire. This was due to the time constraints and lack of researchers that can interview within this project. According to Patten (2016), questionnaires provide a more efficient way to collect data. This was beneficial because of the large study population in this case. The author also mentioned that questionnaires provide data that is easy to analyse. This is why we chose to conduct a questionnaire for this stakeholder group.

Data triangulation

Combining the data from the interviews and the questionnaire, so called data triangulation, enhances the reliability and validity of the collected data (Carter et al., 2014). When different groups, researched using different methods, mention the same perceptions, needs and opinions, it is more likely to be the overall sentiment in the population.

We used data triangulation with interviews and questionnaires to gain insights into the perceptions, needs and opinions of both entrepreneurs and tourists, visitors, residents and shoppers. This created an all-encompassing view of what these people considered the costs and benefits of greening the Kamp and what they considered to be the costs and benefits of the current situation in the Kamp. Additionally, using these methods could enhance the social support for this project, since hearing the perceptions, needs and opinions of the stakeholders created involvement in the project.

3.1.2 Set up of interviews and questionnaire

To answer the first research subquestion (SQ1) interviews and questionnaires were conducted. The mixed methods created data triangulation which gave a holistic insight into the different stakeholders' perspectives on the greening of The Kamp in Amersfoort and reduced bias.

Interviews

The relatively small stakeholder group of entrepreneurs in The Kamp allowed for semi-structured interviews as the most convenient research method to gain insight into their perspective. During the interviews, an interview guide was used (appendix F). At first, 20 entrepreneurs were contacted via email to schedule an interview. When not enough people responded, more entrepreneurs were contacted. This still did not lead to enough responses. As a result, a visit to Amersfoort was planned to directly approach all the entrepreneurs that were open in that moment, which immediately resulted in seven interviews being held on that day. When the entrepreneurs accepted the invitation for an interview, consent was given through reading the consent letter (appendix H) and filling in an online consent form.

During the visit to Amersfoort, many appointments for interviews through telephone call were made as well. These were conducted in the following week. When the entrepreneurs were not available for a phone call in the end, the list with interview questions was sent via email to be filled in. During the phone calls consent was given orally to use the provided information. Entrepreneurs who filled in the list of questions via e-mail gave consent for using their information by sending their answers, which was stated in the document with questions that were sent (appendix I). The interviews were held with two or three researchers of whom one was taking notes. These notes were analysed by categorising the given answers in a shared Microsoft Excel sheet, providing an overview.

Questionnaire

To explore the perspectives of citizens, visitors, residents, and shoppers about greening the Kamp, a questionnaire was administered using Microsoft Forms. The questionnaire gave insight into their needs and wishes for the Kamp, opinions about the current situation in the Kamp and the role of greening in the attractiveness of the Kamp. The questionnaire can be found in appendix G. The sample was based on convenience sampling and snowball sampling, using the network of the researchers and the acquaintances of the entrepreneurs. The questionnaire in Microsoft Forms automatically generates a data file, graphs and figures.

3.2 Greening strategies

To calculate the cost and benefit of greening strategies in the Kamp, Amersfoort, we created a design for the greening plan because the current designs available applied to other streets. We used this design as the basis for the cost-benefit calculations. To create the design, we conducted literature research, interviews, and set up a questionnaire (figure 5).

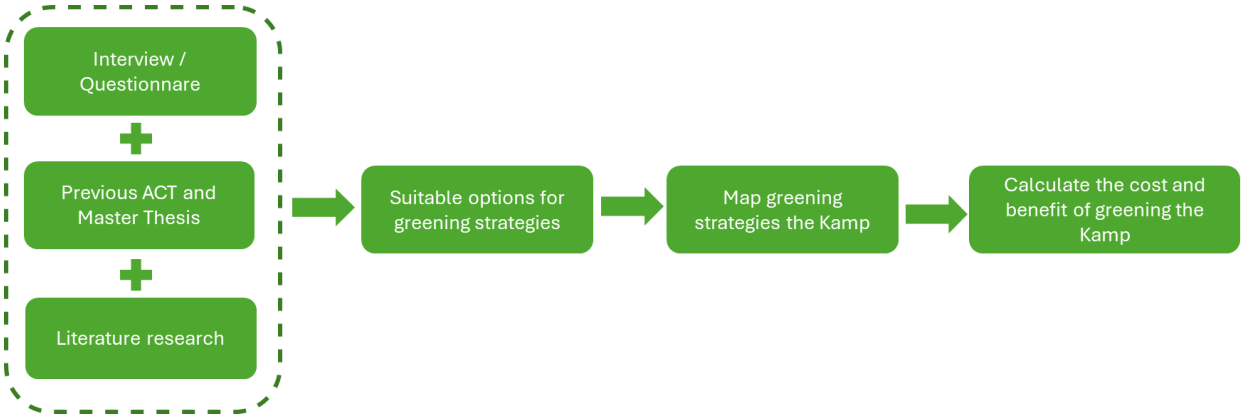


Figure 55 Framework for designing greening strategies map

For the literature research, we analysed the green strategies that had been researched and described in previous ACT projects (Van Ekeren et al., 2024) and master's thesis (Hersbach, 2022) , since these also regarded the city centre of Amersfoort. We made a list of these greening strategies and used Google Search and Google Scholar for information regarding the benefits, requirements, and limitations of each greening strategy. Consequently, the greening strategies for the Kamp were selected from this list.

Furthermore, we visited the Kamp to assess the current conditions, especially regarding the location and state of the current greenery: existing trees, plants, and other greening elements. After that, we used Google Earth to measure the street size, building distribution, and the availability of space. From this step, a physical map was created by placing possible green elements that were selected from the literature research in different locations. We tried out several distributions of green strategies and specific locations before coming to a final design for the CBA. Finally, the physical map with greening strategies was digitalised. This greening proposal is described in section 4.3: Greening strategies.

3.3 Heat stress & water management

3.3.1 General description

The costs and benefits used in this CBA consisted of different environmental aspects. The environmental aspects considered were heat stress and water management within the Kamp and adjacent streets.
In order to improve the heat stress and water management within the Kamp, a plan for redeveloping the study area was created. This was mainly done with a focus on improving the aesthetic appeal to attract more people to and to improve the heat stress and water management within the area. Redesigning the area was done by implementing different greening strategies,

which can be found in chapter 3.3 and appendix E. For determining the heat stress and water management within the study area two different toolboxes were used. The first toolbox named 'Climate resilient city toolbox' developed by Deltares (Voorhoede, n.d) was used to determine the changes with respect to water management and air temperature within the study area when the redesign of the area were to be implemented. The second toolbox used in this study was the 'Heat stress tool' developed by Nelen & Schuurmans (Nelen & Schuurmans, 2024). This tool was mainly used to analyse the differences in the physiological equivalent temperature (PET) when the greening strategies were implemented compared to the situation before the redesign of the area.

3.3.2 Climate resilient city toolbox

The climate resilient city toolbox was used to assess the changes in water management and temperature caused by the greening strategies within the study area. First, the study area was defined in the toolbox (figure 6). Second, characteristics about the study area were set (table 1). Then all greening strategies were drawn into the map according to the study area design (see chapter 4.3). Since not all greening strategies were present in the toolbox, some strategies were incorporated into other measures available in the toolbox. The measures used in the toolbox were 'trees' for the suggested trees in the area redesign, ditches, 'green facades' for the green facades, 'green roofs' for the green roofs, 'city forests' for parks within the city, 'semi-permeable pavement' for parking spaces (goods deliveries), 'creation of shadow' for pergolas and greening for façade gardens, planters and flowers. For all measures the defined water bearing capacity was adjusted to the available water bearing capacity of the soil below the study area (Kaarten | Atlas natuurlijk kapitaal, n.d). For all other possible parameters, the default value as given in the toolbox was used.

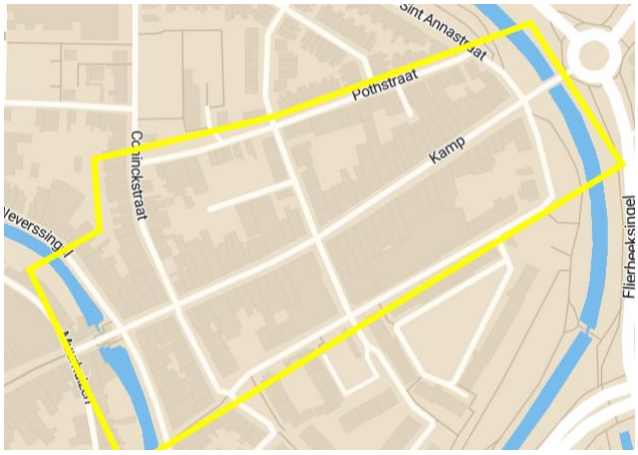


Figure 66 Study area as defined in the Climate resilient city toolbox

Table 1 Study area characteristics

Neighbourhood type	High Netherlands – Historical city centre
Climate adaptation goals	• Heat stress • Droughts • Flooding
Importance of multi-functional land-use	Limited importance
Scale level	• City • Neighbourhood • Street
Present types of land-use	• Grey – Paved surfaces • Red – Buildings • Blue – Water
Available space in soil	Low
Roof types	Roofs with slopes larger than 35 degrees
Soil type	Sand
Position in landscape	High Netherlands flat area

3.3.3 Heat stress tool

The 'hittestress tool' is a tool developed by Nelen & Schuurmans and calculates the PET values for a defined area and implemented measures given by the user of the tool. The tool contains multiple options that may influence the PET values of the area. Examples of measures that users can implement are the addition of trees, grass and bushes, and a change in surfaces (for instance pavement, semi-permeable pavement and water bodies). The greening strategies as described in chapter 4.3 of the report were drawn into the tool, which were the same strategies as for the climate resilient city toolbox. Similarly, not all the greening strategies suggested in this report were available measures to implement in the heat stress tool. Therefore, some of the used greening strategies in this report were incorporated into other measures available in the heat stress tool. The measures used in the toolbox were 'bushes' for the suggested green façades, façade gardens, green pergolas and planters in the redesign of the area, 'trees' for the trees and 'grass' for the suggested green roofs. When all the measures were drawn into the map, the study area was selected after which a report and maps were generated to visualise and describe the changes in PET values before and after the implementation of the greening strategies.

3.4 Social cost-benefit analysis

To investigate the economic viability of greening the Kamp, a comprehensive CBA was conducted based on the proposed greening strategies. A CBA can give important insights into monetary and social costs and benefits, thus playing a vital role in decision-making processes.

3.4.1 Costs of greening

Based on the measures implemented in the climate resilient city toolbox and the input parameter values for the measures used in the toolbox (chapter 3.2.2), the toolbox automatically calculated the construction costs and maintenance costs of the greening strategies (Voorhoede, n.d). The construction and maintenance costs were based on the documentation that was given by for the climate resilient city toolbox by Deltares (Tables construction and maintenance cost (Dutch prices) - Climate Resilient City Tool - Deltares Public Wiki, n.d). In this table the minimum, maximum and average construction costs per green strategy are given, together with the maintenance costs based on the construction costs. For each greening strategy, elaborate explanations were provided on how the construction and maintenance costs were derived, supported with literature that was used to establish the values used for each of the strategies (table 2).

Table 2 Construction & Maintenance costs of proposed greening strategies

Greening strategy	Area (m^2)	Construction (€)	Maintenance (€/year)
Trees	1347	15,688	5
Water ditch	317	47,686	353
City parks	1800	1,800	90
Semi-permeable pavement	237	23,742	100
Pergolas	119	19,885	1,076
Flower beds, façade gardens, planters	774	21,288	775
Green façade	49	14,710	1,471
Green roof	1475	147,549	8,853
Total		**321,858**	**12,723**

3.4.2 Benefits of greening

The benefits of greening the Kamp were listed using the ecosystem services framework. The ecosystem services framework is based on the concept of dependency of human well-being on the ecosystem we live in. It focuses on social and economic benefits that humans can obtain from the ecosystem they reside in (Matzdorf & Meyer, 2014). To be able to monetise these benefits,

indicators for monetisation were created. An overview of the measures, effects, quantification and monetisation was provided in an effect tree (FIGURE 7-10). The benefits were monetised using the TEEB City Tool, 2019 (Does et al., 2019).

Effect tree

For the quantification and monetisation of services and disservices of greening strategies in the study area, an effect tree was used. Initially, all the effects were listed and categorised into four aspects: water aspects, climate/atmospheric aspects, social aspects and business aspects. For every effect, a quantification was listed, after which it was linked to a monetisation indicator (Figure 7 to 10). Positive effects or services are displayed in green while negative effects or disservices are displayed in red.

Effects in water aspects

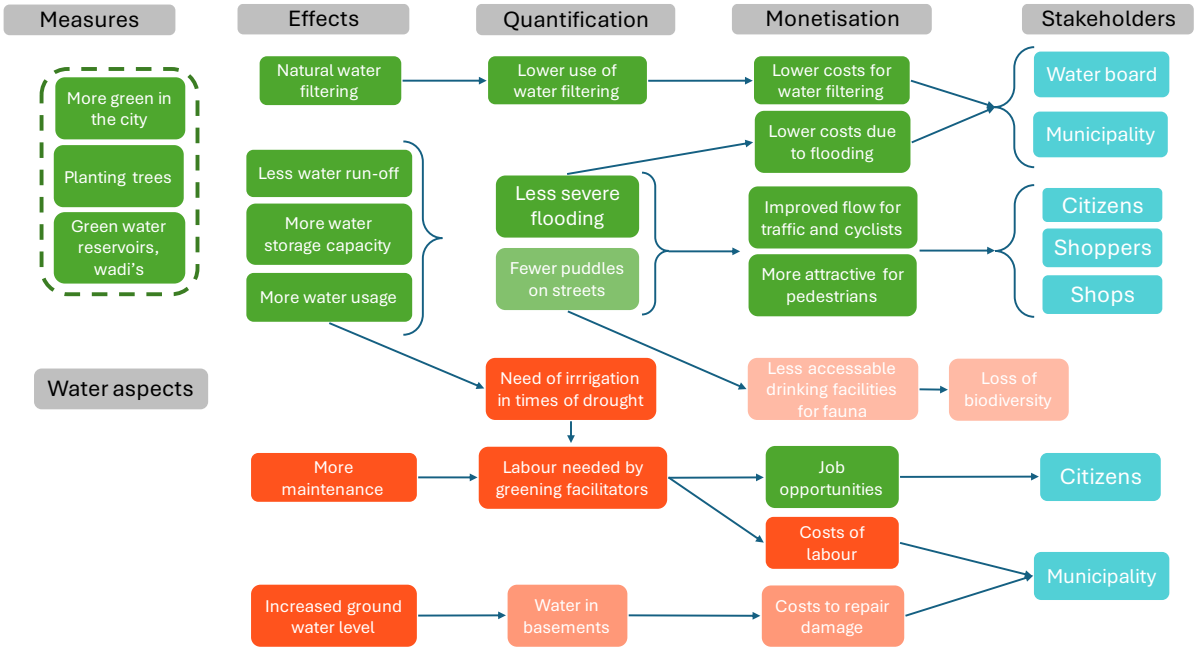


Figure 7 Effect tree for water aspects

Increase in water storage capacity

With the increase of open soil, the infiltration capacity of the street will increase. This will lead to an increase in the water storage capacity of the street, which will lower the probability of flooding (Liu et al., 2014) in the Kamp. Also, fewer puddles due to infiltration would make it convenient for pedestrians and improve the traffic flow. This will be a benefit for shoppers, visitors, and residents. For the municipality and the water board it will reduce the costs of urban flooding. However, the newly planted greens will require more water and maintenance during extremely dry periods, costing money and labour.

Natural filtering

With increased infiltration, more water will seep into the soil, decreasing the stress on the sewage system (Liu et al., 2014). This means less water to process in the water treatment facility, reducing costs for the municipality and water board.

Effects in atmospheric aspects

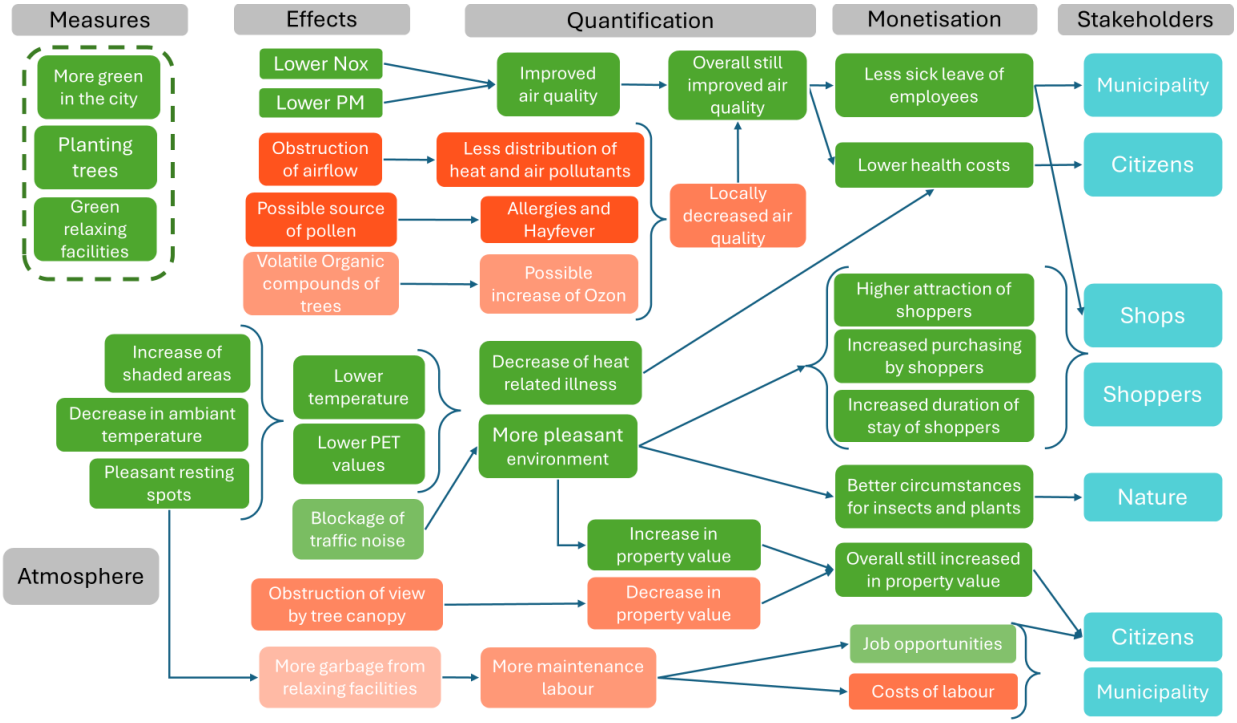


Figure 8 Effect tree for atmospheric aspects

Air quality

More plants in the area will slightly improve local air quality by absorbing Particulate Matter (PM) as well as NO_x (Nitrogen oxides, NO and NO_2), which are known to have adverse effects on human health (Nowak et al., 2006). This decreases health care costs for residents, shop-owners, and the municipality. However, there is a possibility that plants will seasonally release pollen and cause allergic reaction. Also, Volatile Organic Carbons (VOCs) emitted by plants can cause an increase in tropospheric ozone. This has the potential to slightly decrease air quality, increasing health care costs (Leung et al., 2011). Nevertheless, the presence of plants is still expected to improve the overall air quality.

Heat stress

The presence of trees and plants is known to decrease the local air temperature in summer due to e.g. shade. This is results in alleviating the heat stress perceived by humans on relatively warm days. The decrease in the perceived temperature by humans will lead to a decrease in heat-related illnesses (Bowler et al., 2010), thus reducing health costs for both the residents and the municipality. A decrease in air temperature in summer will also increase the attractiveness of the street for shoppers (Lehnert et al., 2021). This will attract more visitors and shoppers, increasing revenue for shop owners. Decreased heat stress is also instrumental in supporting biodiversity (Solecki & Marcotullio, 2013).

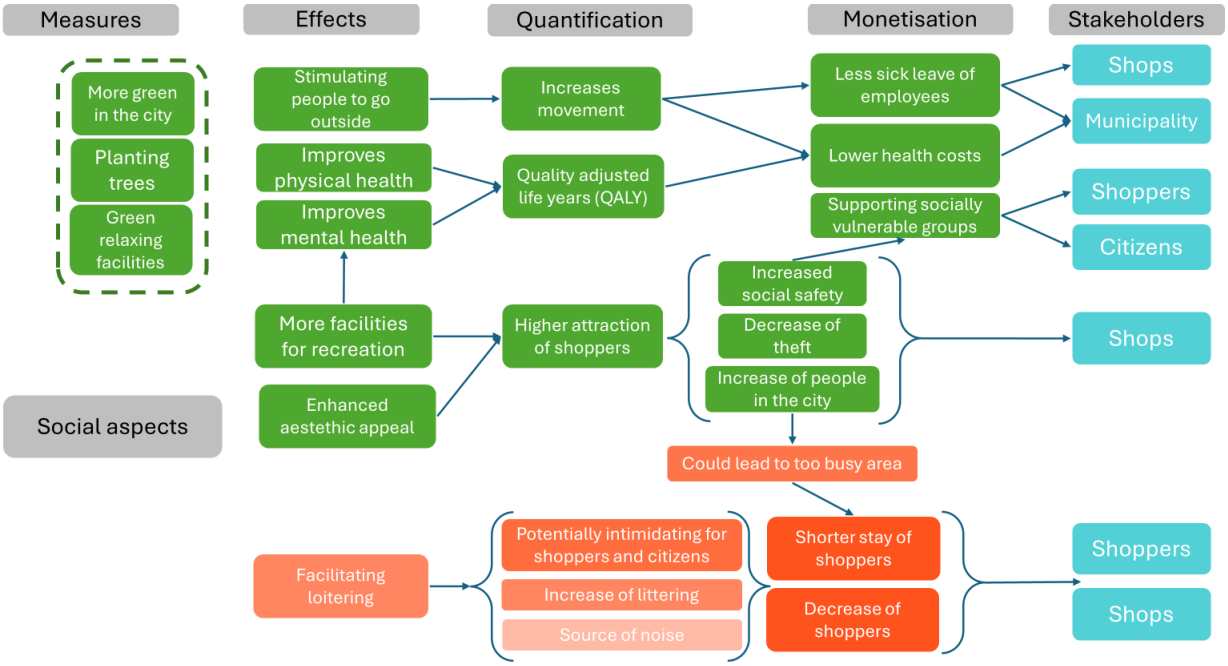


Figure 9 Effect tree for social aspects

Effects in social aspects

Green spaces in cities are known to improve the overall mental and physical health of the residents. Street greening facilitates recreation and recovery from stress. It stimulates people to go outside and thus improves both their mental and physical health(Hunter et al., 2019). This leads to reduced overall health costs for residents and municipality. Greenery in the street increases the attractiveness of the street, thus making it a place to be, attracting more visitors and shoppers (Arnberger, 2012). It also increases social safety (Hunter et al., 2019). However, street trees and bushes can also be ideal places for loitering youth, making it less attractive and decreasing perceived safety.

Effects in business aspects

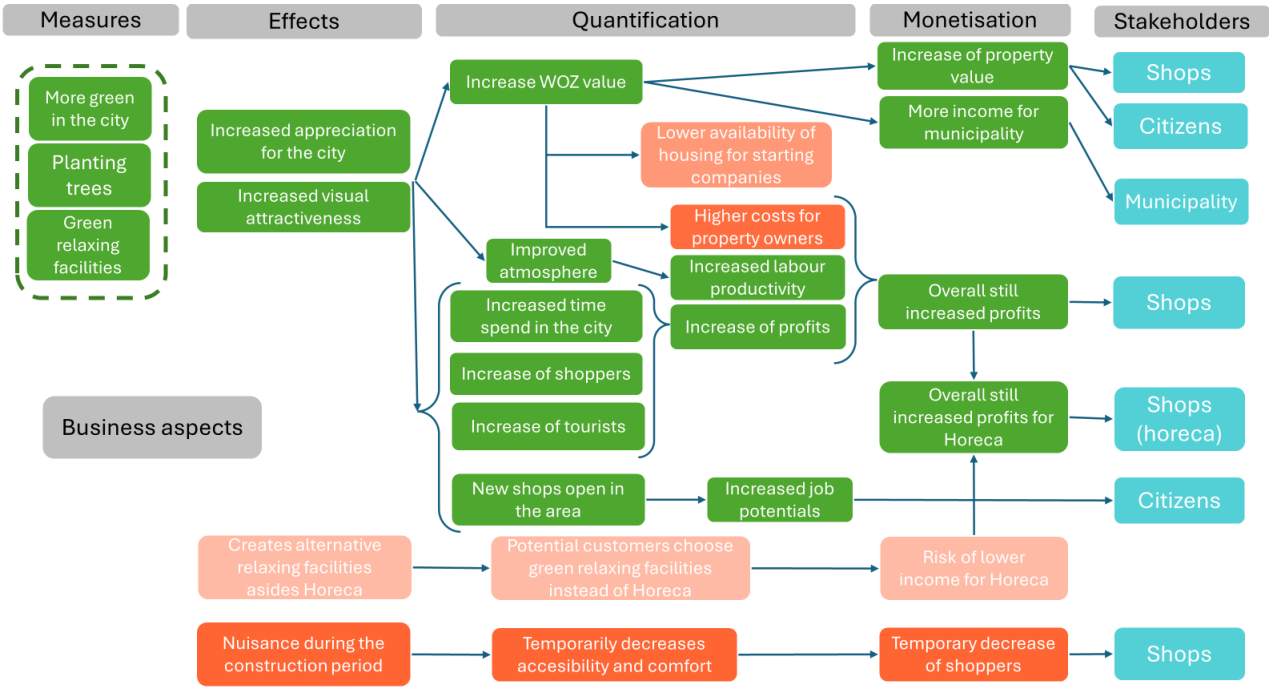


Figure 10 Effect tree for business aspects

More visitors due to an attractive street

Overall, all the green interventions will increase attractiveness of the street, attracting more tourists and visitors. More visitors will mean profits for restaurants and other shop owners (Witteven & Bos, 2012). This will improvement the economy in the study area.

Increased WOZ value

The increase in greening will increase the real estate value of the shops and homes in the area (Teo et al., 2023). This leads to an increase in tax income for municipality. It will also be beneficial for residents who already own property in the area as it will increase the value of their holdings. This can lead to higher tax in proportion to the increased value of the house for the residents, but the overall effect will be positive, as the increase in tax is usually in proportion with the increase in property value. However, the increased WOZ value can make the houses in the area less affordable for the people with a lower income.

Valuation of benefits

The indicators of the benefits were identified from the effect tree. The TEEB City Tool, 2019 was used for the monetisation of the identified benefits. The TEEB City Tool was developed in 2013, based on The Economics of Ecosystems and Biodiversity initiative. This initiative tries to quantify and monetise the services and disservices offered by ecosystems. The TEEB City Tool was made specifically for cities by the Dutch government in collaboration with various municipalities.
The indicators that were selected for monetisation and the corresponding monetary values are shown in table 3.

Table 3 Indicators identified for valuation

Aspects	Benefits	Monetary value (EUR/year)
Water Aspects	Avoided flooding costs	No Impact
	Avoided drought costs	Undetermined
	Avoided water purification costs	872.04
Atmospheric Aspects	Air quality benefits	2111.20
	Avoided cost of consumed gas	569.10
	Avoided cost of CO2 emissions	49.39
Social Aspects	Avoided health costs	755.50
	Recreational benefits	2226
Business Aspects	Increase in tax income	3305.24
	Increase in property value (one-time)	2,747,500
	Profits for shop owners	5%
	Labor productivity	Up to 15%

Water aspects

Avoided flooding costs

According to the TEEB City tool that was used for valuation of ecosystem services, areas within the dikes have very low chances of flooding. Therefore, the positive effect of urban vegetation on reduced flooding risk is negligible, especially considering the small area that we are converting to green. Thus, the monetisation was not included in the final calculations.

Avoided drought costs

Water percolation replenishes the ground water in the area, which can aid in the times of drought. However, the avoided costs for that cannot be determined as the possibility of drought in Amersfoort is uncertain.

Avoided purification costs

As water percolates into the soil, it does not end up in the sewage system. This means that the municipality avoids water treatment costs. The Climate Resilient Cities tool, that was used to calculate construction and maintenance costs, also calculated the water retention capacity of the proposed greening measures. The amount water that can be retained by the proposed measures was 1,014 m^3/year. According to the TEEB City Tool, the inflation corrected avoided cost of sewage treatment is €0.86/m^3. Thus, the total avoided cost of purification per year would be €872.40/year.

Atmospheric aspects

Reduced health costs due to air quality

The reduced health care costs due to improvement in air quality were calculated for three air pollutants: PM10 (Particulate Matter with diameter less than 10 µm), NO_x (nitrogen oxides) and tropospheric O_3 (ozone). The concentrations of these pollutants in the air were retrieved from Atlas leefomgeving (n.d). The proposed vegetation was divided into three types: green roofs, trees & city parks, and ground vegetation including grasses & bushes. Retention capacity of all the pollutants was calculated for the three vegetation types, as suggested in the TEEB City Tool (table 4). Using the health costs saved per kg of pollutant, total reduced health costs from improved air quality were calculated (table 5).

Table 4 Table showing calculated total retention capacity of all three vegetation types for different pollutants

	PM10 (kg/year)	**NO_x (kg/year)**	**O_3 (kg/year)**
Green roofs	1.42	3.49	27.21
Trees & city parks	6.06	6.55	54.19
Ground vegetation	0.74	1.83	14.28
Total	**8.22**	**11.88**	**95.68**

Table 5 Table showing calculated total costs saved for three different pollutants

	Total retained (kg/year)	**Rate per kg (€/kg)**	**Total costs saved (€/year)**
PM10	8.22	156.58	1287.68
NO_x	11.88	35.18	417.84
O_3	95.68	4.24	405.67
Total			**2111.20**

Saved heating & cooling costs

The heating and cooling effects by improved insulation by green roofs was quantified as saved gas costs. According to the TEEB City Tool, total gas saved was on average 0.29 m^3/m^2/year. Using this value for our estimated area of 1476 m^2 led to total gas savings of 428 m^3/year. Using the current rate of gas of 1.33 €/m^3, total saved costs of gas were calculated as €569.10 per year.

Saved cost of carbon emissions due to saving of gas

Total gas saved per year from the previous indicator was used to calculate prevented carbon emissions (852 kg/year. This was multiplied by the current cost of carbon (0.058 €/kg) to obtain cost of prevented emissions, totalling €49.83 year.

Social aspects

Avoided health care costs

The avoided health costs were calculated following the TEEB City Tool. By considering the number of houses, the average number of residents per household, the increase in green, the annual amount of avoided health care costs per patient per year and various coefficients from the TEEB City Tool, we calculated that the total avoided heath care costs are €755/year.

Recreational benefits

For recreational benefits, the monetisation was based on willingness to pay. According to the TEEB City Tool, the willingness of visitors to pay for urban greenery was €1/visit. A similar study in Amsterdam (Bos & Vogelzang, 2018) concluded that the increased number of visitors because of greening is 4000/ha/year. Based on our area of proposed greening, the total benefits amount to 2226 €/year.

Business aspects

Increased property values

According to the TEEB City Tool, the increase in WOZ value of a property due to greening is 5%. This was used to calculate the new property values. We assumed that there were 157 properties in the area based on Google Maps. To stay on the conservative side, it was assumed that the average value of one property was €350,000. Thus, the total increase in property values would be €2,747,500. This was considered a one-time benefit, not annual.

Increase in taxes due to increased property value

Tax rates for WOZ values were found for 4 categories: commercial property user tax, commercial property owner tax, residential property user tax & residential property owner tax. The values of sewage tax were also classified in these 4 categories. Since the data for residential and commercial properties was not available in the public domain, we made the assumptions mentioned above. For tax values, we used the lowest values to stay conservative: 0.1041% for property tax and 0.0162% for sewage tax (Tarieven gemeentelijke belastingen | Gemeente Amersfoort, n.d). The total yearly increase in tax collection due to greening of the street of the Kamp was calculated to be €3305.24/year

Profits for shop-owners

TEEB City Tool mentions that the increase in profit for shop-owners due to street greening would be 5%. However, since it is not possible to estimate current profit, it is not possible to monetise this indicator.

Labour productivity

The TEEB City Tool also concludes that urban greening increases labour productivity by up to 15%. However, similar to the profit for shop-owners, this can neither be monetised.

3.4.3 Calculation of the CBA

Using the estimated costs and benefits of the greening proposal, a CBA was carried out to estimate the Net Present Value and Benefit-Cost Ratio. The time horizon used was 30 years. The real discount rate was 4.11%, as recommended by the EU (European Comission, 2024). The construction was assumed to be completed in the first year. The benefits were assumed to start from year 2.

The total costs and benefits for every year were listed down (see results section 4.4) as mentioned above. Net benefits (Benefits – Costs) for every year were calculated. Present Values of Cost (PVC), Present Value of Benefits (PVB) and Present Value of Net benefits (PVNB) were calculated for every year correcting it by real discount value. The following formulas were used:

$$PVC = \frac{Cost}{(1+RD)^t}$$

$$PVB = \frac{Benefit}{(1+RD)^t}$$

$$PVNB = \frac{Net\ benefit}{(1+RD)^t}$$

Where RD is the real discount rate and it is the year for which the calculation is being done. Further, the cumulative values of PVC, PVB and PVNB were calculated. The cumulative value of PVNB is also called Net Present Value (NPV). It is an indicator of the profitability of the project. A positive NPV value indicates an economically feasible project. In other words, a positive NPV value shows that the benefits outweigh the costs. Benefit-Cost Ratio (BCR) is another indicator of the economic viability of the project. It is the ratio of cumulative present value of benefits over the time horizon to the cumulative present value of costs. A BCR value greater than 1 is an indication of an economically viable project. Both NPV and BCR were calculated for the time horizon of 30 years.

RESULTS

4. Results

4.1 Interview and questionnaire

4.1.1 Interview results

Information about the shops

The Kamp is one of the oldest streets in Amersfoort and lots of businesses have come and gone over the years. This can also be seen in the range of how long the interviewed businesses have been located at the Kamp: the oldest business we have interviewed had been there for 55 years, whereas two other interviewed businesses were relatively new and had only been there for a year. The average of the businesses age was 12.4 years. Furthermore, most of the interviewed businesses were relatively new: 12 businesses had been there for 1-15 years, whereas there were only 2 businesses older than 20.

Out of all the interviewed businesses, three had a gender-specific target clientele aimed at women. These businesses were women's clothes shops and an art studio. The eleven remaining interviewed businesses did not have a gender-specific target clientele. Only two of the interviewed businesses mentioned that they had many visitors from window shopping (visiting shops without a specific goal) next to targeted clientele. The twelve remaining businesses mentioned that they mostly had targeted clientele, despite occasional window shoppers. Regarding age, half of the interviewed businesses had an age-specific target clientele, whereas the other half did not (figure 11) The interviewed businesses with a specific target customer age range covered almost all age range classes, with the range of 40-50 years being the most occurring in the target clientele age range.

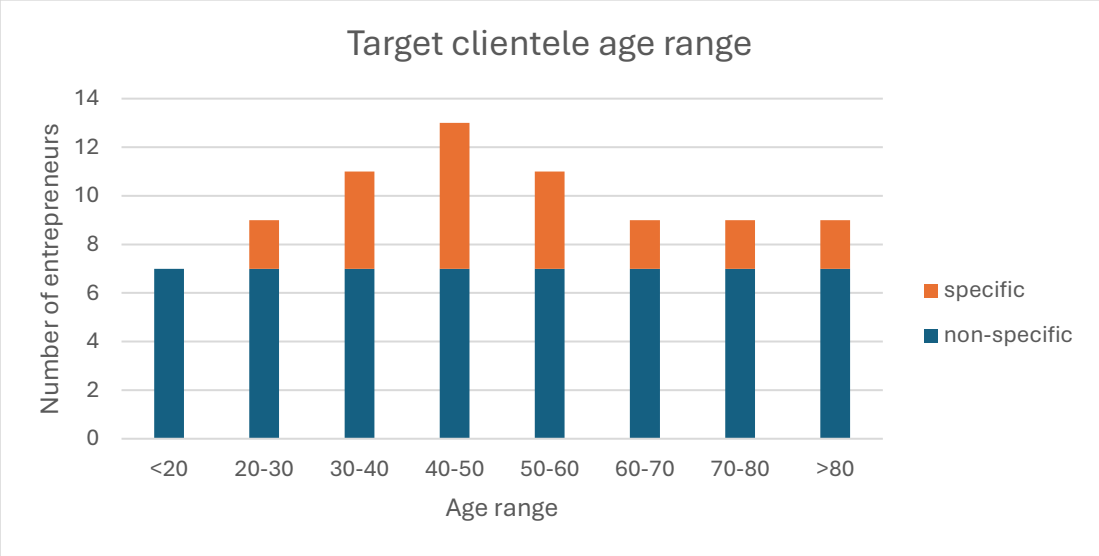


Figure 11 Target clientele age range plotted to age-specific clientele and non age-specific clientele

The duration of customer visits varied amongst interviewed businesses, with the largest group being 6 businesses with long visits, the two second largest groups with either moderate or short visits with 4 businesses, and lastly, one shop without visits. It is important to note that the sample size here is n=15, since there was one business for which we regarded the shop and its organised activities as separate, with differing visit durations. The interviewed businesses also varied in the minimum visitor income class, with 5 shops focusing on the high, 6 shops on the medium, and 3 shops on the low-income class.

Finally, the businesses on the Kamp also varied in the maximum distance which visitors travelled to get to the shop. For 2 businesses this distance was very far, since they were one of few places in the Netherlands to offer particular facilities, for 3 businesses this distance was far, for 6

businesses this distance was medium, for 1 business this distance was short to medium, and for 1 business this distance was short.

Current street situation

When asked about the current situation, the interviewed entrepreneurs described a range of negative aspects of the Kamp, most of which were related to traffic (figure 12). Problems regarding supply traffic were mentioned the most. These were either problems with supplying their shop or inconvenience caused by supply traffic for other shops. Pavement accessibility was a frequently mentioned topic as well, as the large *Fraxinus excelsior* trees were pushing the pavement upwards. Others expressed their concern for disabled people and the sidewalk being too small. Adding to this, interviewees frequently mentioned that the street was too busy, chaotic or messy, and related this to the new *autoluw* policy that was unclear. Moreover, multiple shops mentioned that there were not enough parking spaces, especially close to the shops. Considering greening, interviewees mostly complained about the lack of green in the street. One said that the current trees are too big. Other complaints concerned the number of unoccupied buildings, rusty lamp posts, parked bicycles, or that it felt unsafe in the Kamp at night.

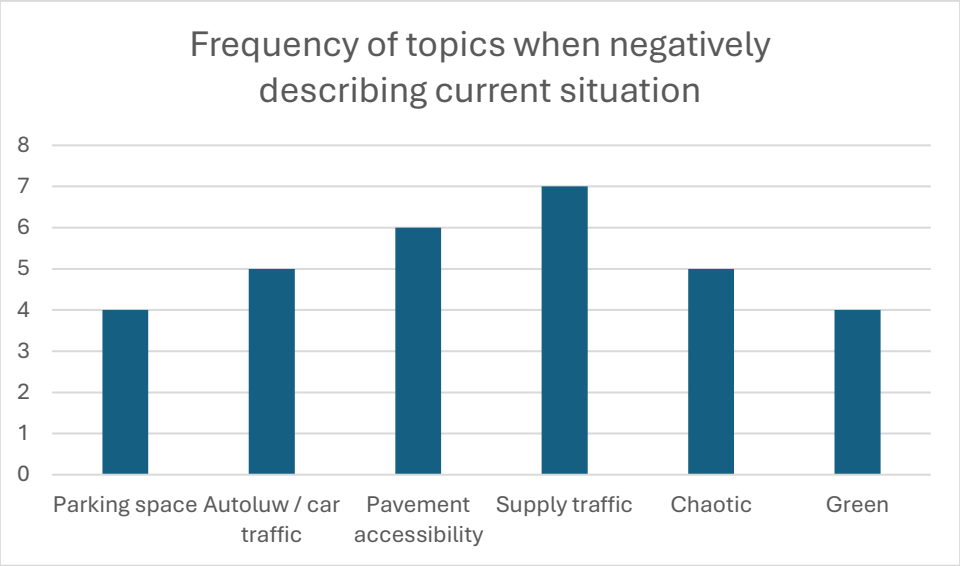


Figure 12 Frequency of topics mentioned when asked for negative aspects about the current situation in the Kamp

When asked about the current situation the interviewees also described different positive elements of the Kamp (figure 12). All positive elements that were mentioned multiple times were related to the appearance of the street, namely the trees, the flowerpots, the historic buildings, and less often the lights that are placed in the trees.

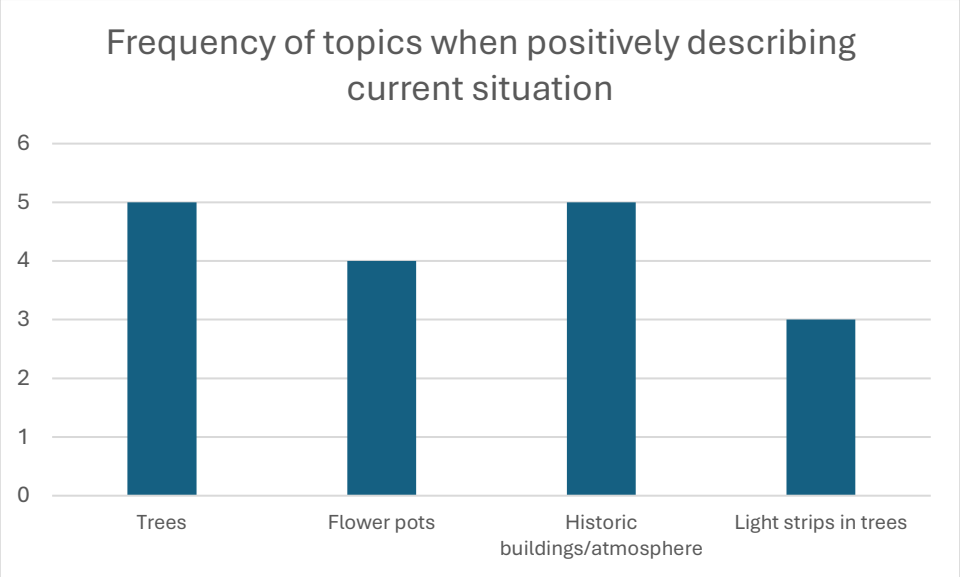


Figure 13 Frequency of topics mentioned when asked for positive aspects about the current situation in the Kamp

When the interviewed entrepreneurs were asked about whether they experienced effects of climate change that could affect their customers or company the answers were mixed. Half of the entrepreneurs responded that they did not experience these effects. If there were experienced effects, they were mostly related to heat stress and less often to flooding. Many entrepreneurs explicitly mentioned that the water catchment was functioning well and that they never experienced flooding.

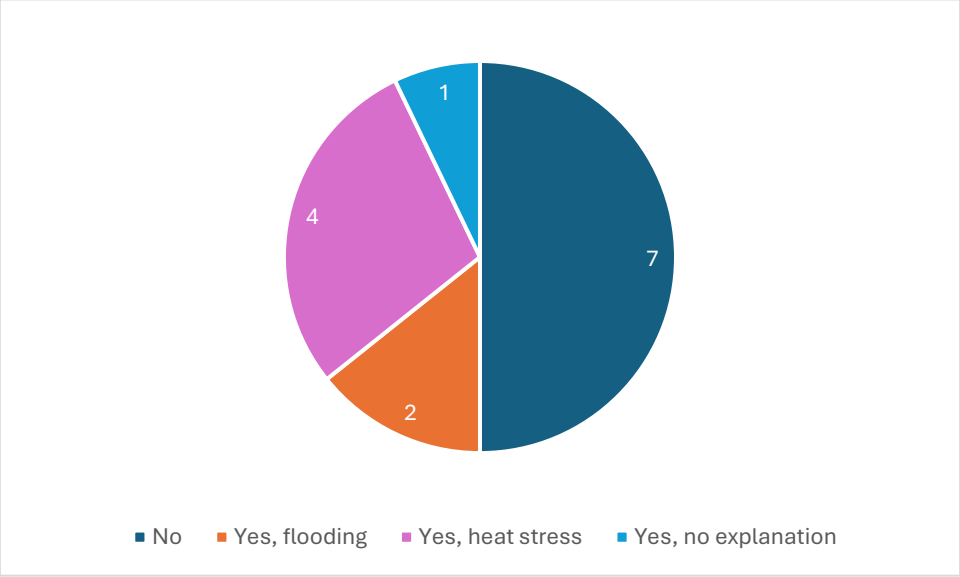


Figure 14 Entrepreneurs' experienced effects of climate change

When asked if greening could help to reduce the negative effects of climate change, 9 out of 14 interviewees confirmed that this would help, particularly with regard to heat stress. Flooding was perceived as less of an issue in the Kamp, so greening was only expected to help against flooding by two entrepreneurs.

Shopping behaviour and visits

When the interviewees were asked whether they observed any changes in shopping behaviour in the last years, the responses varied (figure 15). Some entrepreneurs mentioned that there were

fewer people, others mentioned an increase in visitors or no change. Four entrepreneurs mentioned that people spent less money, which the entrepreneurs often linked to increased energy prices. No entrepreneurs explicitly mentioned customers spending more money than before.

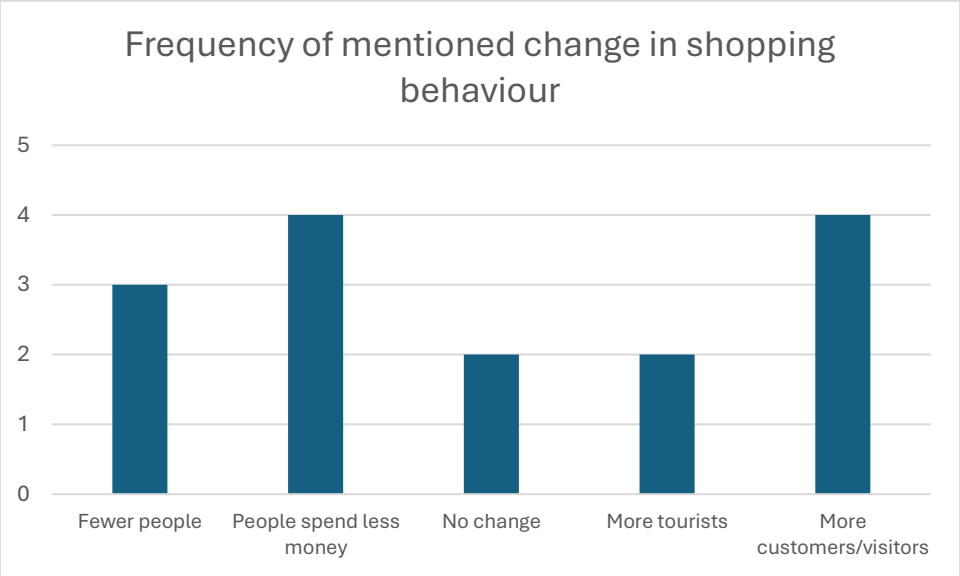


Figure 15 The frequency of mentioned change in shopping behaviour by entrepreneurs in the study area

When asking the entrepreneurs about why people were visiting the Kamp, almost all of them mentioned that people were coming there for specific shops (figure 16). This is a large contrast with the Langestraat. Related to this, many entrepreneurs mentioned the fact that the Kamp has many small and diverse shops, sometimes with very specific items. Sometimes the Kamp was mentioned as a path from or towards the city centre, or as a place visited by tourists.

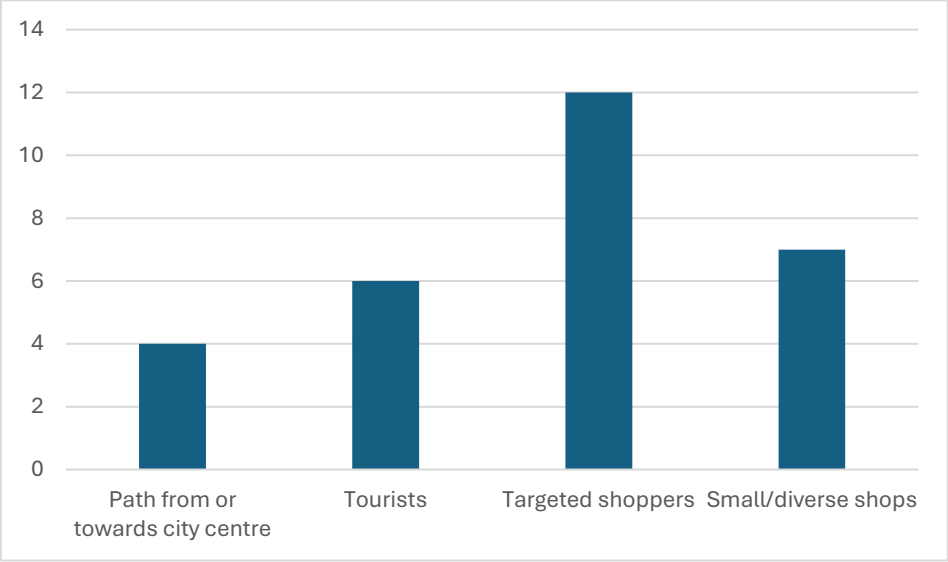


Figure 16 Frequency of mentioned reasons by entrepreuners why people visit the Kamp

Improvements and greening

Asking the entrepreneurs about possible improvements for the Kamp led to a broad range of answers (figure 17). Some entrepreneurs made it clear that they wanted their customers to be able to park their cars in front of the store for a short time or in the street in general. Similarly, entrepreneurs argued that the *autoluw* policy has led to confusion amongst customers about where they could drive and park without being fined. Other entrepreneurs specifically mention that

they would like to have more green in the street, either (new) trees or lower green such as flower beds, that are more visible for visitors. Many entrepreneurs mentioned that they would like to see more benches in the street, but some also mentioned their fear of attracting homeless people which would decrease the attractiveness. In general, some entrepreneurs would like to see more space on the sidewalk for pedestrians specifically less abled.

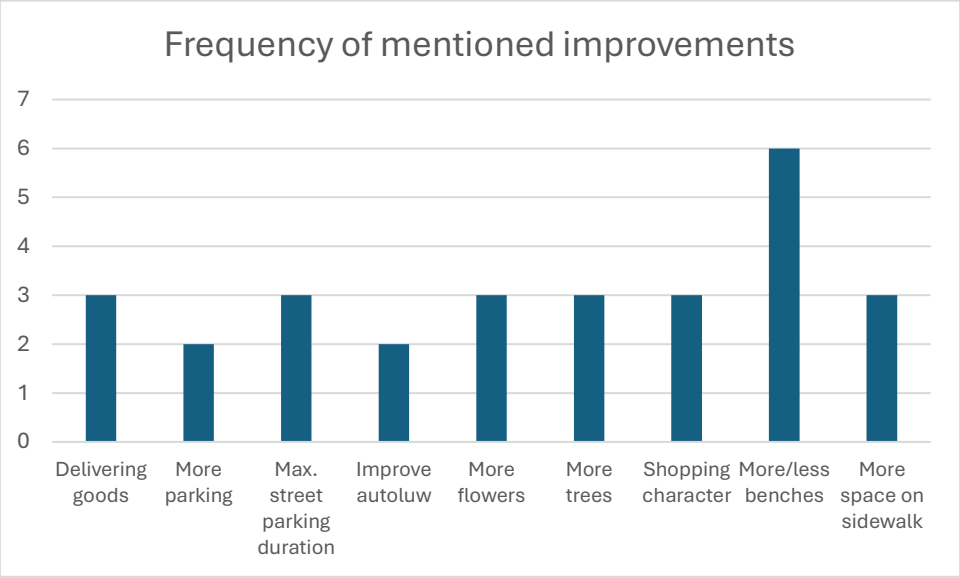


Figure 17 Frequency of mentioned improvements for the Kamp by entrepreuners

When asked about greening specifically, almost all interviewed entrepreneurs were in favour of making the street greener. Only 2 entrepreneurs had a mixed attitude towards greening, whilst the others were either positive (7) or very positive (5).
When asked whether and how they would want to contribute to this greening the results were more mixed. A slight majority of interviewed entrepreneurs are willing to contribute, mostly in the form of maintaining beds or planters in front of their buildings. Of the entrepreneurs who were not willing to contribute, three already had their own planters to take care of. Some also regarded greening and maintaining as a task of the municipality.
Most of the interviewed entrepreneurs thought that an increase in attractiveness would lead to more visitors. Only two entrepreneurs thought that increased attractiveness would not lead to more visitors. The entrepreneurs were less sure about the positive effects of increasing the attractiveness on profit. One of the reasons mentioned for this is the many targeted visitors and fewer window shoppers entrepreneurs in the Kamp. Thus, even if increasing the attractiveness would lead to more people visiting the Kamp, this would not directly increase the profit. No interviewed entrepreneurs expected that increased attractiveness would lead to a decrease in profit (figure 18).

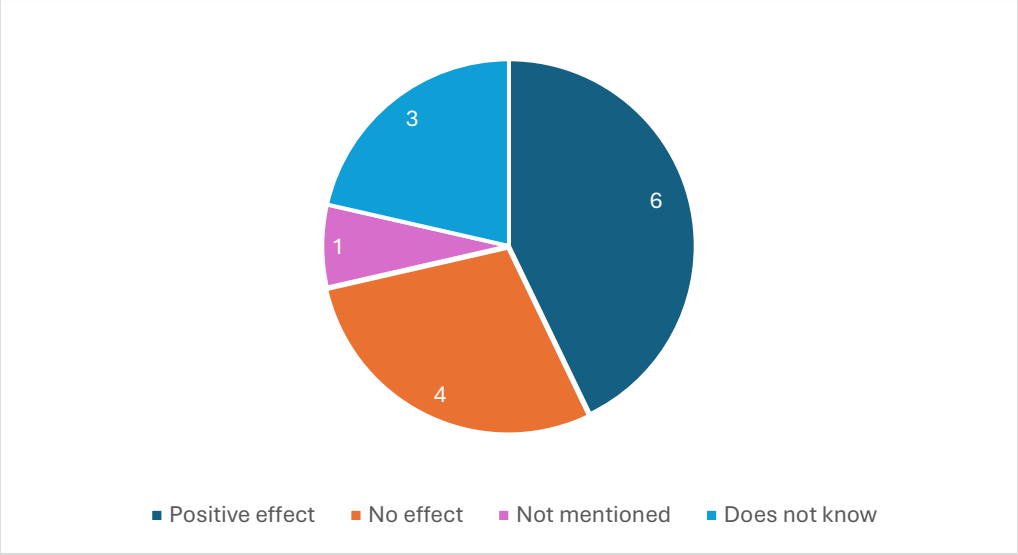


Figure 18 Frequency of entrepreneurs' view on how increased attractiveness of the Kamp influences their profit

4.1.2 Questionnaire results

The questionnaire, which was open from 13 – 19 June 2024, received 60 responses. The respondents represented a diverse range of age groups and were predominantly women at 60%. 73% of the respondents were residents of Amersfoort at the time of the questionnaire, with 13% living in the city centre and 60% in other neighbourhoods.

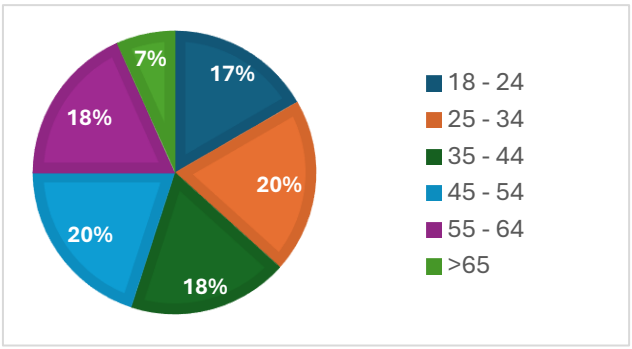


Figure 19 Respondents' age in years

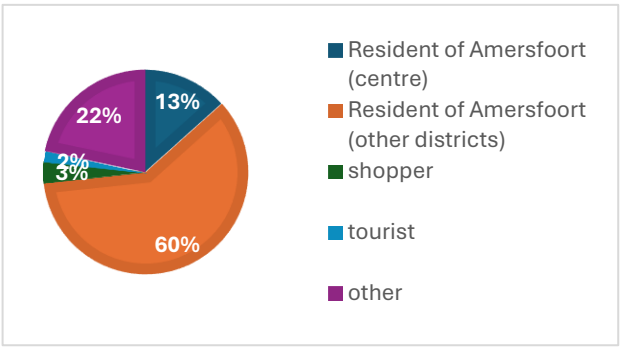


Figure 20 Type of respondent

One-third of respondents stated that shopping was the main purpose of visiting the city centre of Amersfoort, whereas 23% visited mainly for recreation and work. Most of the respondents visited the city centre weekly, and a quarter daily or monthly. We assumed that people who visited daily were working in the city centre due to the similarity of the percentages in both answers.

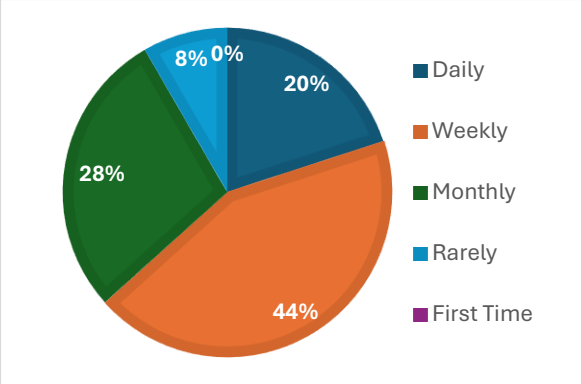


Figure 21 Frequency of respondents visiting Amersfoort city centre

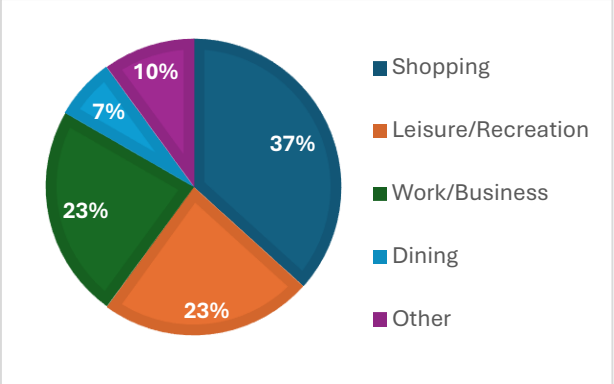


Figure 22 Frequency of respondents' main reason to visit Amersfoort city centre.

We found that there had been a change in shopping habits. Overall, online shopping habits increased compared to 10 years ago, while fewer people were buying goods in physical stores. Interestingly, 10 years ago, 63% of people regularly or often bought products in physical stores, while this was only 42% at the moment of the questionnaire.

Current situation

The average grade given to the Kamp was a 5.5, which indicated room for improvement. People appreciated the accessibility by bike and by foot. They also indicated that they appreciated the small local shops and diversity in shops. Additionally, many indicated that the nice-looking buildings were a positive contribution to the current situation.

The most prevalent negative aspect mentioned was the unpleasant atmosphere and the lack of green appearance. Many people explained that this unpleasant atmosphere was caused by the traffic. A large portion indicated that the range of shops was unsatisfactory. Other mentioned factors making the Kamp less attractive were heat in summer, lack of shade and lack of green in the streets.

Some people elaborated on the situation in the streets, suggesting more green to improve the overall appeal of the Kamp. They also suggested less traffic, more municipal enforcement officials on behaviour of cyclists, like cycling and parking on the sidewalk, and same level sidewalks and streets, to decrease the chaotic appearance of the Kamp. Regarding the greening strategies, the respondents were most positive about implementing beds with flowers or plants, and façade gardens. Big trees and green façades were also indicated by many of the respondents as good implementations. Furthermore, people showed an interest in water tap points as part of greening of the Kamp. Small trees, wadis and green roofs were considered good implementations by a moderate portion of the respondents.

The respondents mentioned that more green in the streets would greatly improve the overall appeal of the Kamp. They were concerned about the available space and mentioned that they preferred green solutions that could be realised efficiently, such as in the *boomspiegel* or on the façades. Additionally, respondents thought that the traffic was a major issue. Reducing traffic, in combination with more green, was the common idea of improving the attractiveness of the Kamp.

The effects of greening

According to the responses on the questionnaire, there was a lot of support for greening. 70% of the respondents indicated that they would be willing to spend more time in the city centre if it would be greener. 43% of the respondents indicated that they would be willing to spend more money in a shopping area with more green (18% totally agreed, 25% slightly agreed).

For respondents, the most significant benefits of greening the Kamp were an increased appeal, improved air quality and reduced temperature. More space for recreation, increase of biodiversity and increased profit for the companies in the Kamp were other benefits that respondents valued. 92% of the respondents thought that a more green space would be good for their physical health

(47% totally agreed, 45% slightly agreed). 93% agreed that green spaces would contribute to their mental health (60% totally agreed, 33% slightly agreed).

The respondents of the survey expressed their concerns regarding the maintenance of green. The second most prevalent answer to the question about negative aspects was 'none'. This shows that the general public opinion about greening was very positive. Other answers, including leaf litter, pollen, construction costs and insects were considered less relevant negative aspects.

4.2 Greening strategies

Van Ekeren et al. (2024) advised 22 types of innovations to implement the greening plan in the Langestraat and Krommenstraat, while Hersbach (2022) suggested 18 possible climate-resilient innovations for greening the shopping street in the city centre of Amersfoort. We did not take all the advice from these two reports but made a selection based on the most suitable option for the Kamp. From this, we identified 20 potential types of greening and then carefully selected the most suitable greening strategy based on available space, benefits, and limitations (Table 6).

Table 6 List of suggestions for greening plan in the city centre of Amersfoort

No.	Type of greening	Previous ACT (Van Ekeren et al., 2024)	Previous Thesis (Hersbach, 2022)	Implement in The Kamp
1	Trees	√	√	YES
2	Façade gardens	√	√	YES
3	Climbing plants	√	√	YES (within green pergola and green façade)
4	Shrubs	√	√	YES (within façade garden and planters)
5	Herbs and grasses	√	√	YES (within façade garden and planters)
6	Planters	√		YES
7	Infiltration crates	√		NO
8	Infiltration strips	√		NO
9	DI/TI sewer system	√		Not in our scope
10	Green roofs	√	√	YES
11	Green balconies		√	NO
12	Pocket Park		√	NO
13	Fountains		√	NO
14	Bird boxes and feeders	√		YES
15	Insect hotels	√		YES
16	Hollow roads	√		YES
17	Water roofs	√		NO
18	Green Facades		√	YES
19	Semi-permeable paving		√	YES (only parking spaces)
20	Green Pergola		√	YES

We chose to implement 14 greening strategies in the Kamp: trees, façade gardens, climbing plants, shrubs, herbs and grasses, planters, green roofs, hanging plants, bird boxes, insect hotels, hollow roads, green facades, semi-permeable paving, and green planters. The strategies were selected or rejected based on the benefits, requirements, and limitations (Appendix E).

For the implementation of greening strategies the following suggestions were made:

- The whole road even levelled
- No pergola or green façade on monumental buildings
- Planters, facade gardens and flower beds with shrubs can be in front of monumental buildings
- Pergolas at the sun side to provide shade and cooling
- Green facades on the sun side
- Parking spaces for suppliers to load and unload
- Different-sized trees spread over the whole area to provide shade and cooling (need to consider how the trees' roots grow)
- Bicycle parking in the Kreupelstraat
- Green roofs on available large flat roofs
- Semi-permeable paving on parking spaces
- Two 'gates' with *Populus nigra var. italica* to mirror the existing gates
- Two shallow street gutters lead through the green spaces, with some drainage wells in case of heavy rainfall (hollow roads)

These suggestions were schematically spatially drawn into a map (figure 23 and 24).

Figure 23 Schematic map of the developed greening plan on which the CBA is based

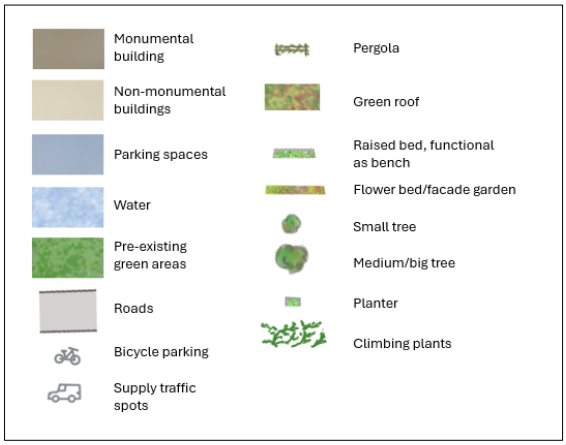


Figure 24 Legend for schematic map

Examples of possible implementations were created using existing Google Maps Streetview photos (Figure 25, 26, 27 and 28, and Appendix D). The façade gardens should not obstruct windows, and do not take up a lot of space (Figure 25 and 26). The lanterns will be removed in another project, so they were also removed in these examples. Bench planters were placed on a wide sidewalk,

creating a pleasant relaxing spot for shoppers and a green touch to the street (Figure 27 and 28). The planters include a medium or small tree.

Figure 25 Before adding a green façade to Jack's Casino

Figure 26 After adding a green façade to Jack's Casino

Figure 27 Before adding trees with a bench

Figure 28 After adding trees with a bench

4.3 Heat stress and water management

Within this study, the climate resilient city toolbox (Voorhoede, n.d) and 'hittestress' tool (Nelen & Schuurmans, 2024) were used to analyse the influence of the chosen greening strategies on the heat stress and water management in the Kamp and neighbouring streets.

4.3.1 Climate resilient city toolbox

When the suggested greening strategies incorporated in the redesign of the area were implemented in the toolbox, the toolbox automatically calculated multiple values regarding climate, cost and water quality parameters. The following tables illustrate the total values for the parameters and the values for each parameter based on the different greening strategies. In table 7 the total values regarding the toolbox parameters are visualised and in the tables in appendix C the values are listed based on the different greening strategies used in the redesign of the area. From the climate resilient city toolbox could be found that both for the heat stress and the water management in the area, the conditions improved with the implementation of the defined greening strategies in the area. For instance, the water bearing capacity of the area increased with >1000 m^3, the groundwater recharge increased by almost 20 mm/year and the average air temperature in the defined study area decreased by almost 0.3°C. Indirectly the implementation of these greening strategies also improved the surface water quality due to the absorption of pollutants by the vegetation. This means that overall the result from this toolbox indicated a positive effect of greening on the study area compared to the area as it is now.

Table 7 Parameter results; total values

	Parameter	**Value**	**Unit**	**Additional information**
Climate	Bearing capacity	1014	m^3	
	Groundwater recharge	18.24	mm/year	
	Evapotranspiration	13	mm/year	
	Heat reduction	0.27	°C	Air temperature
	Number of cool areas	3	-	
Costs	Construction costs	454,237	€	
	Maintenance	25,962	€/year	
Water quality	Pathogen reduction	4.02	%	
	Nutrient reduction	1.24	%	
	Absorption substances	4.62	%	

The values regarding the climate in table 7 are an addition or subtraction to the current values without implementations in the study area. For instance, this means that due to the redesign of the area the bearing capacity of the area increases with 1014 m^3 and that the average air temperature in the area decreases with 0.27 °C.

4.3.2 Heat stress tool

With the suggested greening strategies implemented in the tool, the tool automatically calculated the PET values for the study area based on (De Nijs et al., 2019). This resulted in specific values for PET, percentages of shadow, amount of trees, and green versus grey areas (table 8). Furthermore the spatially distributed PET values for the study area prior to the implemented greening strategies are given (figure 29), as well as the PET values after implementation of the greening strategies (figure 30). To make the comparison more easily visible the spatial difference in the PET values from prior to the measures and after are also visualised (figure 31). Comparing the values in this figure and table 7 we observed a slight decrease in the average PET values within the study area and differences in PET values for each area when the greening strategies would be implemented. The presence of more green - especially trees – led to a reduction of PET values up to and exceeding 5°C. For instance, for one area in figure 2 and 3 which is indicated with the black dashed circle the perceived PET value dropped from 51.7°C to 38.6°C. This means

that the grade of physiological stress would reduce from extreme heat stress to strong heat stress as given in Matzarakis and Amelung (2008).
The results from the 'hittestress' tool were also in line with the results found in the climate-resilient city toolbox. Here it was found that the average PET values for the study area decreased by 0.8°C, with local reductions up to 13°C. Furthermore, due to the implementation of the greening strategies, the amount of shadow and green areas in the whole study area increased, while the amount of grey areas in the area decreased. Overall the implication of greening in the study area greatly improved the apparent temperatures (PET) in the study area, which was in line with the results from the climate resilient city toolbox.

Table 8 Heat stress tool results

Parameter	Value	Unit	Additional information
Old PET	45.4	°C	Average over whole study area
New PET	44.6	°C	Average over whole study area
PET reduction	0.8	°C	Average over whole study area
Shadow prior to implementations	19	%	
Shadow after implementations	23	%	
Amount of trees compared to study area before	5	%	
Amount of trees compared to study area after	8	%	
Green vs grey areas old	11 vs 89	-	
Green vs grey areas new	18 vs 82	-	

Figure 29 PET values for old situation

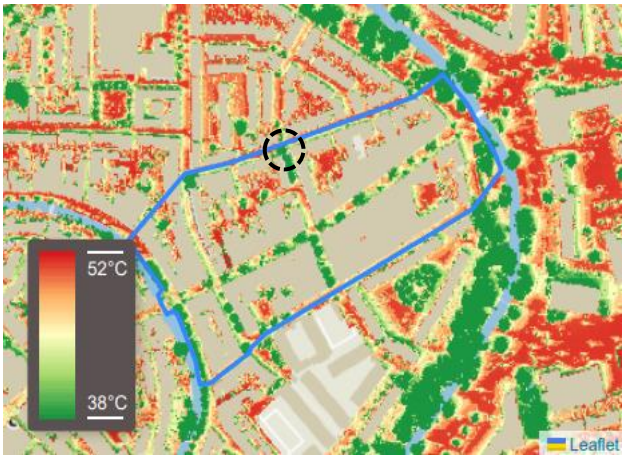


Figure 30 PET values for new situation

Figure 31 Difference between PET values for old and new situation

4.4 Social cost-benefit analysis

The Climate Resilient Cities Tool was used to evaluate the costs of greening strategies, which include the construction and maintenance costs (table 9). The indicators that were identified from the effect tree were monetised using the TEEB City Tool, 2019 (table 9). The explanation for every indicator can be found in the chapter 3.

Table 9 An overview of total costs and benefits

Costs		**Benefits**		
Type of costs	**Monetary value (€)**	**Aspects**	**Indicators**	**Monetary Value (€)**
Construction (one-time)	321,858	Water Aspects	Avoided flooding costs	No Impact
Maintenance (yearly)	12,723		Avoided drought costs	Undetermined
Increase in tax costs	3,305		Avoided water purification costs	872
		Atmospheric Aspects	Air quality	2,111
			Avoided cost of consumed gas	569
			Avoided cost of CO_2 emissions	49
		Social Aspects	Avoided health costs	755
			Recreational benefits	2,226
		Business Aspects	Increase in tax income	3,305
			Increase in property value (one-time)	2,747,500
			Profits for shop owners	5%
			Increased labour productivity	Up to 15%
Total (one-time)	321,858	**Total (one-time)**		2,747,500
Total (yearly)	16,028	**Total (yearly)**		9,888 + fraction profit and labour

Using these values, a CBA was done with a time horizon of 30 years. The results of the CBA are as follows:

- Cumulative Present Value of Costs = € 567,248
- Cumulative Present Value of Benefits = €2,694,086
- Benefit-Cost Ratio (BCR) = 4.74
- Net Present Value (NPV) = €2,126,837

The positive NPV indicates that the proposed greening strategies are financially viable. A BCR of greater than 1 is also an indication of the greening strategies being financially viable.

DISCUSSION

5. Discussion

5.1 Interview and questionnaire

Results from the interviews and the questionnaire showed that people have shifted their shopping behaviour towards more online facilities. Combined with the overall low aesthetic appeal of the Kamp, this shift could pose a threat for the entrepreneurs in this area. People often visited the Kamp for specific shops, rather than for a general shopping experience. The streets were seen as chaotic due to the lack of green, the number of obstacles, and the traffic. The overall opinion on greening the Kamp was positive. People preferred green strategies that would leave enough space on sidewalks, that would be easy to implement, and that would provide a green atmosphere and sufficient shade. Ornamental elements were appreciated as well. The entrepreneurs and shoppers had a similar vision on this. 57% of entrepreneurs would be willing to contribute to the greening, which could decrease maintenance costs. If entrepreneurs would collaborate on this, it could also lead to increased social cohesion and sense of community in the Kamp. Similar projects have been subsidised and implemented successfully in other parts of the city centre of Amersfoort as mentioned in the interview with Siske van Hoof of the Amersfoort municipality (S. van Hoof, personal communication, June 18, 2024). This therefore will likely be successful in the Kamp as well.

A large share of the shoppers indicated in the questionnaire that they would be willing to spend more money in a shopping centre with more green. These findings are in line with scientific literature, where spending increased up to 9.7% in city centres with more green (Wolf, 2005). Furthermore, the answers to the questionnaire corresponded with the overview given by Cinderby and Bagwell (2018) regarding physical and mental health, and increased attractiveness.

We initially tried to conduct the interviews by selecting entrepreneurs randomly divided into categories to prevent bias. However, due to cancellations and declined invitations, some entrepreneurs were not interested, this was not possible. Logically, this resulted in a bias towards positive or interested entrepreneurs. In our interview sample, we received a wide spectrum of answers, ranging from very positive to neutral and negative. As we worked with a sample rather than the entire subject population, this might have led to a bias in more engaged entrepreneurs. This would specifically affect the answers to interview questions about willingness to contribute to the greening plan. Less engaged entrepreneurs may be less willing to contribute to the greening plan.

The questionnaire was distributed by providing a QR code to several shops in the study area. Furthermore, we distributed a link to the survey in a Facebook community of Amersfoort and directly forwarded it to acquaintances of our team members that live in Amersfoort. This naturally resulted in a response bias, where people that were more engaged with the topic were more likely to respond to the survey more quickly. Another bias could result from our acquaintances, which were more likely to have a more positive attitude towards green, as they might have been educated in a related field. Nonetheless, we also received several responses to the questionnaire that indicated a lower interest in green, so the data seems to be derived from a sufficiently diverse sample.

For future research, it could be valuable to take the avoided social costs into account. Respondents to the questionnaire and interviewees indicated that they were annoyed by the amount of traffic in the streets. Consequently, they may avoid the street and not spend their money in the Kamp. The annoyance also can cause stress to some extent. The missed income because of avoiding the street and the social cost of stress can be avoided when greening the Kamp. However, they could not be included in the CBA due to difficulties in calculating these costs. An additional recommendation for future research therefore would be to monetise the social costs and benefits that are relevant to the CBA making it easier to calculate the actual balance in the CBA.

5.3 Greening strategies

Our green strategy design can be considered a combination of the previous master's thesis (Hersbach, 2022) and ACT (Van Ekeren et al., 2024)implemented in the city centre of Amersfoort. Since these sources discussed a different area within the city centre, we only adopted some of the previous research, which resulted in 14 suggested greening strategies in the Kamp. When looking at the interview and questionnaire findings, people prefer big trees. According to Burden (2006) the presence of trees can provide a safer walking environment because street trees form and frame visual walls and provide a distinct edge between pedestrians and vehicles. However, shopkeepers tend to choose smaller trees because the existing trees are too big and push the pavement upwards. As a result, selecting the species tree is one of the important factors that need to be considered if green design is to be applied. In addition, the questionnaire results found that some respondents would like to see water components implemented such as wadi's and tap water. These were not mentioned in the two previous reports.
We realise that some aspects could not be covered in this design, such as underground infrastructure. Beneath the Kamp there is a multitude of cables and pipes, including electricity, gas and oil, drinking water, and sewer cables. Although these elements are not covered in this report, they are important when selecting locations for the trees. However, we did not consider the underground infrastructure because of the wide scope of our research and limited time. Moreover, the main purpose of this project is to calculate the costs and benefits of greening the Kamp. Our design was therefore only used as the basis for the calculation, so it was made as simple as possible. A more detailed future greening design should include all green components, including vegetation, water management, and underground infrastructure.

5.2 Heat stress and water management

To quantify the changes in heat stress and water management, the climate resilient city toolbox (Voorhoede, n.d) and the 'hittestress' tool (Nelen & Schuurmans, n.d.) were used. Although both toolboxes formed a good approximation in estimating the effect of the used greening strategies on the heat stress and water management in the study area, there were some limitations and assumptions in both tools. One of the limitations was that not all greening strategies that we used in our study could be implemented into the toolboxes. For instance, in the 'hittestress' tool it was only possible to implement trees, bushes and grass, while no existing vegetation could be removed. Therefore, some of the greening strategies were categorised as differently to fit the study area design. For the climate-resilient city toolbox, some parameters used in the greening strategies were left to the default values set by the programme itself because of a lack of information on these parameters. This led to an error margin within the calculations made. Lastly, not all functions of the climate resilient city toolbox were functional, leading to a lack of spatial air temperature data for the results.
For further research about the degree of heat stress in the area, it would be advised to perform local measurements of the heat stress in the study area to get an indication of the actual instead of modelled heat stress. This could be done by using an micrometeorological cart (MMC) as used in Milošević et al. (2022). Furthermore, more research needs to be done about the characteristics of each greening strategy regarding water management, so that no default values would need to be used in the toolboxes. Also, the use of the toolboxes itself could be improved, for instance by implementing more greening strategies into the toolboxes.

5.4 Social cost-benefit analysis

The CBA was used to provide an overview of the costs and benefits of greening the Kamp. Considering a time horizon of 30 year, the CBA showed that the benefits of the greening would outweigh the costs. The most important benefit was the increase in property value, assuming a 5% increase in property value. Furthermore, labour productivity could increase up to 15% due to the greener environment and the profits of the entrepreneurs located in the Kamp could increase with 5%. Considering the costs, construction would cost €322,000 and yearly maintenance €16,000.
Interpreting the costs and benefits required some caution. The results were based on a possible greening design that was not necessarily the definitive strategy. Thus, the CBA provided an estimate of the possible costs and benefits of greening the Kamp that could vary for different designs. In comparison with scientific literature, the most obvious similarity was the increase in property values (Rebel group, n.d). Furthermore, considering the small study area, the total monetary contribution of the improved air quality on the total benefit was small, like in other studies (Bos & Vogelzang, 2018; Rebel group, n.d). We did expect that the greening strategy would increase property values and that it would be an important benefit. However, the unequal distribution of benefits among stakeholders is troubling, as the municipality would bear most of the costs and the local business and property owners would acquire most of the benefits.
Although the distribution of benefits and costs is not necessarily in favour of the municipality, greening the Kamp and increasing the attractiveness could nevertheless be of importance for them. Besides the benefits of greening the Kamp, this project could also be implemented as part of the climate goals that the municipality of Amersfoort wants to achieve (Gementee Amersfoort, n.d). Also, our social research found that the local entrepreneurs were willing to adopt a tree, and take responsibility over the maintenance themselves. This could decrease the yearly maintenance costs of the municipality.

To calculate the costs and benefits some assumptions needed to be made. The following assumptions were used in our calculations:

- Average property value = €350.000
- Time horizon of 30 years
- Property owners are willing to adopt green roofs with a subsidy

In the process of doing the CBA, we came across several limitations. First, the increase in labour productivity and profits could not be monetised because the data was not available. Without considering these benefits, the yearly costs would be higher than the yearly benefits. However, if the monetary benefits were calculated with very conservative numbers for labour productivity and profits the yearly outcome would be positive. The second limitation was that we could not get information on the property values of properties used for other-than-residential purposes. Therefore, we assumed an average value of €350,000 to calculate the effect on property values. The amount of €350,000 was a conservative estimate. Considering the tax that needs to be paid over the WOZ value, we also calculated the effects based on the lowest tax rate, which is the tax rate for residential properties, to stay conservative. Also, we assumed that the property owners are willing to adopt green roofs in combination with the subsidy and incorporated green roofs in our strategy. However, property owners could not be willing to adopt green roofs. We assumed a time horizon of 30 years because we do not believe that a shorter or longer time horizon would change our results significantly.
The outcome of the CBA showed that greening the Kamp would yield more benefits than costs after 30 years, even without considering the increase in labour productivity and profits. As mentioned above, our research showed that local entrepreneurs are willing to help with the maintenance. Future research could focus on how the entrepreneurs could be included in the greening strategy and what the extent is to which local entrepreneurs are willing to help with maintenance, since this can significantly decrease the total costs of the municipality.

CONCLUSIONS AND RECOMMENDATIONS

6. Conclusions and recommendations

6.1 Conclusions

This study concludes that the greening of De Kamp is a publicly desirable and economically viable project. It will significantly improve the climate change adaptation of the area.

Our study on stakeholders' perspectives concludes that currently, the Kamp mostly attracts visitors for specific shops rather than general shopping experiences. The street receives an average rating of 5.5 on attractiveness, while lack of green, number of obstacles, and confusion regarding traffic are listed as major reasons for the general chaos on the streets. A majority of respondents also indicate that they will spend more time and money in the Kamp if the street is made more attractive by increasing greenery. A majority of entrepreneurs also believe that greening the streets will attract more visitors and thus increase their profits. Lastly, some entrepreneurs are willing to contribute to the maintenance and stewardship of the implemented greening. This answers our SQ1 regarding stakeholders' attitudes towards greening.

Answering SQ2, implementation of the design leads to an increase of more than 1000 m^3 in water retention capacity of the area, an increase in groundwater recharge by almost 20 mm/year, and a decrease in the average air temperature by almost 0.3°C. There is also an indication of improvement in the overall water quality of the area of the area. The average PET values will decrease by 0.8°C, with a decrease of up to 13°C in some places in the Kamp. Thus, the greening of the Kamp indicates a positive effect on climate adaptation of the area by reducing heat stress and aiding in water management.

Previous studies and literature were used to draw up a tentative greening strategy design for the Kamp to answer SQ3. The greening strategies include trees, shrubs, façade gardens, pergolas and planters. Green roofs are also used since they play a key role in water retention, air quality and insulation. The strategies are mainly based on the attractiveness and feasibility of implementation in the street structure of the Kamp. Due to lack of time, other aspects such as underground infrastructure and economic and practical feasibility were not taken into consideration. The selected greening strategies provide a good basis for assumptions in future cost-benefit analyses.

In line with SQ4, a cost-benefit analysis was conducted to investigate the economic feasibility of the greening project based on the tentative greening strategies mentioned in the above paragraph. The expected costs mainly include construction and maintenance. The benefits are identified using the ecosystem services framework and monetised using the TEEB City Tool, 2019. The benefits include increased water infiltration capacity, improved air quality, reduced heat stress, recreational benefits, overall reduced health costs, increase in labour productivity, increase in profits for entrepreneurs, increase in real estate value, etc.

The Benefit-Cost Ratio in the time horizon of 30 years is calculated to be 4.74. A BCR higher than 1 indicates an economically feasible project. Thus, the CBA concludes that the greening of the Kamp will be beneficial, even though not all of the benefits can be monetised. However, the distribution of the costs and benefits are unproportionally skewed, with the municipality bearing most of the costs and the entrepreneurs reaping most of the benefits. Still, if the entrepreneurs in the street are involved in the maintenance, it will greatly reduce the costs for the municipality.

6.2. Recommendations

Our research concludes that greening the Kamp will generate more benefits than costs, considering a time horizon of 30 years. The OBA and the municipality should keep this time horizon in mind as the benefits will develop over the years. If the municipality is planning to redo the whole street including the underground infrastructure, we recommend combining this plan with the greening plan as it will decrease the construction costs of the greening strategy considered in this research. Our recommendation includes implementing greening strategies, encouraging of sustainable entrepreneurship, implementing public engagement and education, and broadening policy for greening strategies.

With regard to the results from the CBA, we recommend that the municipality implements greening strategies similar to the strategies used in this research. The municipality does not have

to copy the exact plan from this research because this could be infeasible due to budget constraints. On the other hand, if the budget is large enough, the municipality could even implement more greening in the Kamp. Our research has shown the possibilities and that implementing green strategies benefits various stakeholders and attracts more visitors.
Furthermore, we recommend the municipality to encourage sustainable entrepreneurship. By including and working together with the entrepreneurs located in the Kamp, the municipality could increase the support from these entrepreneurs, which could decrease the yearly maintenance costs. From our social research, most entrepreneurs stated that they are in favour of greening the Kamp and some interviewees stated that they are willing to help with the maintenance. This poses an opportunity for the local entrepreneurs because they can invest in sustainable entrepreneurship which could make their businesses more attractive to visitors.
Also, we recommend engaging with the public and educating the local community. This could increase the number of people that will visit the Kamp, considering the people living in and around Amersfoort. This could increase public support if the municipality wants to green other areas in Amersfoort.
Finally, the municipality can provide more types of subsidies, complementing the subsidy for the construction of a green roof. Subsidies, similar to the subsidies for green roofs, can increase private investment in other greening strategies. This can be combined with private ownership or for example the 'adoption' of a tree or planter, where the owner bears the costs of maintenance. Overall, a combination of these actions is preferred to obtain the best outcome.

REFERENCES

7. References

Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *Journal of the american college of clinical pharmacy*, *4*(10), 1358-1367.

Amersfoort in cijfers. (2024). *Cijfers per thema - Bevolking - Amersfoort.* Retrieved June 25, 2024 from https://amersfoortincijfers.nl/dashboard/cijfers-per-thema/bevolking

Armson, D., Stringer, P., & Ennos, A. R. (2012). The effect of tree shade and grass on surface and globe temperatures in an urban area. *Urban forestry & urban greening*, *11*(3), 245-255.

Arnberger, A. (2012). Urban densification and recreational quality of public urban green spaces—a Viennese case study. *Sustainability*, *4*(4), 703-720.

Arnberger, A., Allex, B., Eder, R., Ebenberger, M., Wanka, A., Kolland, F., Wallner, P., & Hutter, H. (2017). Elderly resident's uses of and preferences for urban green spaces during heat periods. *Urban forestry & urban greening*, *21*, 102-115.

Atlas leefomgeving. (n.d). https://www.atlasleefomgeving.nl/kaarten.

Bos, E., & Vogelzang, T. (2018). *Groei versus groen: drie casestudy's over de waarde van het stadsgroen in Amsterdam*. Wageningen University & Research, Wetenschapswinkel.

Bowler, D. E., Buyung-Ali, L., Knight, T. M., & Pullin, A. S. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landscape and urban planning*, *97*(3), 147-155.

Burden, D. (2006). *Urban street trees: 22 benefits, specific applications*. Walkable Communities, Incorporated.

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, *41*(5), 545-547.

Centraal Bureau voor de Statistiek. (2018). *Ouderen kopen vaker online*. https://www.cbs.nl/nl-nl/nieuws/2018/51/ouderen-kopen-vaker-online#:~:text=In%202018%20geeft%2078%20pro,diensten%20online%20aangeschaft%20te%20hebben

Cinderby, S., & Bagwell, S. (2018). Exploring the co-benefits of urban green infrastructure improvements for businesses and workers' wellbeing. *Area*, *50*(1), 126-135.

Clarke, B., Otto, F., Stuart-Smith, R., & Harrington, L. (2022). Extreme weather impacts of climate change: an attribution perspective. *Environmental Research: Climate*, *1*(1), 012001.

Coseo, P., & Larsen, L. (2014). How factors of land use/land cover, building configuration, and adjacent heat sources and sinks explain Urban Heat Islands in Chicago. *Landscape and urban planning*, *125*, 117-129. https://doi.org/https://doi.org/10.1016/j.landurbplan.2014.02.019

De Jong, F. (2024). *ACT Project description. Greening the city of Amersfoort: exploring the social and financial costs and benefits (3312)*.

De Nijs, T., Bosch, P., Brand, E., Heusinkveld, B., Van Der Hoeven, F., Jacobs, C., Klok, L., Kluck, J., Koekoek, A., Koopmans, S., Van Nieuwaal, K., Ronda, R., & Steeneveld, G. (2019). Ontwikkeling standaard stresstest hitte. RIVM. *https://doi.org/10.21945/rivm-2019-0008*.

Does, B., Remme, R., & de Nijs, T. (2019). TEEB Stadtool: Actualisatie en Doorontwikkeling.

European Comission. (2024). https://doi.org/https://competition-policy.ec.europa.eu/state-aid/legislation/reference-discount-rates-and-recovery-interest-rates/reference-and-discount-rates_en.

Evans, G. (2009). Accessibility, urban design and the whole journey environment. *Built environment*, *35*(3), 366-385.

Fontana, A., & Frey, J. H. (2005). The interview. *The Sage handbook of qualitative research*, *3*(1), 695-727.

Gemeente Zwolle. (n.d.). *Groenblauw netwerk*. https://www.zwolle.nl/groenblauw-netwerk

Gementee Amersfoort. (n.d). https://www.amersfoort.nl/omgevingsvisie-amersfoort.

Ghafari, S., Kaviani, B., Sedaghathoor, S., & Allahyari, M. S. (2020). Ecological potentials of trees, shrubs and hedge species for urban green spaces by multi criteria decision making. *Urban forestry & urban greening*, *55*, 126824.

Giles-Corti, B., Broomhall, M. H., Knuiman, M., Collins, C., Douglas, K., Ng, K., Lange, A., & Donovan, R. J. (2005). Increasing walking: how important is distance to, attractiveness, and size of public open space? *American journal of preventive medicine*, *28*(2), 169-176.

Gunawardena, K. R., & Steemers, K. (2019). Living wall influence on microclimates: an indoor case study. Journal of physics: conference series,

Hersbach, N. (2022). *Cool retail: Towards novel, climate-resilient shopping streets*.

Holloway, D., Ho, P., & Boxshall, B. (2003). Roof and façade gardens. *Environment Design Guide*, 1-11.

Hunter, R. F., Cleland, C., Cleary, A., Droomers, M., Wheeler, B. W., Sinnett, D., Nieuwenhuijsen, M. J., & Braubach, M. (2019). Environmental, health, wellbeing, social and equity effects of urban green space interventions: A meta-narrative evidence synthesis. *Environment international*, *130*, 104923.
Kaarten | Atlas natuurlijk kapitaal. (n.d). https://www.atlasnatuurlijkkapitaal.nl/kaarten.
Kendall, R. (2020). *The effect of street tree site planting width on canopy width and ability to provide ecosystem services* University of Nebraska-Lincoln].
Kennisportaal Klimaatadaptatie. (n.d.). *City of Zwolle has developed its own adaptation strategy*.
Knight, T., Price, S., Bowler, D., Hookway, A., King, S., Konno, K., & Richter, R. L. (2021). How effective is 'greening'of urban areas in reducing human exposure to ground-level ozone concentrations, UV exposure and the 'urban heat island effect'? An updated systematic review. *Environmental Evidence*, *10*, 1-38.
KNMI. (2023). *KNMI'23-klimaatscenario's*. https://www.knmi.nl/kennis-en-datacentrum/achtergrond/knmi-23-klimaatscenario-s
Lee, A. C. K., & Maheswaran, R. (2011). The health benefits of urban green spaces: a review of the evidence. *Journal of public health*, *33*(2), 212-222.
Lehnert, M., Brabec, M., Jurek, M., Tokar, V., & Geletič, J. (2021). The role of blue and green infrastructure in thermal sensation in public urban areas: A case study of summer days in four Czech cities. *Sustainable Cities and Society*, *66*, 102683.
Leung, D. Y. C., Tsui, J. K. Y., Chen, F., Yip, W., Vrijmoed, L. L. P., & Liu, C. (2011). Effects of urban vegetation on urban air quality. *Landscape Research*, *36*(2), 173-188.
Li, F., Wang, R., Paulussen, J., & Liu, X. (2005). Comprehensive concept planning of urban greening based on ecological principles: a case study in Beijing, China. *Landscape and urban planning*, *72*(4), 325-336.
Liu, W., Chen, W., & Peng, C. (2014). Assessing the effectiveness of green infrastructures on urban flooding reduction: A community scale study. *Ecological Modelling*, *291*, 6-14.
Lottrup, L., Grahn, P., & Stigsdotter, U. K. (2013). Workplace greenery and perceived level of stress: Benefits of access to a green outdoor environment at the workplace. *Landscape and urban planning*, *110*, 5-11.
Maat, K., & Konings, R. (2018). Accessibility or innovation? Store shopping trips versus online shopping. *Transportation Research Record*, *2672*(50), 1-10.
Marando, F., Heris, M. P., Zulian, G., Udías, A., Mentaschi, L., Chrysoulakis, N., Parastatidis, D., & Maes, J. (2022). Urban heat island mitigation by green infrastructure in European Functional Urban Areas. *Sustainable Cities and Society*, *77*, 103564. https://doi.org/https://doi.org/10.1016/j.scs.2021.103564
Matzarakis, A., & Amelung, B. (2008). Physiological equivalent temperature as indicator for impacts of climate change on thermal comfort of humans. In *Seasonal forecasts, climatic change and human health: health and climate* (pp. 161-172). Springer.
Matzarakis, A., Mayer, H., & Iziomon, M. G. (1999). Applications of a universal thermal index: physiological equivalent temperature. *International journal of biometeorology*, *43*, 76-84.
Matzdorf, B., & Meyer, C. (2014). The relevance of the ecosystem services framework for developed countries' environmental policies: A comparative case study of the US and EU. *Land use policy*, *38*, 509-521.
Milošević, D., Savić, S., Šećerov, I., & Dunjić, J. (2022). *Introducing Mobile Micrometeorological Carts (MMCs) for urban and non-urban micrometeorological measurements*.
Nelen, & Schuurmans. (2024). Hittestress-tool. *In hittestress.nu*.
Nicholls, N., & Alexander, L. (2007). Has the climate become more variable or extreme? Progress 1992-2006. *Progress in Physical Geography*, *31*(1), 77-87.
Nowak, D. J., Crane, D. E., & Stevens, J. C. (2006). Air pollution removal by urban trees and shrubs in the United States. *Urban forestry & urban greening*, *4*(3-4), 115-123.
Oleson, K. W., Monaghan, A., Wilhelmi, O., Barlage, M., Brunsell, N., Feddema, J., Hu, L., & Steinhoff, D. (2015). Interactions between urbanization, heat stress, and climate change. *Climatic Change*, *129*, 525-541.
Patten, M. (2016). *Questionnaire research: A practical guide*. routledge.
Rebel group. (n.d). Aanzet MKBA Bospolderplein: Een eerste verkenning van de potentiële baten van een groen en gezond Bospolderplein. *https://www.groenegezondestad.nl/wp-content/uploads/2023/08/230206_Eindrapportage_Bospolderplein_vF.pdf*.
RIVM. (2021). *Moving towards a healthy climate in Zwolle*. https://english.rivmmagazines.nl/rivmmagazine-en/2021/01/moving-towards-a-healthy-climate-in-zwolle
Samaranayake, S. U., & De Silva, S. (2010). Effect of green workplace environment on employee performance.

Schetke, S., Qureshi, S., Lautenbach, S., & Kabisch, N. (2016). What determines the use of urban green spaces in highly urbanized areas?–Examples from two fast growing Asian cities. *Urban forestry & urban greening*, *16*, 150-159.
Sharmin, M., Tjoelker, M. G., Esperon-Rodriguez, M., Katlav, A., Gilpin, A., Rymer, P. D., & Power, S. A. (2024). Urban greening with shrubs can supercharge invertebrate abundance and diversity. *Scientific Reports*, *14*(1), 8735.
Smits, I. H. M. (2023). *Retail related developments in medium-sized Dutch inner-city shopping areas at the beginning of the 21st century* Eindhoven University of Technology].
Solecki, W., & Marcotullio, P. J. (2013). Climate change and urban biodiversity vulnerability. *Urbanization, biodiversity and ecosystem services: challenges and opportunities: a global assessment*, 485-504.
Tables construction and maintenance cost (Dutch prices) - Climate Resilient City Tool - Deltares Public Wiki. (n.d.). https://publicwiki.deltares.nl/pages/viewpage.action?pageId=289702255.
Tarieven gemeentelijke belastingen | Gemeente Amersfoort. (n.d). https://www.amersfoort.nl/tarieven-gemeentelijke-belastingen.
Teo, H. C., Fung, T. K., Song, X. P., Belcher, R. N., Siman, K., Chan, I. Z. W., & Koh, L. P. (2023). Increasing contribution of urban greenery to residential real estate valuation over time. *Sustainable Cities and Society*, *96*, 104689.
Tse, T., & Tung, T. L. (2016). From clicks-and bricks to online-to-offline. *Retail Design: Theoretical Perspectives*, 87-113.
Turnhout, E., & Elands, B. H. M. (2009). Draagvlak en betrokkenheid bij burgers. In *Burgers, beleid en natuur: tussen draagvlak en betrokkenheid* (pp. 5-13). Wettelijke Onderzoekstaken Natuur & Milieu.
Van Ekeren, J., Goettinger, L., Dijsselbloem, J., Langhout, F., Leenders, R., Hopstaken, J., & Hogendoorn, S. (2024). *A green heart for Amersfoort*.
Venhari, A. A., Tenpierik, M., & Hakak, A. M. (2017). Heat mitigation by greening the cities, a review study. *Environment, Earth and Ecology*, *1*(1).
Voorhoede, D. (n.d). Klimaatbestendige Stad Toolbox. *Klimaatbestendige Stad Toolbox*. https://doi.org/https://kbstoolbox.nl/nl/
While, A., & Whitehead, M. (2013). Cities, urbanisation and climate change. *Urban Studies*, *50*(7), 1325-1331.
Williams, K. J. H., Lee, K. E., Sargent, L., Johnson, K. A., Rayner, J., Farrell, C., Miller, R. E., & Williams, N. S. G. (2019). Appraising the psychological benefits of green roofs for city residents and workers. *Urban forestry & urban greening*, *44*, 126399.
Winants, J. (2021). Manual Facade Gardens-How to improve your hybrid space?
Witteven & Bos. (2012). The benefits of more nature and water in Stadshavens Rotterdam. *Deventer*, Witteven & Bos.
Wolf, K. L. (2005). Trees in the small city retail business district: Comparing resident and visitor perceptions. *Journal of forestry*, *103*(8), 390-395.
World Health Organization. (2024). *Heat and health*. https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health.

APPENDICES

Appendices

A. Contact details for Internal communication

Team members
Tom Steffens (Manager): tom.steffens@wur.nl
Karinke Zeldenrust (Secratary): Karinke.zeldenrust@wur.nl
Jesse Gros (Controller): jesse.gros@wur.nl
Maarten ten Hoff: maarten.tenhoff@wur.nl
Eny Lestari: eny.lestari@wur.nl
Lisa van Malssen: lisa.vanmalssen@wur.nl
Harmen Severiens: harmen.severiens@wur.nl
Saee Ghule: saee.ghule@wur.nl

ACT coach: Jolanda van der Meijde (jolanda@good-mood.nl)
Academic advisor: Jelle Hiemstra (jelle.hiemstra@wur.nl)

B. Detailed Stakeholder list

i. Municipality of Amersfoort: The Municipality is the primary decision maker in the project. They have both high power and high interest. They are facilitators of the project. However, their main challenges in facilitation would be financial constraints and inadequate public support for the project.
ii. Ondernemersvereniging Binnenstad Amersfoort (OBA): Ondernemersvereniging Binnenstad Amersfoort (OBA) is the entrepreneurs' association in Amersfoort. They have high interest in the project. They also have high power; but not as much as the Municipality. They are supporters of the project; they want the street of Kamp (and its side streets) to be greener, with a pleasant atmosphere to shop and to stay, with reduced heat stress and efficient water management.
iii. Entrepreneurs in the area: The individual business owners in Kamp, apart from OBA, have interest in the project, but low power as an individual. They want more greenery and pleasantness to attract more shoppers for offline shopping. They would also want the shoppers to stay more in the pleasant green surroundings and thus probably shop more.
iv. Shoppers: Shoppers who come to shop on the street will have limited interest and limited power. They would like the area to be more green and pleasant, as a place to be, a place to shop more and a place to socialise and spend time with their near and dear ones.
v. Tourists: Amersfoort enjoys some popularity among international as well as domestic tourists as it was voted one of the best cities in Europe. They will also have limited interest and limited power, similar to the shoppers. They would also want more greenery and pleasantness to make their visit to the city worthwhile.
vi. Residents of the area: Residents of the area have high interest in the project, but limited power. They would be interested in greenery and pleasantness to make their neighbourhood more beautiful. Moreover, they would want less heat stress due to climate change and efficient water management to reduce flooding.
vii. NGOs: NGOs are citizen organizations that work for the betterment of the society. NGOs whose values align with greening, and environmentalism are expected to take interest in the project. They have limited power, but certainly more than individual residents. An NGO named 033GROEN would be expected to support the project as their previous work was also related to greening and nature stewardship.
viii. Owners of underground infrastructure: Owners of underground infrastructure include companies that own underground infrastructure like telephone lines, electric lines and water supply/wastewater pipes. These include Telecom, Liander, Vitens, Ziggo, KPN etc. They would have low interest in the project, but high power in reconstruction of the street.
ix. Water Board Vallei en Veluwe: Since this report also focuses on water management in the area, the Water Board will also be a stakeholder. While they would have some interest in the project, we do not expect them to have a high influence.

C. Extensive Heat stress & Water Management results

Measure	Bearing capacity (m^3)	Ground water recharge (mm/year)	Evapotranspiration (mm/year)	Heat reduction (°C)	Number of cool areas	Return period
Trees	137	3	1	0.07	1	1.18
Ditches	32	7	0	0	0	2.15
Green façades	1	0	0	0	0	1
Green roofs	443	0	5	0.07	0	1.15
City parks	180	6	5	0.09	2	7.53
Semi-permeable pavement	24	0	0	0	0	1.14
Creating shadow	120	0	0	0.01	0	1
Depaving	77	1	1	0.04	0	1.52

Parameter values based on different measures

D. Examples of implemented greening strategies in the Kamp

Planting trees, with a ‘Boomspiegel’ with appealing plants and flowers. The current trees will be removed in other projects, so new trees are of the essence for the green appeal of the streets. This example is in front of the Scapino. The lanterns will be removed by another project, so they are also removed in these examples.

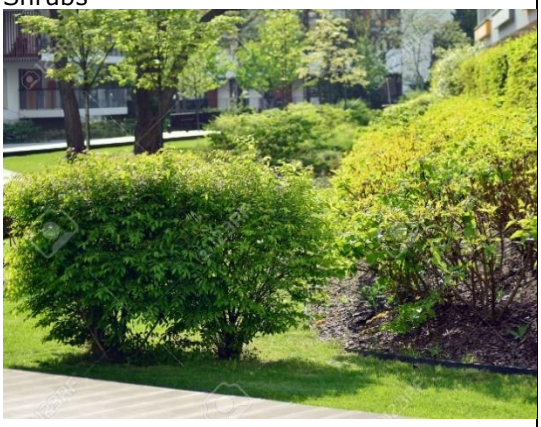
A pergola, placed on the wall, and a few meters on the side walk, without obstructing the pedestrians too much. The pergola is a base for a climbing or hanging plant. This example is next to the Fietsdiscounter. The in case the pergola not be suitable, an example case implementing a façade garden is given as well.


FIETSDIS

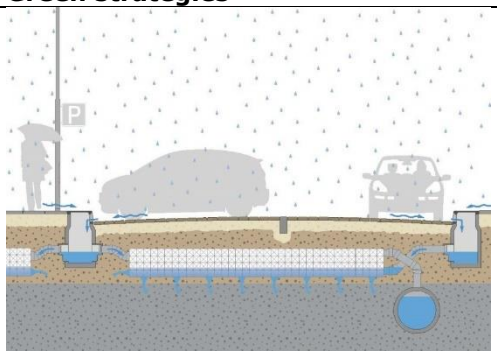
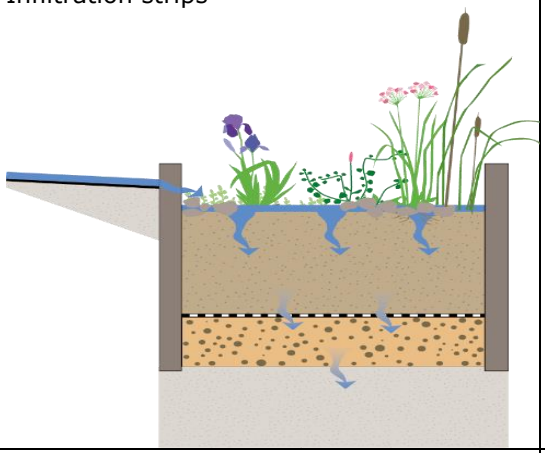
E. List of Greening strategies in the Kamp

No.	Green strategies	The reason we use or reject it
1	Trees 	Implement: **YES** Benefit: ▪ Suitable for wide streets ▪ Reduced and more appropriate urban traffic speed because street trees create vertical walls framing streets, providing a defined edge to help car drivers move and control their speed(Burden, 2006). ▪ A safer walking environment because street trees form and frame visual walls and provide a distinct edge between pedestrians and vehicles (Burden, 2006). ▪ Improves business: a study about business on Treescape shows 12% higher income (Burden, 2006). ▪ Rain, sun, heat, and skin protection. ▪ More aesthetic pleasure environment Requirement: • substantial soil volumes to support their extensive root systems and reach their full mature size potential. • Sufficient planting space Limitations: • Problems with loading and unloading for transportation, limited root spaces (Van Ekeren et al., 2024). • Insufficient soil volume and rooting space can stunt the growth and canopy spread of large trees, limiting their ability to provide maximum shade and environmental benefits • The extensive root systems and large canopies of mature trees can conflict with underground utilities and sidewalks, leading to potential damage and maintenance issues • As large trees grow, their roots can uplift and crack sidewalks, curbs, and other paved surfaces, creating accessibility issues for pedestrians. • The large canopies of mature trees can interfere with buildings and other infrastructure, potentially causing damage or obstructing visibility and access(Kendall, 2020).
2	Façade Garden	Implement: **YES** Benefit • Cheap and easy to plant

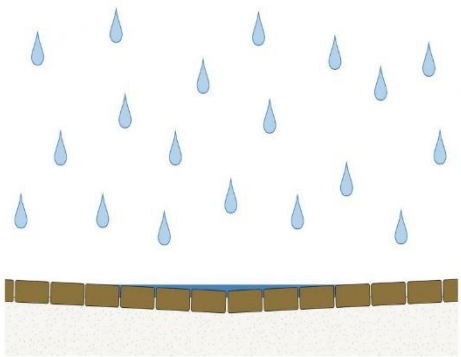
No.	Green strategies	The reason we use or reject it
		• They are easily implementable when dealing with heritage, and they take up little space, enabling traffic to pass through (Van Ekeren et al., 2024). • Facade gardens add visual interest, colour, and natural beauty to urban landscapes, enhancing the overall aesthetic appeal of cities (Winants, 2021) • Restoring a diverse ecology to urban areas (Holloway et al., 2003). Requirement • Check with local authorities or municipalities for any regulations, permits, or restrictions related to planting shrubs along streets (Winants, 2021). • building owners need to agree on it (Van Ekeren et al., 2024). Limitation • require regular maintenance, including watering, pruning, and replanting • Unmaintained or neglected facade gardens can become unsightly • may require obtaining approvals or permits from the local community, shop owner, or municipality, adding complexity to the process (Winants, 2021).
3	Climbing plants 	Implement: **YES (within green façades and pergolas)** Benefit: ▪ can cover vertical surfaces like walls, fences, and building facades, providing greenery where horizontal space is limited. ▪ visually appealing, adding color, texture, and natural beauty to urban landscapes, enhancing the overall aesthetic appeal of cities ▪ can be used to create green facades by growing directly on building surfaces or as part of living wall systems (Gunawardena & Steemers, 2019). ▪ can influence the microclimate by reducing surrounding temperatures and creating a more pleasant environment. Requirement: • building owners need to agree on it. • Select climbing plant species that do not compete excessively with the

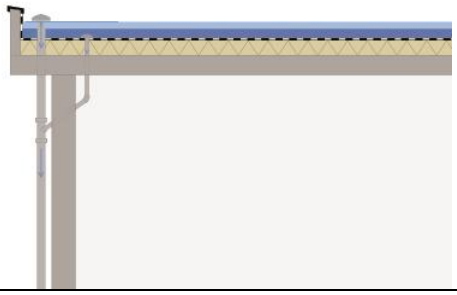
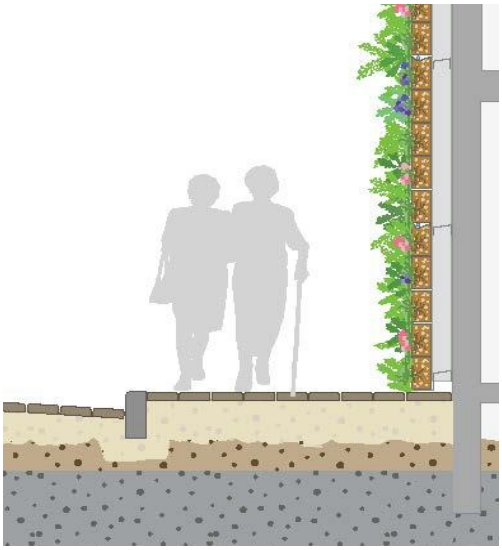
No.	Green strategies	The reason we use or reject it
		street trees for water, nutrients, and sunlight. Limitation: • If left unmanaged, climbing vines can potentially grow onto nearby buildings, fences, or infrastructure, damaging surfaces or structures. • Access for maintenance may require specialized equipment like lifts or scaffolding
4	Shrubs 	Implement: **YES (within façade gardens and planters)** Benefit ▪ can be planted in smaller spaces or combined with trees and façade gardens ▪ require relatively low maintenance compared to trees ▪ provide food and shelter for various urban wildlife species, such as birds, insects, and small mammals, promoting biodiversity (Ghafari et al., 2020) Requirement • Choose shrub species and varieties that are tolerant of urban conditions, • Consider the mature size, growth habit, and maintenance requirements of the selected shrubs Limitation • may compete with street trees for water, nutrients, and sunlight, potentially stunting the growth or health of the trees • Shrubs require regular pruning, weeding, and maintenance to prevent overgrowth and maintain their intended shape and size (Sharmin et al., 2024).
5	Herbs and grasses	Implement: **YES (within façade gardens and planters)** Benefit ▪ help purify the air by absorbing pollutants and producing oxygen, improving air quality in cities. ▪ herb and grass mixtures provides shading and evaporative cooling, helping to mitigate the urban heat island effect.

No.	Green strategies	The reason we use or reject it
		Requirement • regular maintenance, including watering Limitation • can lead to soil compaction, making it difficult for grass to establish and thrive in these areas • may impede accessibility for pedestrians, especially those with mobility challenges, as they can be difficult to traverse compared to paved surfaces. • Unmaintained grass can appear unkempt and negatively impact the visual appeal
6	Planters 	Implement: **YES** Benefit ▪ can be placed in various urban settings ▪ can be designed to be movable, enabling temporary or seasonal greening of urban areas and flexibility in urban design ▪ can control traffic flow, create designated pedestrian zones, and enhance pedestrian safety by acting as physical barriers and buffers between vehicles and pedestrians ▪ add visual appeal and greenery to urban landscapes ▪ provide habitats for various species of birds, insects, and small animals Requirement • regular maintenance, including watering, pruning, and replanting Limitation • require space on sidewalks or along streets, which can be limited in dense urban areas with high pedestrian traffic • require regular maintenance • Some planters may need to be relocated or removed temporarily due to utility repairs or changes in street design. This can disrupt the continuity of greening efforts and incur additional costs for relocation or replacement.
7	Infiltration crates	Implement: **NO** The rejection reason: • Infiltration crates are purely functional structures with no aesthetic or recreational value. They

No.	Green strategies	The reason we use or reject it
		do not contribute to the visual appeal or liveability of urban areas. • do not support the growth of plants, trees, or other vegetation on top of them. This makes them unsuitable for creating green spaces, parks, or urban gardens.
8	Infiltration strips 	Implement: **No** The rejection reason: • Infiltration strips could be used to improve water management with facades. As Amersfoort has a low ground water level, which would mean the infiltration strips need to be used in combination with infiltration crates, to retain the water. The infiltration crates are not suitable for vegetation covering them, which causes them to fall outside of the vision of this project.
9	Green roof 	Implement: **YES** Benefit ▪ Green roofs know many benefits, amongst which are decrease of heat stress, increase of biodiversity, increase of air quality, and they have insulating properties. ▪ They are versatile and can easily be combined with other green innovations and water management measures. ▪ Improve the psychological benefits (Williams et al., 2019) Requirement • Plant selection • Regular maintenance • The roof structure must have sufficient load-bearing capacity to support the additional weight of the green roof system, including the growing medium, vegetation, and moisture retention Limitation • green roofs cannot be applied to monumental buildings and weaker roofs
10	Green balconies	Implement: **NO**

No.	Green strategies	The reason we use or reject it
		The rejection reason: • Although green balconies would be a positive contribution to greening of the city, there is negligible number balconies in our study area. Therefore, this option is not included in our greening strategy.
12	Pocket Park 	Implement: **NO** The rejection reason: • Pocket parks could provide significant amounts of green to the city, as they cover a relatively large area. Hence, this is why pocket parks cannot contribute to the greening of our study area, as no such space is available there.
13	Fountains 	Implement: **NO** The rejection reason: • Fountains can provide a cooling effect at the cost of water and energy. As fountains merely contribute to heat stress, where other greening strategies are more versatile, we chose not to include the in our greening plan for this area.
14	Bird boxes and feeder 	Implement: **YES** Benefit ▪ Support biodiversity is cheap and easy to place (Van Ekeren et al., 2024). ▪ Provide nesting sites, encouraging bird presence and increasing the populations within urban areas ▪ Integrating bird boxes into other green infrastructure creates a more holistic and functional ecosystem ▪ The presence of birds can aid in pollination, seed dispersal, and overall health of the vegetation ▪ Enhance the aesthetic

No.	Green strategies	The reason we use or reject it
		Requirement • They work best when other green innovations exist close by so the birds can live in the area. • Consider factors such as box design, placement, and maintenance to ensure their effectiveness and longevity Limitations • do not have a clear effect on heat stress, water management, air quality
15	Insect hotel 	Implement: **YES** Benefit ▪ Insect hotels can greatly increase the biodiversity and are easy to place. ▪ provide nesting sites and shelter for a variety of beneficial insects like bees, ladybugs, and lacewings ▪ Enhancing pollination for the vegetations in the city ▪ Add visual interest when its design creatively Requirement • most insects travel no more than 70 metres for their food, so insect hotels would only be effective if there is plenty of greenery with nectar producing flowers close by • consider factors such as box design, placement, and maintenance to ensure their effectiveness and longevity Limitations • do not have a clear effect on heat stress, water management, air quality
16	Hollow roads 	Implement: **YES** Benefit ▪ roads improve water management by draining rainwater better from the street. It does not influence the layout of the city on factors such as crowdedness and traffic management. When substantial changes need to be made to the underground infrastructure it is possible to combine that with implementing this innovation. Requirement

No.	Green strategies	The reason we use or reject it
		• consider factors such as vegetation management, accessibility, and safety Limitations • the initial costs of restoring and maintaining hollow roads may be higher • If not properly designed and maintained, the vegetation and topography of hollow roads can impede proper drainage
17	Water roofs 	Implement: **NO** The rejection reason: • Water roofs need roofs that can support the weight, and building owners need to agree on this. • Many monumental buildings will not be suitable for the weight of water roofs, as well as for the changes that would need to be made
18	Green façade 	Implement: **YES** Benefit ▪ help mitigate the urban heat island effect by providing shade and evaporative cooling ▪ enhance the visual appeal of urban environments ▪ Green facades act as insulation for buildings, reducing the amount of heat absorbed and lowering energy demands for cooling Requirement • Proper plant selection, structural support, irrigation systems, and maintenance plans are crucial for successful implementation Limitations • may not be suitable for all building types, especially monumental buildings • require regular maintenance like pruning, irrigation, and plant replacement • Improper maintenance can lead to issues like plant die-off, pests, or damage to the building envelope. • Access for maintenance may require specialized equipment like lifts or scaffolding
19	Semi-permeable paving	Implement: **Yes**

No.	Green strategies	The reason we use or reject it
		Benefit ▪ allows water to infiltrate through the surface layer into the ground below, reducing stormwater runoff ▪ As water passes through the paving system, pollutants like oil, sediment, and heavy metals are filtered out before reaching groundwater or surface water bodies Requirement • Proper installation, maintenance, and sediment control measures are crucial for ensuring the system's continued permeability over time. Limitations • Expensive but can provide long-term cost savings by reducing stormwater infrastructure needs and maintenance • Require regular maintenance • Not suitable for or areas with heavy vehicular traffic or heavy loads, as they can become compacted or damaged over time
20	Green pergola 	Implementation: **YES** Benefit ▪ They serve multiple purposes: they reduce heat stress, provide shade, increase the attractiveness of the city, contribute to biodiversity and improve air quality Requirement • Proper selection plant • Regular maintenance • Require sturdy support structures to bear the weight of the vegetation, Limitation • Could be limited space available • The installation of a green pergola can be expensive

F. Interview Guide Entrepreneurs

Interview guide voor winkeliers

- Opening
- Toestemming vragen voor opname en benoemen hoelang het interview duurt
- Introduceer team
    - Wie zijn we
    - Studieachtergrond
    - Wageningen University
- Introduceer project
    - Definitie
    - Doel
    - Doel interview
- Benoem hoe we de data die we verzamelen gebruiken
- Informatie over De Kamp

Naam winkel:
Huidige situatie

- Hoe lang is deze winkel al gevestigd in het studiegebied?
- Wat is uw doelgroep? (oude mensen, jonge mensen, voorbijgangers, gerichte bezoekers, lang bezoek, kort bezoek, anders?)
- Wanneer u De Kamp voor u ziet, wat vindt u van de huidige situatie met betrekking tot het design en de visuele aantrekkelijkheid?
  kerst mooi, park mooi, omgeving mooi straat lelijk
- Gebaseerd op de huidige situatie met betrekking tot het design en de visuele aantrekkelijkheid; denkt u dat De Kamp verbeteringen kan gebruiken?
  Autoluw verduidelijken, More space on the side walk
- Wat vindt u van het groen in De Kamp?
- Bent u zich bewust van klimaatproblemen die invloed kunnen hebben op uw klanten?
- Bent u zich bewust van klimaatproblemen die invloed kunnen hebben op uw winkel en uw werknemers?

Gedrag van bezoekers De Kamp

- Op basis van uw visie, wat is de hoofdreden dat mensen De Kamp en de zijstraten bezoeken?
  targeted shoppers, tourists, plattegrondjes en evenementen voor naamsbekendheid

*** introduceer aantrekkelijkheid ****

- Hoe denkt u dat de aantrekkelijkheid van De Kamp impact heeft op het aantal bezoekers in De Kamp en zijstraten?
  veel impact, hoofdstraat houd duidelijk op, geen zelfde doelgroep dus minder uitnodigend om door te lopen
- Hoe denkt u dat de aantrekkelijkheid van De Kamp impact heeft op de hoeveelheid tijd die mensen spenderen in De Kamp en zijstraten?
  kan verbeterend zijn maar hangt af van aanbod van winkels, winkels net te specifiek
- Hoe denkt u dat het koopgedrag in De Kamp en zijstraten zich verhoudt tot dat in andere gebieden in het centrum van Amersfoort?
- Veel gericht winkel naar voornamelijk een winkel, winkels ondersteunen elkaar nauwelijks

Gedrag van winkelend publiek

- Heeft u specifieke dingen opgemerkt over het (koop)gedrag van winkelend publiek in de afgelopen jaren?
  COVID, redelijk goed vanwege bezorging, mensen gaan meer weg uit Amersfoort in weekenden of vakanties

- Heeft u in de afgelopen jaren een verandering opgemerkt in het aantal bezoekers van uw winkel?
    - Hoe denkt u dat dit komt?
- Hoe denkt u dat de lokale gemeenschap De Kamp beschouwt?
  niet perse een goed stukje amersfoort
- Wat zijn de grootste uitdagingen waarmee u wordt geconfronteerd?
  ondernemers voelen zich niet gesteund door gemeente, dus zijn ondernemers minder bereid om mee te helpen

Mening over het vergroenen van De Kamp

- Hoe staat u tegenover het idee om de Kamp te vergroenen?
- Welke vormen van vergroening denkt u dat het meest voordelig zouden zijn voor De Kamp? (Bomen, bloembedden, groene daken, verticale tuinen)
  bloembakken stier heel goed
  Bomen al genoeg
  Meer lage begroeing
- Welke mogelijkheden of voordelen voorziet u bij de implementatie van vergroeninginitiatieven in De Kamp?
  aantrekelijker maakt -> meer bezoekers
  beter voor hitte verminder en meer schaduw
- Welke mogelijke uitdagingen of zorgen voorziet u bij de implementatie van vergroeninginitiatieven in De Kamp?
  onderhoud..
- Denkt u dat de voordelen opwegen tegen de nadelen van het vergroenen van de kamp?
- Hoe denkt u dat vergroening specifieke problemen in De Kamp, zoals wateroverlast en hittestress, kan beïnvloeden?
- Hoe denkt u dat het vergroenen van De Kamp de aantrekkelijkheid van het gebied voor shoppers en bezoekers zal beïnvloeden?
- Hoe denkt u dat het vergroenen van de kamp invloed heeft op uw winst?
- Zou u willen bijdragen aan het vergroenen van de Kamp? Zo ja, hoe? Zo nee, waarom niet?

- Heeft u nog vragen of opmerkingen? Of wilt u nog iets toevoegen?

Afsluiting

- Bedanken
- Nogmaals benoemen wat we met data doen
- Benoemen dat we op elk moment de data kunnen verwijderen als de geïnterviewde niet meer wil meedoen
- Benoemen dat we contact opnemen als wij vragen hebben en dat dat andersom natuurlijk ook kan.

G. Questionnaire

Ênquete vergroening De Kamp

Hallo, bedankt voor uw moeite om naar onze ênquete te kijken.
Wij zijn een groep studenten van de Wageningen Universiteit, die onderzoek doen naar de kosten-batenanalyse van het vergroenen van de binnenstad van amersfoort. Wij focussen ons vooral op De Kamp.
Om uw ideeën en meningen beter te begrijpen, zou het ons enorm helpen als u deze ênquete in zou willen vullen.
Voel u vrij om de ênquete zo kort of uitgebreid als u wil in te vullen.
De antwoorden zijn volledig anoniem, we komen niet te weten wie u bent of wie deze ênquete invult.
We zullen zorgvuldig omgaan met uw privacy.
U kan op elk gewenst moment stoppen met het invullen van de ênquete, en bent nergens toe verplicht.

Namens ons gehele team, dankuwel!

* Required

Persoonlijke Gegevens

1. Wat is uw leeftijd? *

- ◯ 18-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55-64
- ◯ 65<

2. Hoe identificeert u zich? *

- ◯ Vrouw
- ◯ Man
- ◯ Anders
- ◯ Niet van toepassing

3. Welke beschrijving past het beste bij u als bezoeker van het centrum? *

- ◯ Inwoner van Amersfoort (centrum)
- ◯ Inwoner van Amersfoort (andere wijken)
- ◯ Winkelend publiek
- ◯ Toerist
- ◯ Other

Doel van Bezoek

4. Wat is uw doel voor het bezoeken van het stadscentrum van Am rsfoort? *

- ◯ Winkelen
- ◯ Vrijetijdsbesteding/Recreatie
- ◯ Werk/Zaken
- ◯ Uit eten
- ◯ Other

5. Hoe vaak bezoekt u het stadscentrum van Amersfoort? *

- ◯ Dagelijks
- ◯ Wekelijks
- ◯ Maandelijks
- ◯ Zelden
- ◯ Voor de eerste keer

Perceptie van Winkelgedrag

6. Hoe zou u uw **online** koopgedrag van 10 jaar geleden omschrijv n? *

- ◯ Ik kocht nooit dingen online
- ◯ Ik kocht zelden dingen online
- ◯ Ik kocht af en toe dingen online
- ◯ Ik kocht regelmatig dingen online
- ◯ Ik kocht vaak dingen online

7. Hoe zou u uw koopgedrag in **fysieke winkels in het centrum van Amersfoort** van 10 jaar geleden omschrijven? *

- ◯ Ik kocht nooit dingen in fysieke winkels
- ◯ Ik kocht zelden dingen in fysieke winkels
- ◯ Ik kocht af en toe dingen in fysieke winkels
- ◯ Ik kocht regelmatig dingen in fysieke winkels
- ◯ Ik kocht vaak dingen in fysieke winkels

8. Hoe zou u uw huidige **online** aankoopgedrag omschrijven? *

- ◯ Ik koop nooit dingen online
- ◯ Ik koop zelden dingen online
- ◯ Ik koop af en toe dingen online
- ◯ Ik koop regelmatig dingen online
- ◯ Ik koop vaak dingen online

9. Hoe zou u uw huidige koopgedrag in **fysieke winkels in het centrum van Amersfoort** omschrijven? *

- ◯ Ik koop nooit dingen in fysieke winkels
- ◯ Ik koop zelden dingen in fysieke winkels
- ◯ Ik koop af en toe dingen in fysieke winkels
- ◯ Ik koop regelmatig dingen in fysieke winkels
- ◯ Ik koop vaak dingen in fysieke winkels

Perceptie van de huidige Situatie

10. Hoe zou u de aantrekkelijkheid van De Kamp momenteel beoord len op een schaal van 1-10?
*

0	1	2	3	4	5	6	7	8	9	10

Not good at all — Extremely good

11. Hier kunt u uw antwoord op de vorige vraag toelichten en beschrijven welke zaken u mist in De Kamp

12. Welke elementen vindt u positief aan de huidige situatie in De Kamp? (Meerdere antwoorden mogelijk)
*

- [ ] Divers aanbod aan winkels
- [ ] Prettige sfeer
- [ ] Kleine lokale bedrijven
- [ ] Groene uitstraling
- [ ] Goed bereikbaar met de auto
- [ ] Goed bereikbaar met de fiets
- [ ] Goed bereikbaar met het openbaar vervoer
- [ ] Goed bereikbaar te voet
- [ ] Mooie gebouwen
- [ ] Geen
- [ ] Other

13. Welke elementen vindt u negatief aan de huidige situatie in De Kamp? (meerdere opties mogelijk)

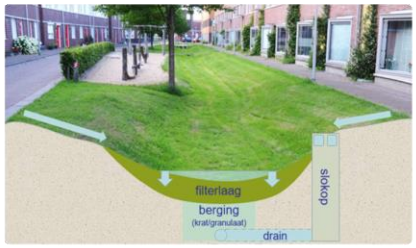
- [ ] Klein aanbod aan winkels
- [ ] Onprettige sfeer
- [ ] Weinig grote ketens
- [ ] Te weinig groen
- [ ] Slecht bereikbaar met de auto
- [ ] Slecht bereikbaar met de fiets
- [ ] Slecht bereikbaar met het openbaar vervoer
- [ ] Slecht bereikbaar te voet
- [ ] Onaantrekkelijke gebouwen
- [ ] Geen
- [ ] Other

14. Welke van de volgende elementen zouden het voor u minder aantrekkelijk maken om het centrum van Amersfoort te bezoeken? (Meerdere antwoorden mogelijk) *

- [ ] Regen
- [ ] Hitte in de zomer
- [ ] Te weinig schaduw
- [ ] Te weinig bankjes
- [ ] Geen
- [ ] Other

Vergroeningsstrategieën

15. Welke van de volgende opties zou u het liefst geïmplementeerd zien in De Kamp en de aangrenzende zijstraten? (meerdere opties mogelijk) *



☐ Wadi's

☐ Grote bomen

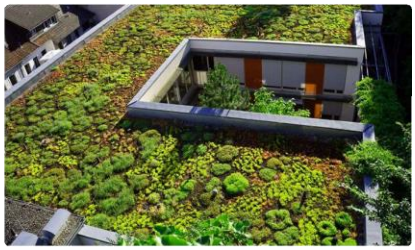
☐ Klein bomen

☐ Struiken

☐ Perken met bloemen en planten

☐ Geveltuintjes

☐ Groene gevels



☐ Groene daken

☐ Kleine vijvers

☐ Fonteinen

16. Hier kunt u uw keuze toelichten:

Economische Impact

17. Zou u bereid zijn meer tijd door te brengen in een groen r stadscentrum?

- ◯ Helemaal mee eens
- ◯ Enigszins mee eens
- ◯ Niet mee eens, niet mee oneens
- ◯ Enigszins mee oneens
- ◯ Helemaal mee oneens

18. Zou u bereid zijn meer geld uit te geven in een groener winkelgebied?

- ◯ Helemaal mee eens
- ◯ Enigszins mee eens
- ◯ Niet mee eens, niet mee oneens
- ◯ Enigszins mee oneens
- ◯ Helemaal mee oneens

19. Hoeveel meer bent u bereid te betalen voor producten of diensten in groenere gebieden? *

- ◯ 0 %
- ◯ 1 - 5 %
- ◯ 6 - 10 %
- ◯ 11 - 15 %
- ◯ Meer dan 15 %

Milieu- en Gezondheidsvoordelen

0. Denkt u dat een vergroening goed zal zijn voor uw fysiek gezondheid? *

- ◯ Helemaal mee eens
- ◯ Enigszins mee eens
- ◯ Niet mee eens, niet mee oneens
- ◯ Enigszins mee oneens
- ◯ Helemaal mee oneens

21. Denkt u dat vergroening bijdraagt aan de mentale gezondheid? *

- ◯ Helemaal mee eens
- ◯ Enigszins mee eens
- ◯ Niet mee eens, niet mee oneens
- ◯ Enigszins mee oneens
- ◯ Helemaal mee oneens

Voordelen en Kosten van Vergroening

2. Wat zijn volgens u de belangrijkste voordelen van het gro ner maken van De Kamp? (Vink alles aan wat van toepassing is) *

- ☐ Verbeterde luchtkwaliteit
- ☐ Lagere temperatuur
- ☐ Esthetische aantrekkingskracht
- ☐ Verhoogde biodiversiteit
- ☐ Ruimte voor recreatie en ontspanning
- ☐ Verhoogde winst voor winkeleigenaren
- ☐ Verhoogde vastgoedwaarde
- ☐ Other

23. Wat is volgens u het negatieve effect van het groener maken van De Kamp? (Vink alles aan wat van toepassing is)
*

- [ ] Bouwkosten
- [ ] Onderhoud van planten
- [ ] Mogelijke bron van pollen
- [ ] Bladafval
- [ ] Insecten
- [ ] Geen
- [ ] Other

24. Hoe denkt u dat vergroeningsprojecten de beschikbaarheid van parkeerruimte kunnen beïnvloeden?
*

- ◯ Sterke vermindering
- ◯ Enige vermindering
- ◯ Geen verandering
- ◯ Enige toename
- ◯ Sterke toename

WOZ Waarde

5. Bent u een inwoner van de binnenstad van Amersfoort? *

- ◯ Ja
- ◯ Nee

26. Vergroening kan ervoor zorgen dat de WOZ (belasting) waarde van woningen in het gebied stijgt. Dit verhoogt de waarde van de woning, wat voordelig kan zijn als u de woning wilt verkopen. Echter, u moet ook meer belastingen betalen. Wat is uw mening hierover?
*

H. Consent letter interview

Vergroenen De Kamp – Interview toestemmingsverklaring

Een sociale kosten-baten analyse van vergroeningsstrategieën in De Kamp in Amersfoort

Geachte heer/mevrouw,

Deze studie betreft het verzamelen van informatie voor het uitvoeren van een kosten-batenanalyse met betrekking tot het vergroenen van De Kamp en de zijstraten van de Kamp in Amersfoort. In de uitnodiging per mail heeft u enige informatie ontvangen over deze studie en de vraag of u wilde deelnemen aan dit onderzoek. In deze brief vatten wij die informatie nogmaals samen. Op basis van deze informatie vragen wij uw formele toestemming voor deelname aan het interview, waarbij u kunt aangeven of u specifieke wensen heeft met betrekking tot het interviewproces.

Achtergrondinformatie

Deze studie maakt deel uit van het vergroeningsplan van De Kamp, geïnitieerd door de Gemeente Amersfoort en de Ondernemersvereniging Binnenstad Amersfoort (OBA). De OBA heeft de Science Shop in Wageningen benaderd voor het uitvoeren van een kosten-batenanalyse voor dit plan. Wij, acht studenten van Wageningen Universiteit, voeren dit onderzoek uit als onderdeel van het vak Academic Consultancy Training. Voor dit vak schrijven wij een adviesrapport voor de Gemeente Amersfoort en de OBA.

In de afgelopen jaren is het koopgedrag van consumenten veranderd. Zij doen steeds meer aankopen online in plaats van in fysieke winkels. De Gemeente Amersfoort en de OBA willen daarom de binnenstad van Amersfoort transformeren van een plek waar men alleen aankopen doet naar een plek waar consumenten, toeristen en inwoners willen zijn en blijven. Hoe meer tijd zij doorbrengen in de binnenstad, hoe meer zij zullen uitgeven. Dit is van belang voor de ondernemers in de binnenstad. Het aantrekkelijk maken van de binnenstad draagt bij aan het creëren van een plek waar mensen willen verblijven.

Doel van het onderzoek en het interview

Om te bepalen of de huidige plannen het waard zijn om door te voeren, is het van belang een sociale kosten-batenanalyse uit te voeren. Aan de hand van dit interview willen wij onderzoeken wat voor ondernemers de sociale kosten en baten zijn met betrekking tot het vergroeningsplan in De Kamp. Hierbij vragen wij specifiek om uw mening en inzichten, omdat deze ons een vollediger beeld geven van de perceptie van de ondernemers in de stad.

Onderwerpen die we graag met u bespreken zijn onder andere:

- De huidige situatie in De Kamp en omgeving
- Gedrag van bezoekers van De Kamp en omgeving
- Gedrag van winkelend publiek in De Kamp en omgeving
- Het vergroeningsplan van De Kamp

Het interview zal ongeveer 30 minuten duren. We streven naar een gesprek waarin u zich comfortabel voelt. Tijdens het interview zullen er 2-3 onderzoekers aanwezig zijn die het gesprek met u voeren of aantekeningen maken.

Privacy en toestemming

Alles wat tijdens het interview wordt besproken, zal vertrouwelijk worden behandeld, evenals de gegevens die wij verzamelen. Deze gegevens kunnen worden verwerkt in verschillende vormen, zoals geanonimiseerde citaten. Daarnaast willen wij u vragen of wij het interview mogen opnemen. Dit is van belang voor de analyse van de gegevens.

Wij hopen dat wij u voldoende informatie hebben gegeven voor het geven van uw toestemming. Als u vragen heeft, kunt u contact opnemen met Karinke Zeldenrust: Karinke.zeldenrust@wur.nl .

Tekenen van uw toestemmingsverklaring

- Ik heb deze informatiebrief gelezen.
- Ik weet dat deelname aan dit onderzoek vrijwillig is en dat ik op elk moment kan terugtrekken.
- Ik weet dat dit interview wordt gehouden met studenten die het vak "Academic Consultancy Training" volgen aan Wageningen Universiteit.

Ik geef toestemming voor de volgende procedures (kies naar wens):

- ☐ Het interview mag worden opgenomen
- ☐ Het interview mag niet worden opgenomen

Naam van de participant:

Handtekening:

Datum: …./…./…….

Hartelijk dank voor uw deelname aan ons onderzoek.

Namen van de aanwezige interviewers:

Handtekeningen:

Datum: ……/……../…....

H. List of questions via Email

Interviewvragen ondernemers De Kamp en zijstraten

Naam winkel:

Huidige situatie

1. Hoe lang is deze winkel al gevestigd in het studiegebied?
2. Wat is uw doelgroep? (oude mensen, jonge mensen, voorbijgangers, gerichte bezoekers, lang bezoek, kort bezoek, anders?)
3. Wanneer u De Kamp voor u ziet, wat vindt u van de huidige situatie met betrekking tot het design en de visuele aantrekkelijkheid?
4. Gebaseerd op de huidige situatie met betrekking tot het design en de visuele aantrekkelijkheid; denkt u dat De Kamp verbeteringen kan gebruiken?
5. Wat vindt u van het groen in De Kamp?
6. Bent u zich bewust van klimaatproblemen die invloed kunnen hebben op uw klanten, uw winkel en uw werknemers?

Gedrag van bezoekers De Kamp

7. Op basis van uw visie, wat is de hoofdreden dat mensen De Kamp en de zijstraten bezoeken?

Aantrekkelijkheid

8. Hoe denkt u dat de aantrekkelijkheid van De Kamp impact heeft op het aantal bezoekers in De Kamp en zijstraten?
9. Hoe denkt u dat de aantrekkelijkheid van De Kamp impact heeft op de hoeveelheid tijd die mensen spenderen in De Kamp en zijstraten?
10. Hoe denkt u dat het koopgedrag in De Kamp en zijstraten zich verhoudt tot dat in andere gebieden in het centrum van Amersfoort?

Gedrag van winkelend publiek

11. Heeft u specifieke dingen opgemerkt over het (koop)gedrag van winkelend publiek in de afgelopen jaren?
12. Heeft u in de afgelopen jaren een verandering opgemerkt in het aantal bezoekers van uw winkel?
    a. Hoe denkt u dat dit komt?
13. Hoe denkt u dat de lokale gemeenschap De Kamp beschouwt?
14. Wat zijn de grootste uitdagingen waarmee u wordt geconfronteerd?

Mening over het vergroenen van De Kamp

15. Hoe staat u tegenover het idee om de Kamp te vergroenen?
16. Welke vormen van vergroening denkt u dat het meest voordelig zouden zijn voor De Kamp? (Bomen, bloembedden, groene daken, verticale tuinen)
17. Welke mogelijkheden of voordelen voorziet u bij de implementatie van vergroeninginitiatieven in De Kamp?
18. Welke mogelijke uitdagingen of zorgen voorziet u bij de implementatie van vergroeninginitiatieven in De Kamp?
19. Denkt u dat de voordelen opwegen tegen de nadelen van het vergroenen van de kamp?
20. Hoe denkt u dat vergroening specifieke problemen in De Kamp, zoals wateroverlast en hittestress, kan beïnvloeden?
21. Hoe denkt u dat het vergroenen van De Kamp de aantrekkelijkheid van het gebied voor shoppers en bezoekers zal beïnvloeden?

22. Hoe denkt u dat het vergroenen van de kamp invloed heeft op uw winst?
23. Zou u willen bijdragen aan het vergroenen van de Kamp? Zo ja, hoe? Zo nee, waarom niet?
24. Heeft u nog vragen of opmerkingen? Of wilt u nog iets toevoegen?

Heel erg bedankt voor uw reactie. Wij stellen dit zeer op prijs. Mocht u nog vragen hebben over het onderzoek, dan kunt u deze stellen via karinke.zeldenrust@wur.nl
Door het invullen van deze enquête gaat u ermee akkoord dat uw antwoorden worden gebruikt in ons onderzoek naar het vergroenen van De Kamp. Uw antwoorden worden gebruikt samen met die van andere ondernemers rondom De Kamp om de publieke opinie te vertegenwoordigen. De antwoorden zullen niet herleidbaar zijn naar individuele ondernemers. Als u op enig moment besluit niet mee te willen doen aan het onderzoek, of nog verdere opmerkingen wilt toevoegen, kunt u dit laten weten via bovengenoemd mailadres. Als u niet meer mee wilt doen aan het onderzoek zullen uw antwoorden worden verwijderd.