Article

Greening the City: How to Get Rid of Garden Pavement! The 'Steenbreek' Program as a Dutch Example

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Abstract: The Steenbreek program is a private Dutch program which aims to involve citizens, municipalities and other stakeholders in replacing pavement with vegetation in private gardens. The Dutch approach is characterized by minimal governmental incentives or policy, which leaves a niche for private initiatives like Steenbreek, that mainly work on behavioural change. The aim of this paper is to build a model based on theory that can be used to improve and better evaluate depaving actions that are based on behavioural change. We tested this garden greening behaviour model in the Steenbreek program. The main result is that the model provides an understanding of the 'how and why' of the Steenbreek initiatives. Based on this we are able to provide recommendations for the improvement of future initiatives. Steenbreek covers a wide range of projects that together, in very different ways, take into account elements of the theoretical framework; either more on information factors, or on supporting factors, sometimes taking all elements together in a single action. This focus is sometimes understandable when just one element is needed (e.g., support), sometimes more elements could be taken into account to be more effective. If a certain element of the framework is lacking, the change of behaviour will not (or will only partly) take place. The model also gives insight into a more specific approach aimed at the people most susceptible to changing their behaviour, which would make actions more effective.

Keywords: green city; pavement; greening behaviour; green gardens; behavioural change model

1. Introduction: Reduction of Green Surface in Cities

1.1. Pavement in Cities

Open areas of soil in cities around the world are becoming increasingly sealed off [1,2]. Small and larger green spaces within a city are becoming scarce due to the building of houses and offices, the construction of new roads and the paving of private gardens. A study with aerial photos in The Netherlands [3] showed that 60% of the surface of the private gardens in urbanized areas in The Netherlands are paved. Van Heezik et al. [4] stated that private gardens cover between 22% and 27% of the total area of seven UK cities and 36% in a small New Zealand city. The sealing off of surface in cities has significant effects on factors such as biodiversity, water retention and heat stress. Gardens should be given special attention in this respect. As such "*it comprises the largest green space in most cities and [has] the greatest potential for increasing the extent of wildlife-friendly and native-[species-]dominated habitat, improving the quality of ecosystem services, and providing opportunities for urban dwellers to reconnect with nature.*" ([4], p. 1). Depaving gardens can locally have large effects on water retention [5] and urban heat stress [6].

This is one of the reasons that initiatives have arisen all over the world that aim to remove pavement from gardens [1]. Steenbreek [7] is one of the oldest and largest initiatives in The Netherlands. The program aims to change the attitude of garden owners

away from having paved gardens to a more green minded approach. A large range of instruments has been developed to achieve this aim (set out in the next section); and in many places Steenbreek projects have been successful in removing pavement. However, the trend in sealing off surface is, at best, only slowed down by such initiatives. Developing an understanding of the way people can change their behaviour towards greening their gardens is important knowledge that can support more effective delivery of Steenbreek and other similar initiatives. Whilst there is much local experience of working with inhabitants and a body of anecdotal evidence, very little research has been directed at identifying effective ways to motivate garden owners to transform their (more) heavily paved gardens to support biodiversity, particularly native biodiversity [4,8–10].

The aim of this paper is therefore to build a model based on theory that can be used to improve and better evaluate depaving actions. We have assessed this garden greening behaviour model with Steenbreek initiatives. Recommendations on how to implement the model are given.

In Box 1 we introduce as an example an inhabitant of Rotterdam, who explained in a newspaper article the reasons why she did not have (more) vegetation in her garden. After the model explanation we will return to this article to illustrate several model characteristics.

Box 1. Shortened newspaper article [11] as example of reasons for removing pavement from the garden (see Appendix A for actual situation).

> "The most paved gardens are located in this Rotterdam neighborhood: I'm ashamed of it."
> Inhabitants of Schiemond have the most paved gardens in Rotterdam. The municipality of Rotterdam claims to be aware that the city is 'quite paved' and says it wants to change this by 'helping and stimulating Rotterdammers to make their own environment greener'. The gardens in Schiemond consist mainly of tiles, tiles and tiles. You can see some vegetation, not of trees and plants, but especially of the dominant weeds. Hardly any gardens seem to be maintained in this part of Delfshaven. "Admittedly, I am ashamed of this garden, you can understand why," says an inhabitant pointing to her backyard. The garden consists for a large part of crooked tiles with one lane of earth where plants are mixed up. She can't remember the last time she tried to maintain the garden. Her garden of five by five meters is visible to everyone in the neighborhood. "I'd rather have it all in grass now, but that costs something. I just can't afford it". This inhabitant is a single mother with three children and lives on social welfare. She has severe back problems, which makes gardening difficult. "But gardening is really in me. If I had someone who could take the tiles out for me, then they would be long gone".
> A representative of organization Groenemorgen, who previously laid out 1000 facade gardens in Schiemond, says: "take immediate action, because a paved environment is a lifeless environment. As soon as you take a tile out, you create life and make room for nature". According to him, "people should think more about the advantages of vegetation. You provide cooling on hot days and prevent flooding when it rains. The story we need to tell more".

1.2. The Role of Gardens in Cities for Wellbeing

In this paper we often use the terms green or green space, which we define as areas with vegetation located within built-up areas; these areas include natural and planted trees, grass, shrubs and flowers [12], in which the natural aspect is important but not dominant [13]. Special attention within this green space is given to gardens, which we define as private spaces adjacent to or surrounding dwellings [14].

Gardens offer substantial potential for supporting people's relationships with nature [9,15], which is confirmed in our own survey (see Appendix C).

However, these opportunities are strongly related to socioeconomic class [16]. In regions with a higher socioeconomic status a greater cover of large mature gardens with higher biodiversity exists, combined with a larger area of public green space. People who live in more deprived neighbourhoods have less nearby biodiverse spaces, and therefore encounter fewer opportunities to connect with nature and gain benefits from urban biodiversity, which also touches upon the issue of environmental justice [17,18]. According to Hand et al. [19] gardens are the most preferred spaces for children, since they do not often make use of the more biodiverse areas in their surrounding neighbourhoods.

As such it is the quality of gardens that is the most important factor defining children's exposure to nature. Research by Chalmin-Pui et al. [20] suggested that vegetation in gardens is important for wellbeing, and that even when small quantities of ornamental plants are added to front gardens within deprived urban communities, it has a positive effect on an individual's stress regulation and aspects of subjective well-being.

1.3. Steenbreek and Steenbreek Alike Programs

Operation Steenbreek was established in 2015 to be able to take action against the trend to pave private gardens (the name "Steenbreek" has two meanings in Dutch; one is the literal "stone break", the other is the more whimsical "Saxifrage" which is a family of herbaceous perennial flowering plants). The seed of this action was planted a year earlier during a meeting in Wageningen, where possible negative effects of pavement, or soil sealing, on urban nature were considered. Four city ecologists together with people from Entente Florale Nederland, the University of Groningen, Wageningen Environmental Research and Van Hall Larenstein University of Applied Sciences, joined forces. In the vision of Steenbreek green gardens can make a large contribution to urban biodiversity. Co-benefits are human well-being, climate adaptation (such as water retention or heat reduction) and civil participation.

Steenbreek is organized as a foundation. Several groups are represented on the Board, green-oriented Dutch NGO's (such as Groei&Bloei; Algemeen Verbond van Volkstuindersverenigingen in Nederland—AVVN; Vereniging Stadswerk Nederland; Vogelbescherming; Boomfeestdag; Instituut Voor Natuureducatie en duurzaamheid—IVN; Koninklijke Nederlandse Natuurhistorische Vereniging—KNNV) and the state institute for nature Staatsbosbeheer. Municipalities, water boards and provinces also connect to Steenbreek. Municipalities, in particular, play a central role for specific Steenbreek activities. Currently, 150 municipalities are members. Steenbreek itself has a more overarching role in knowledge development and exchange, in stimulating and in advising. Nationally, Steenbreek organizes various activities for professional administrators and those involved in practical implementation, civil servants from municipalities, provinces, central government and water boards. Examples are the National Green Day, workshops, knowledge exchange days as well as dissemination of information via digital and paper channels. Most activities take place on a local scale with a great diversity of activities and impact; some municipalities organize many different activities, while others do less. In most municipalities there are activities to stimulate citizens to plant vegetation in their gardens, to educate and inform them during the National Garden Week, sometimes together with local garden centres and often including actions such as 'exchanging a tile for a plant'.

A special project is the yearly 'Steenbreek trophy'. This incentive has been awarded since 2016 (2016 The Hague; 2017 Leeuwarden; 2018 Laarbeek; 2019 Foundation Active Spijk—municipality Zevenaar). It is an internal contest in which connected municipalities or villages compete over who has created the most greening impact that year. The city of The Hague was the first to win this trophy, many tiles in private gardens were replaced with vegetation. Last year's winner was the Foundation Active Spijk, in which the village community had made enormous progress in greening gardens (Figure 1).

Grashof [21] concluded that at this moment Steenbreek meets the goals of municipalities (outcome effectiveness), in terms of number and types of activities, but is not yet able to change citizens' behaviour (outcome effectiveness) in terms of pace and number of changed gardens.

Steenbreek is not the only Dutch project with an aim to make cities greener, but it is the only platform with a broad agenda for the removal of pavement from both private and public spaces. IVN-Groen Dichterbij [22] is, like Steenbreek, a national program, but focuses mostly on public space, organising people around efforts to make their own neighbourhoods greener. Other societal movements like Steenbreek are: Amsterdam Rainproof [23] which focuses on water retention, but lines up with Steenbreek when

pavement removal is an objective; or the MeerBomenNu (More Trees Now) [24] activities for 1 million extra trees during the planting season of 2020/2021 from November till March.

Figure 1. The Foundation Active Spijk is the winner of the Steenbreek trophy 2019 (source: Stichting Steenbreek).

By analysing specific Steenbreek activities we try to understand which factors are relevant in changing behaviour towards depaving. Furthermore, the Steenbreek platform consists of a multitude of initiatives deployed in many Dutch cities. An overarching model could help to exchange good examples, to evaluate the efficacy of operations, and to fit initiatives into a local situation.

2. Materials and Methods

The objective is to build a model to understand changing behaviour in garden greening. The starting point for this was to find a generally accepted model to study behavioural change. After a literature study, we found a more generic model for behavioural change which we adjusted to be more useful for greening the garden in an urban environment, adding elements specific for this situation (e.g., the physical-environmental factors) and filling the model with elements based on literature about greening gardens in the city (see Section 3.2).

This model for garden greening behaviour was tested with Steenbreek initiatives, to see how applicable it is. We selected five cities to represent Steenbreek: Nijmegen, The Hague, Groningen, Leeuwarden, Rotterdam. These cities were chosen as having a geographical spread (west, east, north of The Netherlands), to have some large cities (Rotterdam, The Hague; around 500,000 inhabitants) and some smaller ones (Groningen, Leeuwarden, Nijmegen; between 120,000–220,000 inhabitants), one more active (Nijmegen) and one less active (Leeuwarden), some with outsourcing circumstances (The Hague, Nijmegen) and situations where the municipality runs the projects itself (Leeuwarden, Groningen, Rotterdam).

We conducted interviews in the selected cities using semi-structured questions. These interviews were based on the theoretical model. We also interviewed an expert about the German and Belgium situation, in order to be able to reflect on the Dutch situation. Besides the interviews, we did an internet search into the Steenbreek initiatives in the five selected cities. We assessed the way the elements of the model were used in the initiatives (see additional material). Interviews and assessment of initiatives gave us the opportunity

to show what elements of the model were regularly addressed by the Steenbreek cities and which were not. Sometimes Steenbreek initiatives outside our sample were used for reflecting on specific elements of the initiatives in the sample.

To determine which possible (predisposing) factors of the garden greening behaviour model could actually effect behavioural change, we carried out a digital map study at district level for the five selected cities. In total we examined 101 districts spread over the five cities. With the map study we identified a few physical-environmental factors. We also included national statistical data [25] to determine possible social-cultural factors. We linked these factors to data derived from the Cobra map [26] which provides information about the average percentage of vegetation in a garden per district as well as data from Wageningen Environmental Research about the average amount of public or private vegetation within a buffer zone around an address. All collected data were from 2019. For all these data a correlation analysis was made and 15 factors were selected as most relevant (with a high positive (>0.5) or negative (<−0.5) correlation value (see Appendix B)). Additionally, we connected a survey among (approximately) 400 respondents in relation to people's perception of nature in cities and the contribution of green gardens. This survey demonstrated how factors in the garden greening behavioural model can be connected.

The assessment of Steenbreek initiatives is used to derive recommendations to improve the model and to support a behavioural change in projects like Steenbreek.

3. Theory on Behavioral Change

3.1. Behavioral Change

According to Thaler and Sustein [27] there are three traditional instruments for influencing behaviour: legislation, raising awareness, financial incentives. They added a fourth instrument: 'nudging', which is to alter people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. Besides, less psychological, more sociological instruments can be used: helping people or organizing people (see also Figure 2). This asks for a more two-way interaction [4].
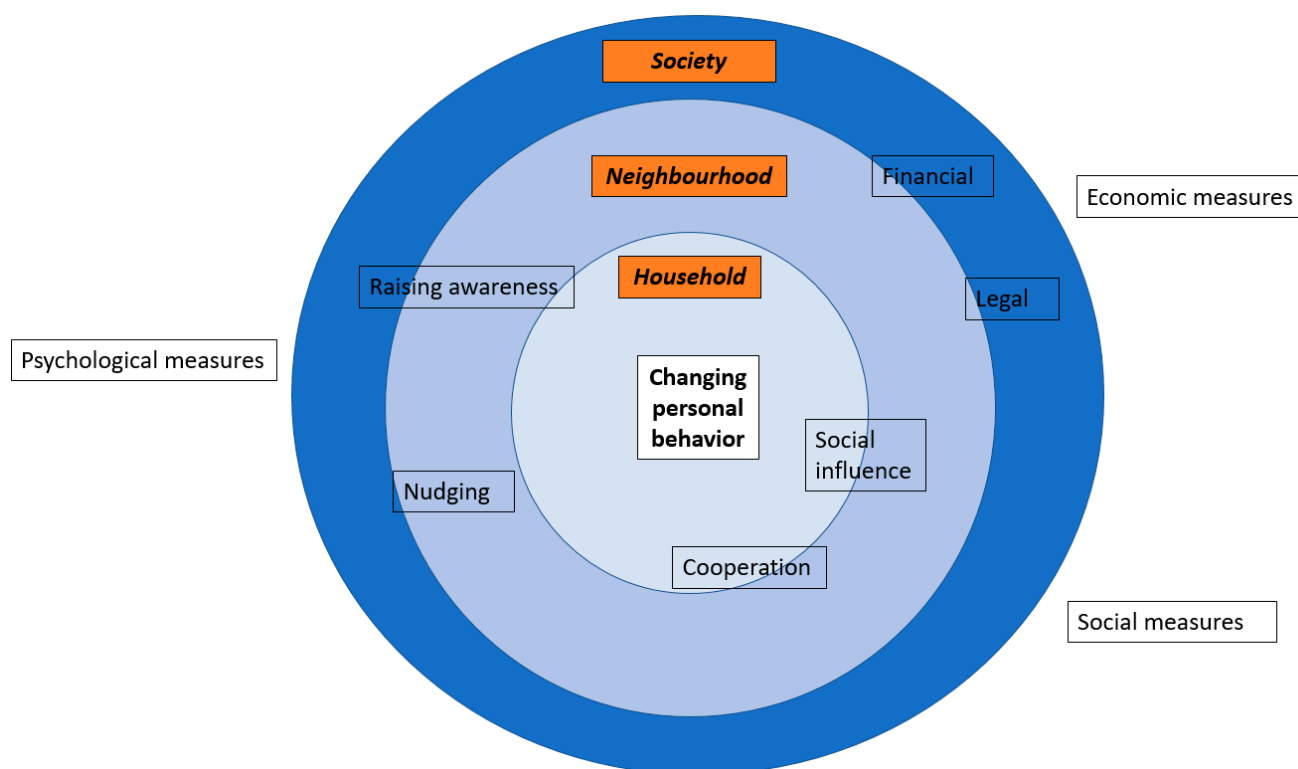

Figure 2. Different measurements to change behaviour at different levels of influence (own figure).

We presumed behaviour is influenced at different levels. The lowest, most direct level is the household in which one lives. At this household level social influences, cooperation and even power relations are important (only valid when there is more than one person in this household). The next level is the neighbourhood level, at which other social aspects are also important, in addition to raising awareness and nudging. At the society level financial and legal instruments to change behaviour can be applied. These measures also influence each other. Sometimes they support each other, sometimes they conflict. For instance, legal measures that create greener cities can also improve social acceptability; or financial incentives can help to build a social movement to influence personal behaviour. Steenbreek often now uses awareness raising as a tool, and sometimes also nudging via small financial incentives (like free plants). Organizing green impact via existing local green groups is also more and more common.

3.2. The Behavioural Change Model

The model we have applied to assess the way Steenbreek influences personal behaviour of greening the garden is an adapted EFSA model (Figure 3) [28]. This model is a combination of earlier models that were designed to describe the way people can be influenced in changing their behaviour, mostly in medical circumstances. De Vries et al. described the model as follows: *"The [original model] states that behaviour is the result of a person's intentions and abilities. A person's intentions can range from no intention to change (precontemplation) to an intention to change the behaviour (preparation). A person's abilities and environmental barriers determine whether their intentions will be realized. Important abilities are plans to implement intentions by specific actions to reach the goal behaviour and actual skills. Motivational factors, such as various attitudes, social influences and self-efficacy, determine a person's intention. Motivational factors are determined by various predisposing factors, information factors (the quality of messages, channels and sources used) and awareness factors (knowledge, risk perceptions and cues to action)"* ([28], p. 613).
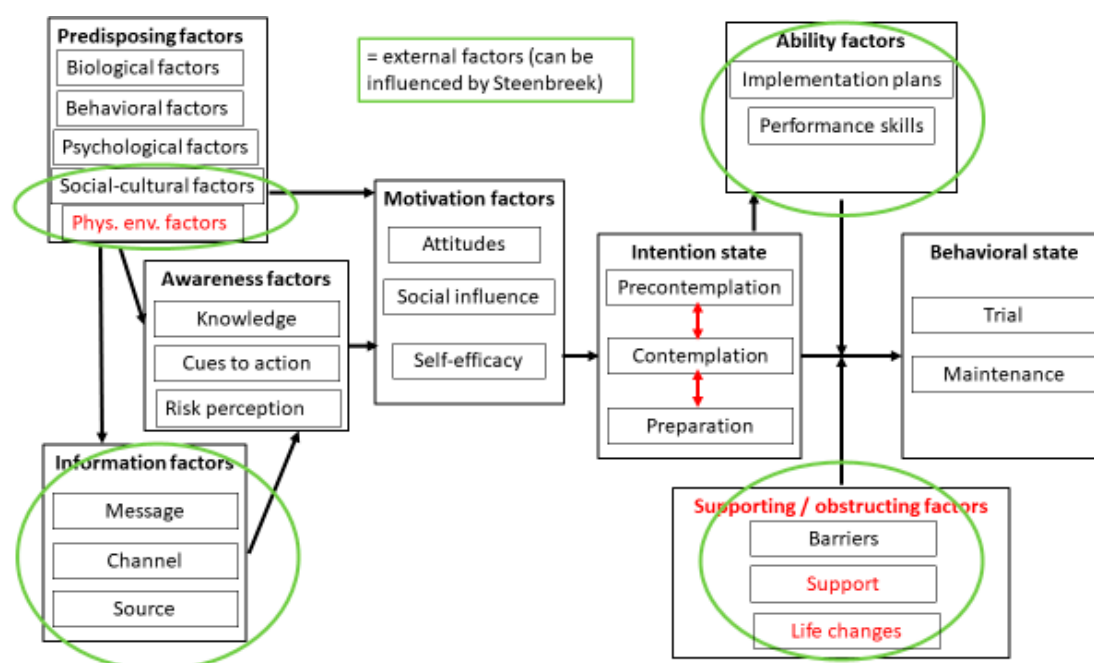
Figure 3. Garden greening behaviour model. An adapted EFSA model [28] with the adaptions in red. Physical environmental factors are added in the box 'predisposing factors'. The original model is a medical model predicting behavioural change after, for instance, anti-smoking campaigns. In changing gardening behaviour the physical factor (size of garden, surrounding gardens, etc.) is also important. Life changes are added as factor that can strongly influence personal behaviour in greening the garden. Green circles depict the factors that we assume can be influenced by Steenbreek.

In the model three main stages of behavioural change can be distinguished: awareness, motivation and action. This model fits the purpose of our study, because it combines a psychological and sociological approach. Most effective, stable, and long-term behavioural change is thought to be achieved if a concept can be applied that requires that recipients think carefully about message content, integrate it into existing belief systems, and act accordingly [4]. However, if someone is not yet motivated, there is an alternative approach that involves the creation of a two-way communication process or an interactive dialog. To change people's gardening behaviour to support biodiversity, requires an understanding of the values that underlie attitudes, an acknowledgement of the norms that influence garden design and management, and a communication style that is effective in achieving long-term stable behaviour change.

The original model was adapted because when changing behaviour towards maintaining 'green' in cities, physical-environmental factors of the surrounding also seem important (for more explanation see later). Second, because changes in the predisposing factors like moving to another district, the birth of a child, or getting another job, can often trigger a change into (more) green behaviour [5,29]. These life changes can either impose green behaviour or the other way around. Furthermore, the model is cyclical, a new behavioural state is subject to all kinds of factors that can change the behaviour again, and the other way around, new behaviour can lead to other predisposing factors (biological, psychological, social). For this reason we will make frequent cross references in the following sections.

3.3. Factors That Can Be Influenced by External Programs

The factors described below can directly be influenced by programs like Steenbreek and are therefore the most important factors in the garden greening behaviour model.

3.3.1. Predisposing Factors

Predisposing factors define the context in which behaviour and behavioural change occur.

Biological and Psychological Factors

In order to maintain a green garden individual behaviour must be able to physically and mentally change. Help for this transition can be provided by training, planning or support in maintenance (ability factors). People can be mentally too distracted (work, life in general, see also barriers) to be able to concentrate on greening or maintaining the garden or can be physically limited (e.g., older people).

A psychological factor that can 'hold people back' is wanting to be in control as much as possible [8]. Vegetation is never completely in control: falling leaves, weeds, insects, etc. Thus some people need to be able to change their 'mind set'.

Human characteristics in relation to how nature is experienced are also important [30]. On the positive side, gardening can be physically and psychologically very healthy. There is a lot of literature that stresses the positive physical and mental effects of gardening and green [31–34]. This can be used as leverage for getting pavement removed.

Landscape aesthetics are also a psychological factor that should be considered [4,35–37], which often means that gardens should not be too wild (looking 'natural').

Behavioural Factors

This section describes the extent to which paved gardens are already a part of daily life. Using and maintaining the garden in a certain way has very often become a habit. To change a habit is not easy, it often needs a trigger. Klöckner and Prugsamatz [38] and Verplanken et al. [39] demonstrated that habits influence the way we search for or get information, and that people with strong habits are much more restricted in the information they search before making a decision. In such a way habits reinforce themselves against change by excluding counter-habitual information from being perceived and processed.

Another aspect of behavioural factors is the question of how the garden is used. Can this usage still take place when the garden is greened (further)? Many gardens are used to

meet other people, to do chores (cleaning furniture etc.), or play (in a safe environment). Is this still possible in a more green garden (see also intention state)?

Physical-Environmental Factors

Physical-environmental factors are related to features of districts in Dutch cities, such as the amount of public green, the period the district was constructed, the way in which it was constructed, the type of housing (private owned single family or apartments or renting). More vegetation in the neighbourhood might imply that people are more likely to put (more) vegetation in their gardens as well [5,8,40]. 'Seeing green is planting green', interpreting Goddard et al. [41] and Zmyslony and Gagnon [42] when they spoke of neighbourhood mimicry. If we separate the social component ('because others do it, we do it', see also next section) then the physical-environmental factor can be seen as inspiration for garden greening behaviour. It shows the positive sides of green (shade in hot summers for instance), and it shows the joy that green can bring, for instance the surprises that nature brings ('a butterfly in the garden!'). It illustrates ways of laying-out of the garden that can be, either small- or large-scale.

Social-Cultural Factors

Many authors stress the fact that cultural and socioeconomic factors shape the motivations and attitudes behind gardening methods and environmental behaviour [4,43,44]. The social-cultural factors can be divided into different realms (see also Figure 1): households, neighbours, municipalities and society/influencers.

- Household: The most direct influence comes from members of the household. Consent must be reached within this group before a change in the appearance of the garden can take place (see Figure 1). All members of a household have needs and wishes. Children want to play (needs), and can have wishes influenced by what they see and hear at school (green school yards).
- Neighbours and other actors: There are two ways that the norms of neighbours can influence people: 1. Perceptions of what others are doing (descriptive norms) 2. What they think others expect them to do (injunctive norms) [45]. Descriptive norms for greening the city are: seeing others greening (or paving) their garden, which imposes a social norm for doing the same, thus suggesting a tipping point in greening or paving. Injunctive norms can inhibit or promote adaptation, depending on whether people believe that others approve or disapprove of this adaptation. However, Bouman and Steg [44] stated that individuals' personal values are difficult to change and that individuals' perceptions of others' values might be more malleable. This is because perceptions of group values are based on limited and biased information, so the perceived group values often deviate from the real group values, also in the area of willingness to change. This suggests campaigning with information about the number of people that want to change (see also nudging). Van Valkengoed en Steg [45] stated that public participation may change perceived descriptive and injunctive norms related to adaptation. The work of a group of citizens can establish a descriptive norm that suggests to the general public that others are willing to engage in adaptation behaviour. Even people who are not actively participating themselves, but hear that different community members are involved in adaptation planning can be influenced.
- Municipalities: In addition to legislation, municipalities can influence the behaviour of inhabitants in two ways: by showing a good example and by cooperation. According to Van Valkengoed and Steg [45] there are six reasons why cooperation between municipalities and inhabitants can influence their behaviour (related to sustainability): 1. A two-way dialogue/conversation can help to determine each other's responsibilities; 2. Jointly developed success-measurements for outcomes can increase the perception of inhabitants in relation to the effectiveness of the work carried out (to develop adaptation measures); 3. It can also raise perceived autonomy and empowerment of citizens, which can increase their personal motivation for undertaking further,

individual adaptive measures; 4. It can increase trust in government and the perceived fairness of adaptation planning. Higher trust in government has been found to be positively, albeit weakly, associated with more engagement in private adaptation behaviour; 5. If citizens are actively involved in adaptation planning, changing behaviour may be perceived as part of a 'citizens' duty' or a 'community value', which may strengthen people's injunctive norm that adaptation is desirable and approved by members of the community; 6. It increases the effectiveness of communication strategies because the collaborating inhabitants become a source of (municipality) information. Through co-operation with local NGO's municipalities can be more effective, because inhabitants will more easily accept a message from locals.

- Influencers: Just showing a vision directed at greening cities and showing moral sentiments about this, without even making regulations, is an incentive for (many) people to change behaviour. Zawadzki et al. [46] showed this for climate change, where the moral sentiments of political leaders predicted respondents' willingness to save energy to reduce climate change and their support for the Paris Climate Agreement. In other words, politicians, and influential people in general, should provide a role model themselves and be explicit about the role that inhabitants can play in greening the gardens.

3.3.2. Information Factors

Information is a message with a certain content and form, that is sent from a certain (trusted or less trusted) source reaching the recipient through a certain channel. All elements of the process add to the amount of impact of the information, let alone other contextual factors [4,45].

Channel

The first question is about whether to use a one-way or a two-way communication channel. Van Heezik et al. [4] were in favour of a two-way channel, because not everybody who joins a project seeks to be informed, the communication can be tailored to individuals and a more equal contribution of all parties could be reached. The second question is: what kind of channels are used: newspaper, internet, word-of-mouth, social media, coffee-moment chat, and we can also consider competitions (e.g., who can remove the largest area of paving, create the longest green façade, etc.) as a channel, with their advantages and disadvantages.

Source

There is no consensus about the role of the source of the message in convincing the receiver. Some said it matters [47], others found no differences in communication effectiveness of different sources [48]. These differences could be explained by the different layers existing in communication as described in a review article by Chryssochoidis et al. [49], who said that it depends on four aspects: (1) socio-cultural and individual personality characteristics; (2) perceived attributes of institution or information source; (3) risk aspects; (4) information-specific aspects. Trust in the information source is important [49]. The perceived attributes of information sources that make them trustworthy are: inter alia 'competence', 'knowledge', 'concern', 'openness', 'honesty', 'vested interest' and 'fairness'. If this is the case, it implies that sometimes works better to use others to spread the message. Somebody close to the lifestyle of the people involved, see for example the many (on-line) influencers who are being used for promoting almost everything. Looking for local leaders or influencers can be part of this strategy.

Message

In sustainability communication the gravity of the problems and the possible disadvantages should not be mentioned, rather the possibilities for overcoming these problems [50] and the benefits that can be gained [51,52]. They also highlight—in parallel to what has

already been said under the topic 'source'—that the characteristics of the receiver matter. The message should be understandable and appealing. The message should be connected with the situation the receivers are living in [53]. For example, if they in general have small gardens, the images used should be likewise. For a description of the content of the message, see motivation factors.

3.3.3. Ability Factors
Performance Skills

One must know how to change a paved garden into a garden with more vegetation. That means: removing and disposing of tiles, landscaping the garden and managing the garden. A lot of people think that they are not able to manage a garden [5,54]. Some municipalities in The Netherlands employ neighbourhood gardeners, who can teach people how to maintain a garden [55].

Implementation Plans

Besides having the skills to change, people also need a plan for how to change and keep a green situation [54]. Making a change step by step is one option (related to behavioural state—trial). Helping people to make a plan, both spatial as well as temporal (starting small) is part of this. According to Verbene et al. [5], there is a lot of potential in a low-maintenance garden, because many people think they do not have the time nor the skills to maintain a garden.

3.3.4. Supporting/Obstructing Factors
Barriers

Barriers for greening the garden can be (after [56]): (1) Money to change the garden and to maintain the garden; (2) Time, converting a garden with vegetation and maintaining it (is considered to) cost more time than a paved garden. This barrier can be removed by letting others maintain the garden, for instance a gardener or by a group of people from the neighbourhood; (3) Other, more urgent problems consume all attention and energy. It is commonly known that greening actions hardly have any effect on socially weak neighbourhoods, where people are more occupied by simple survival (based on interviews, see also predisposing factors); (4) Ongoing risks (see risks); (5) Availability of plants; (6) Language, especially in the larger cities; a group of immigrants is not able to communicate in Dutch, whereas they might be willing to cooperate in garden greening.

Supporting Factors

Money for planting or for green plans, or even plants for free, are all financial supporting factors, possibly supporting a change in behaviour. The success of 'plants for tiles' actions prove that it works, although people could also be joining who just wanted to get rid of the pavement. Often only a nudge is necessary to change people's behaviour: plants are not so expensive, but providing a plant for free is enough to change some people's behaviour, in The Netherlands at least. This could be done for other barriers as well.

Life Changing Events

When a life changes significantly, like getting married, children are born, or when moving to another house, behavioural changes for other aspects are also more easily applied [5,29]. This is due to the fact that habits, that would otherwise persist, have to change because of a life changing event, which creates a moment in life when people are susceptible, in this case to changes into a greener direction.

3.4. Behavioural Change Factors That Cannot Be Influenced Directly by Programs

Several behavioural change factors cannot be influenced directly by behavioural change programs. Nevertheless, they are important because the factors that can be influenced are related to these factors or should utilise them.

3.4.1. Awareness Factors

Awareness factors cannot directly be influenced by programs like Steenbreek, however it seems to be indirectly possible via Information factors and predisposing factors. Because this should match with awareness, some specific information is given about what awareness factors are.

Knowledge

What a person already knows is the starting point for raising awareness. This knowledge should be activated in order to start a learning process [57] and new information should be linked to existing information. The easiest way to establish this is through dialog.

Cues to Action

Cues for taking action in the case of removing pavement can be that people get an understanding of the relationship between flooding, urban heat etc. and the layout of their garden. So this is strongly related to the (external) physical-environmental factors. This is also something that can be used in formulating the message towards people, also giving clues about *when* the message should be sent (in times of flooding, extreme heat etc.), because studies stress that providing local frames for sustainability problems works much better than global frames [58].

Risks

Changing behaviour always involves risks, both social and physical. A social risk can be exclusion from the group (see also social-cultural factors). A physical risk can be that it brings extra labour (in the form of physical work). Changing your garden also seems rather definite, so the urge to change can be less. Reducing risks is possible by doing small experiments, see also Trial (behavioural state).

Besides these risks, some people have the perception that more vegetation can lead to risks like mosquitos, harvest mite, oak procession caterpillar, cats defecating in the garden [54]. This thinking is part of biophobia (see [59,60]), and cannot be completely tackled when it is deeply rooted. However, information about how to avoid these risks can help, for example by choosing for a mixed lay out of nature and culture, which could be less threatening than a complete natural lay out [59].

3.4.2. Motivation Factors

Motivation factors are internal factors, part of the mind of people, different from the predisposing factors, which are external from a person. Motivation factors contain the effect of a combination of external factors (especially predisposing and information factors) and internal factors (awareness and motivation). Sijsenaar ([56], p. 128) found profound differences in motivation factors for lower, middle and higher educated people, in relation to taking measures for water retention and greening their gardens. Lower educated inhabitants are relatively more motivated by approval, pleasure, personal benefit, financial compensation, by seeing examples of good behaviour and by help (facilitating). Moderately educated people are somewhat less sensitive to these factors; the higher educated consider themselves to be more competent or wish to contribute directly themselves (mentally or physically), while the highest educated are more motivated to do something good for the environment.

Attitudes

Attitudes are about the values that people give—in this case—vegetation in the garden (or in the city in general). Values are a key driver for sustainability actions [44]. It is always an internal struggle to balance the different values one tries to perceive: ecological, social, financial, personal welfare, esthetical. One of the major goals people want to achieve with a garden is aesthetics [4,35–37]. A green lay-out should be congruent with their feeling for beauty. However, people who perceive more responsibility for adapting sustainable

solutions are more likely to engage in adaptive behaviour [45]. If people deny personal responsibility and perceive governments at all levels as primarily responsible, they are less likely to implement adaptive measures.

This means that measures related to more vegetation should link to people's general values and to what they want to achieve. It is also important to get to know what personal welfare and well-being means. Can more vegetation in the garden be part of that?

Social Influence

Social-cultural factors that influence the attitude of people are described in the section about the predisposing factors. However, not everybody is susceptible to social-cultural influences to the same extent, see for instance Aral and Walker [61] about buying online. Some people living in a green neighbourhood will still pave their garden.

Self-Efficacy

Van Valkengoed and Steg [45] distinguished two types of efficacy: (1) self-efficacy: am I able to do what I have to do; and (2) outcome-efficacy: does my action have the wanted outcome? In terms of managing a green garden, self-efficacy is: am I able to manage it in such a way that I like it?; and outcome-efficacy is: is it effective against flooding, does it help biodiversity, etc. To stimulate greening the garden, it could help to tell people that the greening of their garden really has a substantial influence on flooding (outcome-efficacy).

3.4.3. Intention State

In the garden greening behaviour model three intention states are distinguished: (1) Precontemplation: one is not intended to change; (2) Contemplation: one is willing to change; (3) Preparation: one is willing and starting to change. So, the meaning of these boxes differs from the other boxes. A person is in one of the three stages, whereas in the other boxes the sum of the elements is important (e.g., awareness is a combination of knowledge, cues to action and risk perception).

Reijnders [54] researched the reasons why people who wanted to have more vegetations in their gardens, did not carry out actions to do this. In other words, they remained in the category contemplation instead of getting to the category preparation. She distinguished six categories of reasons: (1) Use of the garden (children, bicycles, meeting people); (2) Knowledge and skills (survival of plants); (3) Cannot or will not (because of time consumption); (4) Pets (damaging plants, nuisance cat poop); (5) Investments (especially when planning to move); (6) Aesthetics (green is messy and tiles are fashion).

This difference between wanting and really starting a greening action is also found in other research (see Appendix C). It is necessary to know people's intention state to change their behaviour. It takes a lot of effort to try to change the behaviour of people in the precontemplation state. Better to use your energy to persuade people in the contemplation state and to help to change people who are in the preparation state. For this it is necessary to know the state of mind of people before taking action.

3.4.4. Behavioural State

The behavioural state is the outcome of the garden greening behaviour model: what is the person in question really going to do. It can be seen in experimenting and maintaining.

Experimenting/Trial

Experimenting is a safe way of changing behaviour. Only drinking alcohol in weekends, only smoking outside, etcetera. For greening the garden this can be translated to start with greening a small part of the garden and experiencing the effects on oneself (pro's and con's) and the surroundings.

Maintaining

The previous sections were about changing behaviour, but in the end maintaining the new green garden behaviour is the goal of the greening actions. As Dempsey et al. [62] described for the public space, in science and practice there has for a long time been a focus on creating new spaces, also called place-making. However, less thought was given to maintenance, or place-keeping, which however has its own challenges. For instance, the possibility of persisting in the new habit of maintaining the garden, creating new habits that fit in the garden and fitting old uses in the new garden (e.g., meeting people).

4. Results: Assessment of Steenbreek Initiatives in Terms of Behavioural Change

This results section will focus on the four categories of factors that we suppose Steenbreek can influence directly (some predisposing factors, information factors, supporting/obstructing factors, ability factors, see Figure 3. Should it be required, a short recap of the theory is given. Some lessons that can be learned from the other (missing) categories are given afterwards.

In Table 1 an overview of the results is presented (see Supplementary Material for a more extensive analyses of the initiatives). In general terms, the results show that in those projects started by residents, Steenbreek is often mainly supportive. The fact that Steenbreek is there to help, can be a reassurance for people before they start, so then Steenbreek has also become part of the social environment (predisposing factor). Some of the projects organized by Steenbreek focused mainly on one aspect of the model, e.g., Information (Zevenheuvelenloop), while others (Pijpekappu), scored on almost all aspects. Because behavioural changes are based on all aspects of the model, Pijpekappu should be more successful. However, the Zevenheuvelenloop initiative has also been very innovative by organising a running contest in order to broadcast the message more widely and so broadening the scope of Steenbreek.

Table 1. Overview of results of matching the garden greening behaviour model with the sample of 24 initiatives in five Dutch cities and some examples from other cities ('Other examples' column); - = not available, + = available, +/- = available but not generally applied or in temporarily projects.

Factor	Sub-Factor	Within Sample	Other Examples	Remark
Predisposing: Biological and psychological		-	+/-	Biological and psychological effects of a green garden are underexposed
Predisposing: Physical and environmental		+	+	Many projects aiming to green the public space surrounding gardens
Predisposing: Social cultural	influencers	-	+/-	Influencers are used on national level
	Neighbours and other actors	+	+	Much emphasis on 'together'
	households	+/-	+/-	Difficult to reach, probably via children/school projects
Information	Two-way process	+/-	+/-	Awareness is available, implementation of two-way process in some initiatives
	Using other sources	+	+	In implementation and spreading the message

Table 1. *Cont.*

Factor	Sub-Factor	Within Sample	Other Examples	Remark
	Message	+/-	+/-	Clear message, could be more tailored to the private social ecological situation
	Channel	+	+	Many types of channels are used
Ability factors	Implementation plan	+/-	+/-	Good examples but not used everywhere
	Performance skills	+	+	Many ways to improve performance skills
Supporting/obstructing	Barriers	+/-	+/-	Some of the six identified barriers are always addressed (money, plants), some not so often (language, more urgent problems, time)
	Life change	-	+/-	Some strong examples, that could be used more widely
Additional factors	Cues to action (awareness)	-	+/-	No interventions after a hazard.
	Habits	+/-	+/-	No awareness yet, except for Bluumkes feur jou
	Knowledge (awareness)	+/-	+/-	Some joint effort for spreading the message
	Efficacy (motivation)	-	-	Being more precise about the effect of private actions
	Intentional state	-	-	Initiatives could be much more focused on the contemplation state
	Experiment (behaviour)	-	+	Small interventions for greening the garden are often carried out
	Maintenance (behaviour)	-	-	No examples of coaching in maintenance

Table 1 also shows that Steenbreek delivers well in relation to information factors and ability factors, especially when other example initiatives are considered. In the case of the predisposing factors more emphasis could be placed on predisposing and biological factors and influencers (see next sections for in-depth explanation). In the case of the supporting factors, better use can be made of Life Changing Events. The additional factors, those that are placed deeper in the model and cannot be influenced directly by Steenbreek, could be better addressed by the initiatives. This means getting a better understanding of the people involved in order to make a more targeted approach possible. For instance, focusing on the people in the contemplation state.

4.1. Influence of Steenbreek on Predisposing Factors

4.1.1. Biological and Psychological Factors

Theory says: people should physically be able to maintain a green garden (biological factors), and psychologically be able to let go a bit of control. A green garden should not be too wild, because this is not wanted aesthetically. Psychologically the positive aspects of green should be promoted.

In our study sample these factors are not addressed. The positive effects for biodiversity and climate play a role in the (messages about) the initiatives, but not so much about biological and psychological wellbeing.

An option is to educate people in how to let go of the urge to be in control. Educating people in seeing the advantages both biological (physical) and psychological. None of the projects researched explicitly contained elements of education. However, some Steenbreek initiatives in other cities are in cooperation with IVN, the institute for nature education [63], and have an educational focus.

4.1.2. Physical-Environmental Factors

Theory says: seeing vegetation in the neighbourhood does help you to plant vegetation yourself. Steenbreek cooperates with municipalities, housing corporations and other actors that are able to develop housing areas with more vegetation. Many activities of Steenbreek focus on more vegetation in parts of the public space ('trees with neighbours—'bomen met de buren'; 'self-management of public green'—'zelfbeheer'). This leads to greener surroundings (public green) for people, that can inspire them to plant more vegetation in their own gardens. However, the trend is not positive: due to building houses in the existing towns (infill), the amount of green spaces is diminishing. Rotterdam has a policy of greening the city centre with an extra 20 ha of vegetation in conjunction with building extra houses in the city centre. Places where vegetation can be established or increased can be found by using old rail tracks, creating roof parks, changing paved squares into green squares and by removing surplus lanes from roads and converting them to vegetated areas and stimulating the development of green façades and roofs.

4.1.3. Social-Cultural Factors

Society/influencers theory says that influencers, amongst others politicians, should speak up about their visions and their own behaviour in order to establish their trustworthiness in relation to the subject of sustainability. Municipal visions are more and more supportive and embrace the Steenbreek activities. However, the personal motivation and actions of politicians towards sustainability is here a major addition, which is not yet fully applied in Steenbreek actions. Outside our sample, influencers are deployed to voice the message of Steenbreek [64,65].

Neighbours and other actors: Theory deals with two types of norms: Injuctive and Descriptive norms. Injuctive norms can be: Steenbreek is working with local people—in the neighbourhoods—who are channels for spreading the message. Promoting conversations about what people think of vegetation in gardens could be an addition because people's perception of what others think of their greening actions is often too negative [45]. Descriptive norms can be: Many Steenbreek municipalities are communicating about the number of tiles that have been removed. A good approach can be to stress the number of people (=neighbours) that are cooperating. See here the connection with nudging: x% of the population wants to ... etc. Steenbreek also stresses the 'togetherness' within the actions. For example, on the site of Steenbreek The Hague [66]: "*Of course you can also make neighbours enthusiastic. Organize a street activity together with your neighbours or the entire street! Create façade gardens together or make a common courtyard greener! Fun to do it together and it makes the street more beautiful and greener*" (own translation). Steenbreek uses the available social-cultural factors in cities and villages: for example in Spijk the existing 'Naburschap' (togetherness) is loaded with green activities, including the church and local entrepreneurs.

Households: These are the most proximate persons available. Some of the initiatives in our sample are about greening school yards, a way to let children become aware of the value of green, which in turn can influence parents and their attitude towards their garden.

4.2. The Use of Information Factors by Steenbreek

Theory says: a two-way process is better. Steenbreek makes use of the fact that modern communication is a *two-way process*, mainly delivered at the level of the local projects. For example, when providing plants that residents can put into their own gardens, there is often communication about the type of plants that would be appropriate. Another

example is a dual project aiming at physical health and healthy gardens ('Bluumkes feur jou' Nijmegen [67]), which has the purpose of really listening to people and discovering their problems. There are also competitions in which residents are encouraged to come up with green solutions for their street/neighbourhood (Rotterdam).

However, there are also many projects which just have the aim of sending a general message about the environment, which is also what dominates the websites of Steenbreek. More is possible, as is shown by initiatives of some municipalities that are not in our sample; these include campaigns in which garden designers have assisted residents upon request (Leeuwarden), a process which allows specific attention to be given to their wishes for the use of their gardens (see predisposing (behavioural) factors.

Steenbreek often uses information *sources* other than the municipality or Steenbreek at a national level. Municipalities themselves are not always seen as a convincing source of information, so many of them therefore work with partners. That is why there is a lot of cooperation with local groups/actors, for example De Bastije in Nijmegen, Sustainable The Hague in The Hague. In Groningen, the municipality works together with the Groningen Nature & Environmental Federation. In other cities, Steenbreek also works with garden centres and gardeners to inform inhabitants about more green in the garden.

Theory says the *message* should be understandable and appealing. The message should be connected with the situation in which the receivers are living. For example, if they in general have small gardens, the images used should reflect that. The *message* of Steenbreek is twofold: green is good for people and nature, and Steenbreek will provide you with help if you want it (you don't have to change your garden alone). However, often the message is not tailored to the individual situation.

The *channel* is often a website, or face to face, but other channels are also used, such as television broadcasting (Groningen [68]), or competitions (Amsterdam, Rotterdam). One of the interesting aspects of a competition is that it requires strict measurements of results and outcomes, which therefore makes it easier to quantify the effects of these actions. The competitions in our sample (between Amsterdam and Rotterdam, one to make the largest façade garden, and the other to make a 1000 m façade garden over a period of months) were very successful, one of them even won a position on the sustainability ladder of a national newspaper [69].

4.3. The Support for Ability Factors by Steenbreek

4.3.1. Implementation Plans

In some activities Steenbreek helped with the process of drawing up garden plans (Leeuwarden). According to Verberne et al. [5], low-maintenance gardens showed a lot of potential, because many people think they have no time and no skills to maintain a garden. Many municipalities and projects pay attention to garden maintenance. Garden centres often become involved in this process. Housing associations can also take care of maintenance for people with little time, or physical disabilities, etc. Another example is the green pharmacy, a sub-project of Steenbreek in Leeuwarden, where an herb area has been set up on a vacant site [70].

4.3.2. Performance Skills

In some initiatives in our sample Steenbreek helped people to improve their performance skills; thus in Groningen workshops on garden maintenance were given and a series of videos about green gardening was broadcast on local television ('Groen Goud'). Some activities focus on cooperation between different inhabitants. Learning from each other can be an important effect. In other municipalities, consultations were held with housing corporations in order to motivate tenants. Sometimes they can, if they wish, have their front garden maintained with little extra service costs.

4.4. Supporting/Obstructing Factors Removed by Steenbreek

4.4.1. Barriers

Barriers [56] and how to remove them: (1) Money: Steenbreek gives away plants and removes tiles for free. This is the core-work of Steenbreek and is an initiative that is present in all the cities that were assessed; (2) Reducing time input: this is less visible in the initiatives, sometimes carried out by showing people low maintenance gardens, showing them the possibility of starting small, or giving advice; on rare occasions an opportunity can be provided for others to do the garden maintenance. To be effective in this respect, Steenbreek should always include low-maintenance gardens in the general information that they provide [5]; (3) Solving more urgent problems can consume all attention and energy. The most interesting project in this respect is "Bluumkes feur jou" (Nijmegen), where social factors and environmental factors are combined. This approach is rarely implemented in other cities and should be explored further; (4) Avoiding risks. Risks like creating breeding areas for mosquitos are only mentioned in the side-lines of initiatives. However, the message in relation to avoiding risks like mosquitos is already implicit in actions proposed for rain barrels (Nijmegen), namely through the use of closed systems, which seems to be an effective way to handle it, because too much emphasis on risks would be counterproductive; (5) Availability of plants is not a real risk, because this is part of the core-work of Steenbreek. However, more emphasis could be placed on trading plants between inhabitants, because that leads to stronger social links (see Figure 1 in relation to circles of influence); (6) Availability of advice: in our sample Steenbreek is often supportive of projects that originate in society, which implies giving advice. In Leeuwarden the project 'three garden plans for free' is an example of a Steenbreek initiative where specific advice is given. However, the message is often general, and more specific advice could certainly remove this barrier.

4.4.2. Life Changing Events

Theory says: use life change events as windows of opportunity to change behaviour. There is some attention to *life-changing events* from the perspective of Steenbreek, e.g., in The Hague and Rotterdam, where some people who move into a new house are asked to consider greening their garden. Much more is possible, for example giving a tree at the birth of a child or providing coupons for buying green when moving into a new house.

4.5. Learning from Additional Factors

Additional factors are part of the garden greening behaviour model, but cannot be directly influenced by Steenbreek (outside the green circles in Figure 3).

Theory says that *cues to action*—showing the direct link between your own behaviour and how that has direct effects on you and also on a wider scale—plays a role in increasing awareness. Moments of flooding and extreme heat are not yet used by Steenbreek to inform people about their contribution in reducing these environmental problems; e.g., showing how places with trees have lower ambient temperatures.

Theory says that habits (*behavioural factors*) are not easy to change due to the fact that habits filter information. In other words, the message of Steenbreek can be ignored by people who have a paved garden. Furthermore, the desired use of the garden is not always possible when it contains a lot of vegetation. However, people within Steenbreek initiatives have not yet encountered this problem. In line with projects like "Bluumkes feur jou" (Nijmegen) a desired change in lifestyle could be combined with another type of garden; for instance, a healthier life can be combined with mowing the grass.

Increasing *knowledge* (awareness factors) is a direct effect of the message of Steenbreek. Two points are important: firstly, to connect the information with what is already known. It is not clear whether this has been done in the research sample. Secondly, the message can be supported by other sources (joint effort). Joint action is taken at a local level (cooperation with IVN etc.), but overall cooperation, using each other's strong points would increase effectivity.

Attitudes and *social influence* (part of motivational factors) can only be managed via information and predisposing factors. However, *self-efficacy* and *outcome efficacy* need special attention. In terms of managing a green garden: am I able to manage it in such a way that I like it? Is it effective against flooding, does it help biodiversity etc.? For the outcome efficacy situation, it might help to tell people that greening their garden really has a substantial influence for dealing with flooding, or for improving biodiversity, etc. This means a less general message, but a more specific one targeted towards the gardens of people. In this respect, the information given must stress the (water retention, biodiversity) effect of earlier projects; it should not only tell something about the number of tiles removed, but also about the amount of biodiversity that has returned as a result of Steenbreek activities.

Theory says the *intentional state* of people is key in changing behaviour. Steenbreek does not research the intentional state of people. People with the precontemplation attitude (no intention to change) are not the right target audience; people with contemplation aspects (intention to change) could be offered information, motivation etc.; and people with preparation aspirations (start to change) could be offered help. If the intentional state of people could be identified and assessed in advance, the energy of Steenbreek could be much more focused on those who really want to change.

Steenbreek sometimes supports inhabitants who want to *experiment* (part of behavioural state) with new behaviour (removing pavement in a small part of the garden). Steenbreek supports small initiatives in greening the garden. If this is an effective strategy is not yet known, more in-depth research is needed for this.

The same holds for continuing with the *maintenance* once the behaviour and the garden has changed. Little is known about the factors that support the enduring maintenance of new green gardens. More support is developed for maintenance of larger green areas outside gardens (e.g., 'Zelfbeheer'/Self maintenance), where municipalities also have a larger co-responsibility.

4.6. Relevant Factors Related to Behavioral Change

In this section we link the actual percentages of green in gardens in the five cities assessed to factors in the garden greening behaviour model, especially predisposing factors: the physical-environmental and social-cultural factors. The data studied is from 2019. The correlation analysis showed 15 factors that could be considered relevant to the predisposing factors (see Appendix B for the data for all 5 cities together as well as separate). The factors with a correlation value higher than 0.5 or lower than −0.5 can probably be linked to these predisposing factors and are discussed below.

4.6.1. Physical-Environmental Factors

In general the numbers support the idea that more vegetation in the public space corresponds with more vegetation in the gardens. The percentage of vegetation in a garden (the rest is paved area) is positively related to the size of a garden. First of all people want a place to use a garden for relaxing etc. [54], especially on a paved part. If there is more space in a garden, then this could be for vegetation, however this depends on their intention state. In some districts there are relatively small gardens with a high percentage of vegetation; examples are the districts Delfshaven or Noord (in Rotterdam) with an average garden size of respectively 78 m^2 and 75 m^2 and around 59% of vegetation in their garden. Also in Groningen there are a few districts with the same characteristics, Oud-Zuid, Oud-West, and Noord. All these districts combine a relatively small garden size with a relatively high percentage of vegetation, in which the contemplation state of greening the garden has definitely been passed. The localization of public green in the vicinity of a garden or other (larger) green gardens (in a buffer of 125 m around an address) positively influences the amount of vegetation in a garden, proving the relationship that would be expected from the model.

The larger gardens are also linked to the relatively larger number of single family houses which can be found in the more recently modified or created districts; these districts have a rather low density of inhabitants. With the exception of Rotterdam (for example the districts Delfshaven and Charlois) where more apartment blocks (the opposite of single family housing) have a higher percentage of vegetation in a garden. In Groningen in particular, there are larger gardens in more recently built districts, while in the older districts of Rotterdam you can encounter a relatively high percentage of vegetation in the gardens.

4.6.2. Social-Cultural Factors

In general the numbers support the idea that districts with low income/migrants/apartment blocks have less vegetation in the garden. In districts with a relatively high density of inhabitants (or addresses) per km^2 there is not much space for private green; and if these are there, they are often relatively small. Furthermore, the amount of public green is limited. In the older districts of Leeuwarden, Nijmegen, The Hague and Groningen this phenomenon is especially clear. In these districts the relative number of inhabitants receiving social welfare is also higher, as is the relative number of migrants living there. This supports our earlier statement about environmental injustice (see [17,18]). In most cities the percentage of vegetation in a garden is lower related to these two social cultural factors, except for Rotterdam, especially when looking at the districts of Delfshaven, Noord, Crooswijk and Charlois, with a relatively highly percentage of vegetation in the garden. This phenomenon should be studied further, at the neighbourhood level.

The house tax value (WOZ) is related to the size of the parcel and the quality of the house or apartment built on that parcel. A higher WOZ-value almost always implies more space for a garden, so indirectly there is also more vegetation (see also previously discussed physical-environmental factor). This also supports our statement about environmental injustice (see [17,18]). People with higher incomes can afford to have more vegetation, and as a consequence have a healthier environment.

Living in a more recently built district is also linked to more private and single family housing with larger gardens (especially in Nijmegen, Groningen and Leeuwarden). In these areas the highest relative number of young inhabitants (below 15 years) can be found, also (except in Rotterdam and The Hague) with more public green (particularly in Nijmegen and Groningen).

Within the group of inhabitants between 25 and 65 years, particularly in Nijmegen, there is a lower amount of vegetation in the garden. These groups of people in Rotterdam live predominantly in apartment blocks (low percentage of single family housing). In contrast, the more elderly people (above 65 years) do have more vegetation in their garden when living in Leeuwarden and The Hague. In The Hague in particular, these people also have relatively more public green available around their address. When living in Rotterdam these elderly people live in more recently built districts with a low density of inhabitants.

Another social-cultural factor influencing the amount of vegetation in a garden could be the number of migrants in a city. Mostly in Groningen and Leeuwarden they rarely live in a single family house, having a small (or no) garden, and often renting. They often live in highly populated areas and do need social benefits. This group of people could have little money to spend (should be researched further) and in their neighbourhood there is also not much public green available.

4.7. Applying the Garden Greening Behaviour Model to the Example Given Earlier

We now return to Box 1, where we introduced an inhabitant of Rotterdam, who explained the reasons why she did not have more vegetation in her garden. We have applied the model in this example which shows how helpful the model is when analysing this situation (see Box 2).

Box 2. Shortened and analysed (in capitals between square brackets) newspaper article [11] as example of reasons for removing pavement from the garden.

"The most tiled gardens are located in this Rotterdam neighborhood: 'I'm ashamed of it'."
Inhabitants of Schiemond have the most paved gardens in Rotterdam *[THE PHYSICAL-ENVIRONMENTAL FACTORS ARE NEGATIVE FOR CHANGE]*. The municipality of Rotterdam claims to be aware that the city is 'quite paved' and says it wants to change this by 'helping and stimulating Rotterdammers to make their own environment greener' *[MUNICIAPALITY AIMS AT EXTENSION]*. The gardens in Schiemond consist mainly of tiles, tiles and tiles. You can see some vegetation, not of trees and plants, but especially of the dominant weeds. Hardly any gardens seem to be maintained in this part of Delfshaven *[PREDISPOSING BEHAVIORAL FACTOR]*.
"Admittedly, I am ashamed of this garden, you understand why," says an inhabitant pointing to her backyard *[SHE WANTS DIFFERENTLY, BUT DOESN'T DO IT: CONTEMPLATION PHASE]*. The garden consists for a large part of crooked tiles with one lane of earth where plants are mixed up. She can't remember the last time she tried to maintain the garden. Her garden of five by five meters is visible to everyone in the neighborhood *[SOCIAL CULTURAL FACTOR = MESSAGE TO OTHERS]*.
"I'd rather have it all in grass now, but that costs something. I just can't afford it" *[MONEY AS A BARRIER/NUDGE: A TILE FOR SOME GRASSSEED]*. This inhabitant is a single mother with three children and lives on social welfare *[BARRIER: OTHER PROBLEMS ARE MORE URGENT]*. She has severe back problems, which makes gardening difficult *[BIOLOGICAL PREDISPOSING FACTOR]*.
"But gardening is really in me *[PSYCHOLOGICAL PREDISPOSING FACTOR]*. If I had someone who could take the tiles out for me, they would be long gone" *[SOLUTION = SUPPORTING FACTOR]*.
A representative of organization Groenemorgen, who previously laid out 1000 facade gardens in Schiemond *[NUDGE: A LOT OF PEOPLE HAVE PRECEDED YOU]*, says: "take immediate action, because a paved environment is a lifeless environment. As soon as you take a tile out, you create life and make room for nature". According to him, "people should think more about the advantages of vegetation. You provide cooling on hot days and prevent flooding when it rains. The story we need to tell more." *[BUT THIS IS NOT THE LIMITING FACTOR FOR THE INHABITANT. NUDGE: CAN I HELP YOU?]*

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5. Discussion and Recommendations

5.1. Matching Theory with Practice

In this research we analysed how Steenbreek, as an example of a program that wants to change the behavior of inhabitants, complies with the factors mentioned in the garden greening behaviour model. However, because this is a new way of thinking, not all information about this relationship could be derived from the data sources. This requires more in-depth study. This is also the reason that the assessment of the initiatives cannot be more precise than it is shown in Table 1.

With regular Steenbreek activities like 'a plant for a tile' the people who are in a contemplation state can presumably be reached, or even already in a preparation state. The group that is in the precontemplation state cannot be so easily reached. However, it helps if all elements of the garden greening behaviour model are in place. The predisposing factors should be good, for instance a green environment (physical-environmental factors) helps people to green their garden. This implies that municipalities and housing companies should also green their properties and communicate widely that they take their task in greening the city seriously (social-cultural factors). This result is in line with the study into behavioural change for climate change [71].

In the interviews it was often stated that—with the limited amount of resources—Steenbreek is a success. However, in the same interviews it was also said—and supported by literature—that the overall trend is not positive (probably without Steenbreek and Steenbreek-like programs even more negative). Still more people seem to pave their garden more than they depave their garden, which could be dangerous for the success of Steenbreek, because of the negative trend in physical-environmental and social-cultural surroundings. Van Heezik et al. [4] suggested a tipping point in greening the city, which means that when a certain number of gardens and other spaces are green, and a certain number of households are joining in greening the streets and gardens, the others will follow (except for the people who for different reasons will never follow). This leads to an approach where all efforts

(of all involved) should be combined and directed to certain areas in the city instead of spreading energy over the whole city.

The data on the actual state of vegetation in gardens (Section 4.6.1) is accurate enough to describe differences in the percentage of vegetation per garden on a district scale. This therefore provides enough insights to describe the current state of vegetation in gardens. Effects of behavioural change can only be described via longitudinal studies, where actions like Steenbreek actions are coupled to specific neighbourhoods. The data is also useful for describing the statistical relationship between some predisposing factors like physical environmental factors (vegetation outside the garden) and social-cultural factors (tax value, migrants, age). The outcomes confirm the expected relations.

Applying the garden greening behaviour model to Steenbreek also showed the coherence among the elements of the model, especially those elements that can be directly influenced by Steenbreek (Figure 4). It showed that it helps if all elements are in place if behaviour is to be able to really change, and it showed how the system of mutual and reinforcing influence between elements can grow over time.
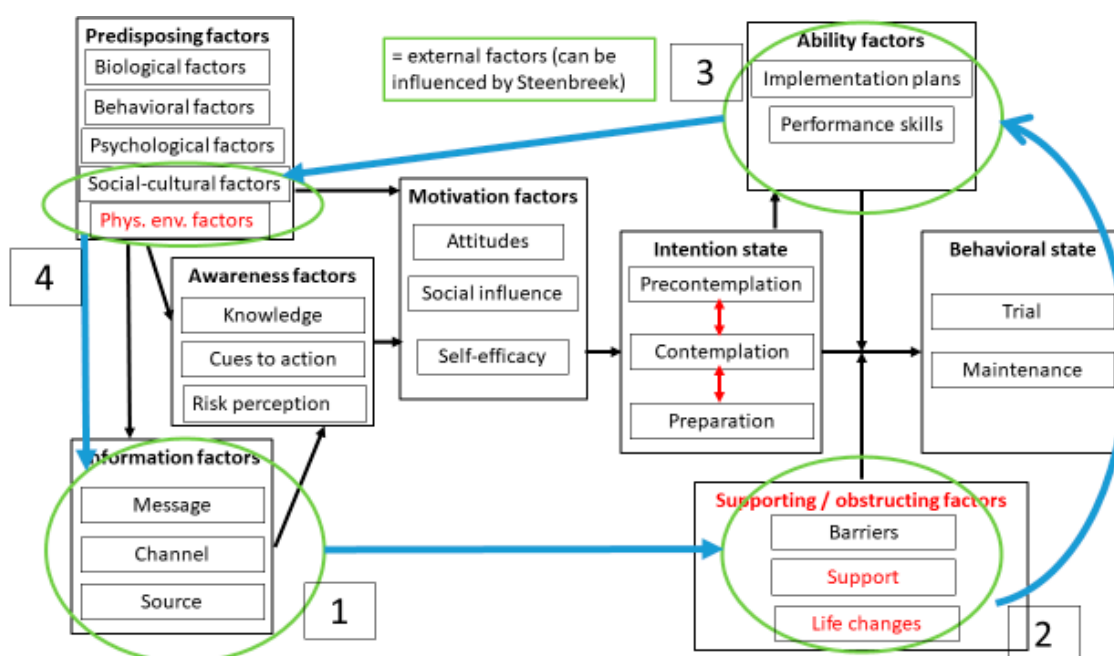
Figure 4. Coherence between elements of the garden greening behaviour model.

Steenbreek started in 2015 as a NGO sending out a message about how to stop biodiversity decline and increase liveability by removing pavement. This was not enough for a revolutionary change of behaviour, obstructions should be removed. However, in some projects local successes were achieved.

This message was supported by actions to remove barriers for changing behaviour, through actions like a 'plant for a tile' or information about avoiding risks like mosquitos in water barrels.

The next step was to help people to create a green garden by making plans together (implementation plans). This, in addition to a larger scope of Steenbreek (with the help of other actors like the municipality), leads to another—greener—environment, which might help people to change their own gardens and to raise awareness in the neighbourhood. Knowing that Steenbreek can help greening the neighbourhood (Supporting factor) has become a sort of institutionalized phenomenon: people know that they can rely on this help, so this has become a social-cultural factor.

This physical and social change to the neighbourhood can also change the message (look around you), the source (people from the neighbourhood), and the channel (local sources).

5.2. Actors and Measurements

Verberne et al. [5] said that an integral approach is necessary in order to really get greener gardens in the city. Such an approach has several aspects:

(1) Greening private gardens should be combined with greening the public space, to have a maximum effect on biodiversity [72], water retention, liveability, etc. Besides, a green public space can inspire people to green their garden too (physical-environmental factors). It shows that other actors like the municipality take their responsibility for greening seriously, which is also an important factor in behavioural change (social cultural factors).

(2) All parties around the inhabitants should send the same message of greening the garden, and should show that they work together [73]. These parties include a municipality, water board, housing cooperation, but also neighbourhood organizations, garden centres and garden television programs.

(3) Combining greening and social measures can have a positive impact. When the social measures lead to having a grip on ones' own life (removing a barrier), it means that for some people more room for other issues like the garden enter their perspective. In particular when social projects lead to empowerment, this can also lead to larger ability factors to green the garden.

(4) Besides raising awareness and softly influencing environmental behaviour, legal and financial measurements are also being deployed. In The Netherlands legal measures are not yet used, except by some housing corporations that demand that tenants make their gardens green again when leaving the house. One neighbourhood in Amsterdam [74] is very vulnerable for heat and flooding, so the municipality does not allow new pavement. However, there will be no direct enforcement, according to Beumer [30]. This can still be effective for a certain group of people who like to follow rules ('hierarchists'). Examples from abroad (Germany, Belgium) give indications that a combination of financial, legal and exemption measures would be very helpful.

5.3. Freedom Dilemma

Many scholars involved in behavioural change raised the topic that people should have the freedom to do with their garden what they like, even if this is harmful for society (e.g., [30,75–78]. This is called the public-private dilemma. However, inhabitants are always influenced by others and the context they live in, as is shown in the description of the garden greening behaviour model. For instance, garden centres try to sell the most expensive garden attributes (tiles, benches), with a form of nudging (show it on the best spot etc.). Besides, most of the municipalities in The Netherlands are very restrictive in using legal or financial incentives to change behaviour and just focus on using awareness-raising, which made one of the respondents in the survey state: "*I am done with non-committal, we really need compulsory actions if we want to reach our climate and biodiversity goals*". If, in this context, municipalities want to change private behaviour in the broader public interest, which is the focus of government, they can better use theory in order to improve their ability to do so.

5.4. Recommendations

5.4.1. For Steenbreek

When the Steenbreek approach was assessed using the garden greening behaviour model, the main aspect that was missing is the targeted approach (see also Baptiste et al. [37]). Steenbreek in general aims at everybody in a neighbourhood and with a rather general message. When people are interested, a more specific conversation begins in order to see what can be done. A more targeted approach would be to find those who are in the contemplation state (intention state), and to ask them about their perception of barriers. Offer them possibilities to avoid risks, refer them to other institutions to solve more social problems, use another language if necessary. Nudge them by showing how many preceded them with positive results for them and the environment. Help them with implementation plans, and if necessary offer them assistance with maintenance. This

approach requires more research before initiatives are started (like Sijsenaar [56] did), and will lead to more efficiency.

In many cases Steenbreek measures, in some way or another, the amount of pavement that has been replaced with green plants. However, the initial concern of Steenbreek is about improving biodiversity and liveability. Monitoring of biodiversity does take place in cities, but up to now no specific evaluations of the role of Steenbreek as an organisation that could monitor biodiversity have been made. The results of monitoring biodiversity, if positive, could be used as a place-specific message for improving motivation (cues to action) for people. As Ehrhardt-Martinez et al. [79] and Abrahamse et al. [80] stated for energy saving programs, contextualized feedback of information about green measures could be a positive incentive to keep changing. Not only spreading the message of the number of tiles that are removed, but also the (estimated) effect on biodiversity (we have seen species X), temperature, water retention, etc.

Several options are available for overcoming the problem of the shortfall in skills and abilities required for delivering garden greening actions (performance skills). Common management of private gardens can be promoted, for example as seen in the role played by housing corporations who have the resources to carry out such management. There can also be promotion of low maintenance GREEN gardens [5]. The study of gardens in cities (Section 4.6.1) showed that many households possess small to very small gardens. The message, support (of performance skills) should also be directed to (very) small gardens, which is not always the case. New ways of combining vegetation with functions like sitting, playing, etc. in (very) small gardens should be developed.

Jones and Niemiec [81] stated that motivating diffusion behaviour by using messages about sustainability is crucial for reaching enough people to really green the city. Barriers to start diffusion behaviour differ from barriers to start greening your own garden; do I know enough to tell others?; do I reach others?; would they like me to inform them?. These are questions related to diffusion behaviour. Stimulating diffusion behaviour is possible by training change agents and allowing them tell success stories of how to reach your network with a green message.

5.4.2. For Municipalities

By providing economic measures, municipalities can support and supplement Steenbreek activities that are mainly focused on psychological and social measures (Figure 5). The full package of measures will be much more effective, and see examples from Belgium and Germany. However, the huge amount of experience of Steenbreek with behavioural change via psychological and social measures could very well be used to support municipalities in other countries.

The garden can become an element within thinking about green space strategies for municipalities. These plans can be structured according to the creation of 'habitat zones' [82] aiming at reaching a specific type of habitat in the city, using all green elements—inc-luding the gardens—that are available. This integral approach could substantially enhance the biodiversity experience for people [83].

5.4.3. For Research

Our sample was based on the Steenbreek programs conducted in five Dutch cities. The assessment showed that some elements included within the garden greening behaviour model were underexposed in the programs. However, these factors have occasionally been covered by programs in other cities. For example Steenbreek Maastricht gives the training course 'easy green', to help people with simple garden maintenance, which is what is needed to support the performance skills of many people. A larger study that could be implemented more broadly, including other cities, would give a theory-based overview of programs working at the level of practical delivery.
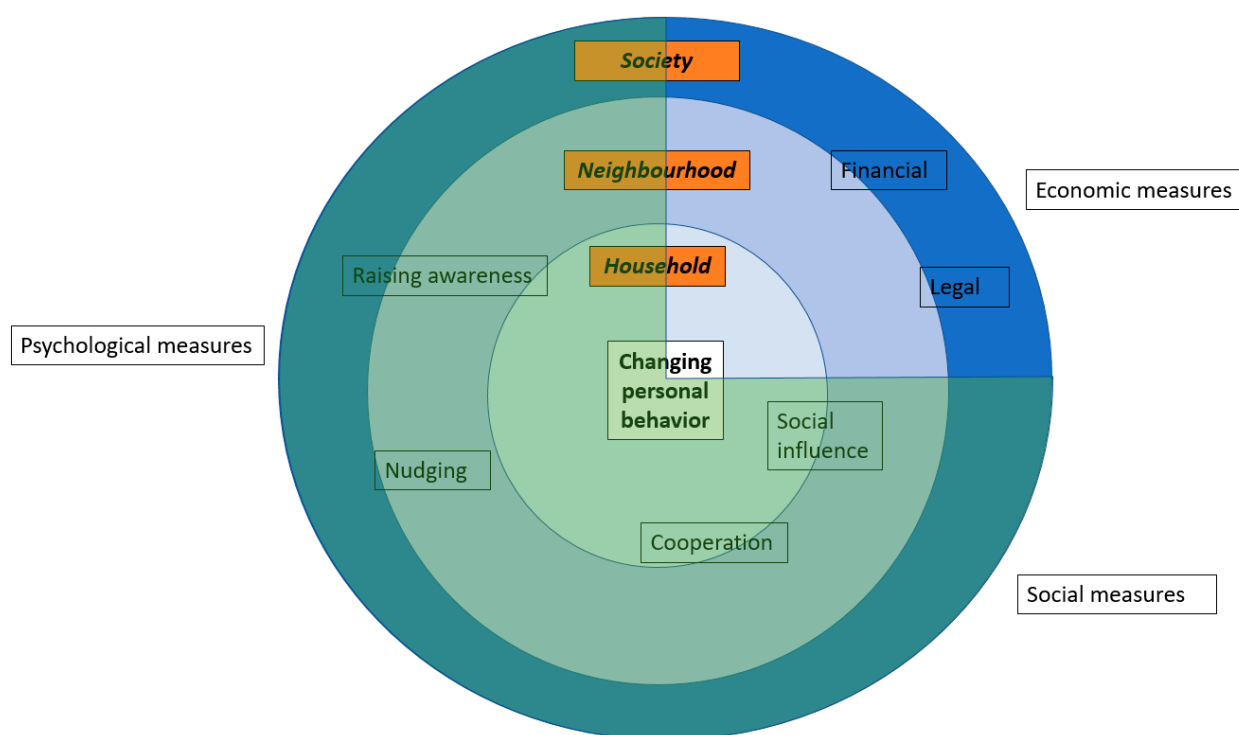
Figure 5. Additional measures needed to complete behavioural change.

Another interesting line of research would be to start longitudinal studies of the behaviour of people who have already greened their gardens. Do they continue managing them sustainably, do they expand the amount of green, do they change their attitude to nature, do they also start to do work for sustainability related issues in general?

Up until now, there has been no standard against which to measure the removal of pavement. Some municipalities count in Elephants, others in soccer fields, kilogrammes, number of tiles, etc. We argue for a standard method of measurement so that the real effect of programs like Steenbreek can be seen.

6. Conclusions

The aim of the study was to build a model based on theory that can be used to improve and better evaluate depaving actions. We started with a commonly accepted behavioural change model, that has been generally applied to medical studies and programs. We added certain factors specific for greening the garden and filled the model with knowledge about those factors, based on literature and interviews. This garden greening behaviour model was then tested with Steenbreek activities. This case study showed that the model was helpful for reflecting on strengths and weaknesses, for understanding how the case has evolved and for identifying what can be improved. It also showed how factors are related and how an integral approach could be constructed. Some Steenbreek programs that aim at greening the neighbourhood (e.g., 'bomen met de buren')—instead of greening the garden—do not fit in the model yet; additional steps must be taken to integrate these as well.

Greening the city is very necessary. Gardens are important in this respect. Understanding of the garden greening behaviour model is a necessary component in allowing gardens to play their role in liveable cities.

Appendix A. 2019 Situation in Schiemond, Rotterdam

(Source: https://sensingurbannature.cobra360.nl/index.php?@steenbreek#, accessed on 14 December 2020).
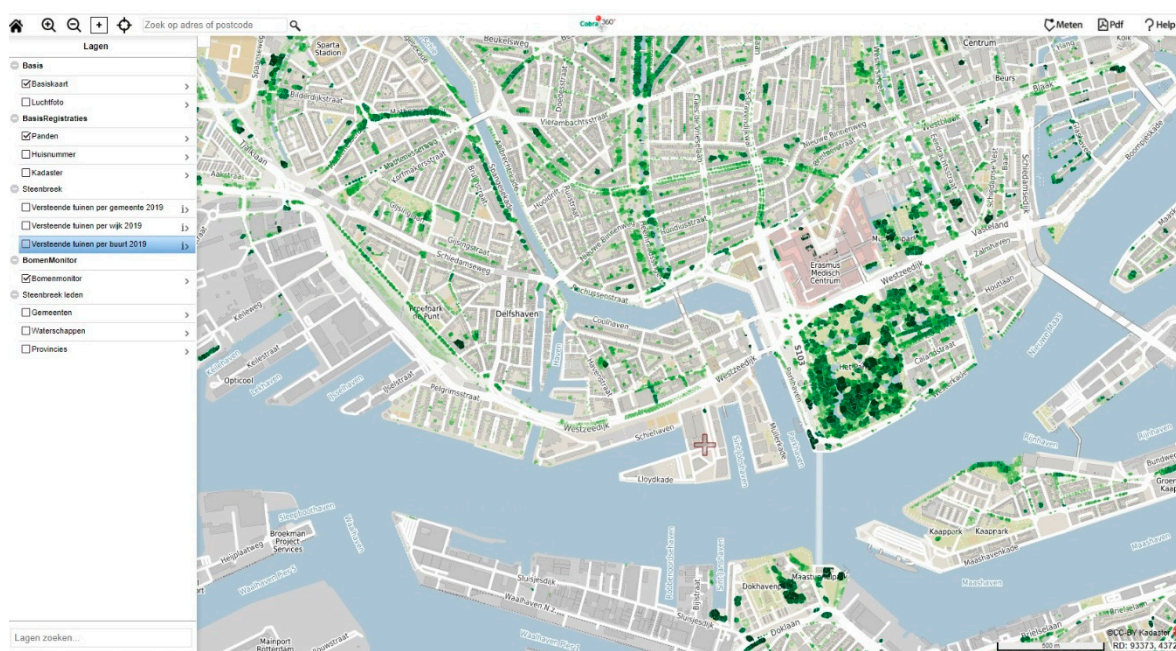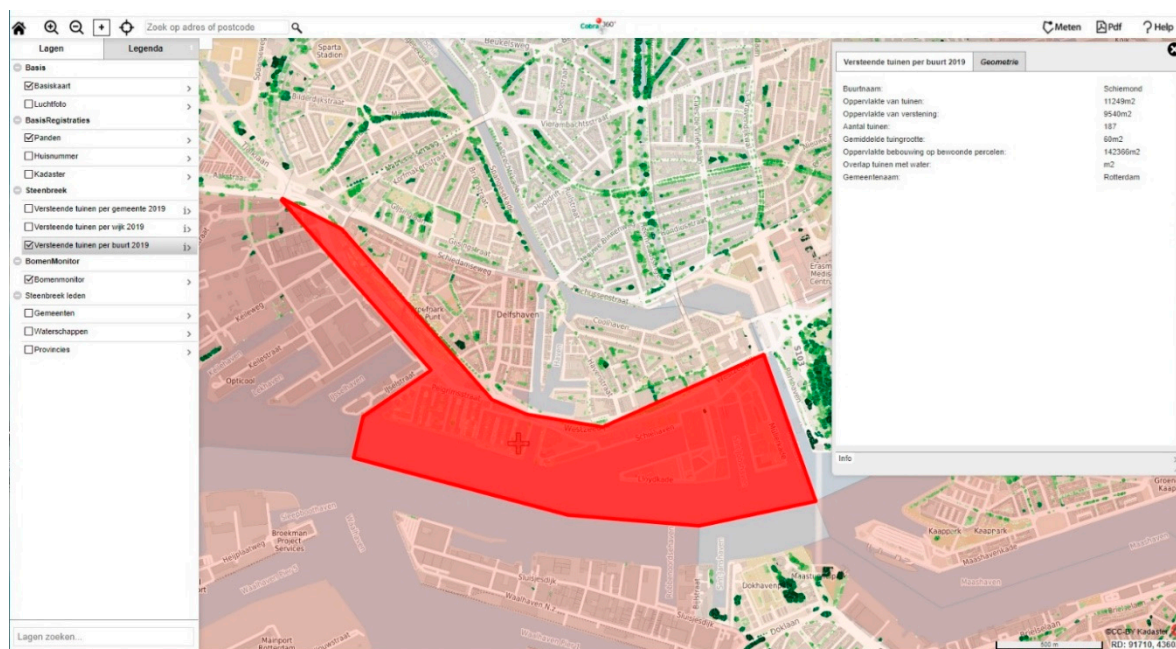
Appendix B. Overview Correlation Values

| Correlation overview		green in garden(%)	av. garden size (m2)	district area (ha)	predom. build.yr	#inhab/ km2	av.WOZ value	single fam. housing(%)	private owner(%)	persons <15yr (%)	persons 25-65(%)	persons >65(%)	migrants (%)	Soc.benefits (%)	Pub.green m2/125bu
av. Garden size (m2)	Overall	0.564													
	Groningen	0.552													
	Leeuwarden	0.754													
	Nijmegen	0.688													
	Rotterdam	0.335													
	's-Gravenhage	0.550													
district area (ha)	Overall	0.362	0.419												
	Groningen	-0.011	0.401												
	Leeuwarden	0.695	0.761												
	Nijmegen	0.322	0.562												
	Rotterdam	0.212	0.563												
	's-Gravenhage	0.117	0.182												
predom. build.yr	Overall	-0.048	0.409	0.105											
	Groningen	0.073	0.634	0.856											
	Leeuwarden	0.227	0.331	-0.116											
	Nijmegen	-0.236	0.298	0.802											
	Rotterdam	-0.587	0.238	0.424											
	's-Gravenhage	-0.115	0.361	0.447											
#inhab/km2	Overall	-0.467	-0.578	-0.414	-0.442										
	Groningen	-0.184	-0.580	-0.784	-0.900										
	Leeuwarden	-0.757	-0.728	-0.608	-0.494										
	Nijmegen	-0.382	-0.535	-0.863	-0.663										
	Rotterdam	0.240	-0.498	-0.468	-0.566										
	's-Gravenhage	-0.559	-0.672	-0.403	-0.347										
av.WOZ value	Overall	0.437	0.400	-0.139	0.041	-0.259									
	Groningen														
	Leeuwarden	0.364	0.688	0.277	0.609	-0.499									
	Nijmegen	0.536	0.544	0.414	0.034	-0.050									
	Rotterdam	0.405	0.717	0.272	0.144	-0.231									
	's-Gravenhage	0.710	0.589	0.102	-0.027	-0.639									
single fam. housing(%)	Overall	0.238	0.456	0.482	0.498	-0.636	0.034								
	Groningen	0.315	0.656	0.791	0.686	-0.685									
	Leeuwarden	0.476	0.660	0.505	0.330	-0.488	0.808								
	Nijmegen	-0.069	0.346	0.743	0.822	-0.752	-0.023								
	Rotterdam	-0.590	0.032	0.145	0.519	-0.743	-0.037								
	's-Gravenhage	0.242	0.322	0.676	0.572	-0.494	0.444								
private owner(%)	Overall	0.414	0.472	0.303	0.308	-0.469	0.385	0.728							
	Groningen	0.483	0.722	0.773	0.722	-0.705		0.917							
	Leeuwarden	0.468	0.635	0.395	0.397	-0.539	0.885	0.948							
	Nijmegen	0.196	0.493	0.904	0.770	-0.825	0.354	0.846							
	Rotterdam	-0.261	0.079	-0.086	0.215	-0.668	0.131	0.818							
	's-Gravenhage	0.492	0.225	0.251	0.017	-0.408	0.568	0.626							
persons <15yr (%)	Overall	0.101	0.196	0.217	0.388	-0.157	0.135	0.478	0.514						
	Groningen	0.158	0.556	0.858	0.796	-0.748		0.863	0.821						
	Leeuwarden	0.243	0.419	0.069	0.647	-0.427	0.693	0.612	0.613						
	Nijmegen	0.021	0.468	0.865	0.890	-0.770	0.130	0.906	0.806						
	Rotterdam	0.140	0.134	0.522	-0.064	-0.382	-0.023	0.413	0.346						
	's-Gravenhage	-0.014	-0.174	0.271	0.036	0.182	0.152	0.281	0.262						
persons 25-65(%)	Overall	-0.382	-0.279	-0.116	-0.121	0.389	-0.373	-0.280	-0.291	-0.185					
	Groningen	-0.018	0.125	0.372	0.442	-0.328		0.231	0.361	0.332					
	Leeuwarden	-0.361	0.007	-0.106	-0.159	0.167	-0.003	-0.049	-0.058	0.011					
	Nijmegen	-0.766	-0.435	-0.075	0.256	0.162	-0.175	0.320	0.198	0.168					
	Rotterdam	0.141	-0.287	-0.595	-0.447	0.671		-0.685	-0.447	-0.686					
	's-Gravenhage	-0.463	-0.449	-0.241	-0.200	0.432	-0.577	-0.338	-0.511	-0.393					
persons >65(%)	Overall	0.425	0.338	0.077	0.040	-0.437	0.412	0.070	0.264	-0.063	-0.681				
	Groningen	0.477	0.366	-0.010	0.259	-0.468		0.171	0.178	0.145	-0.277				
	Leeuwarden	0.533	0.057	0.282	-0.045	-0.245	-0.186	0.044	0.024	-0.301	-0.819				
	Nijmegen	0.434	0.107	-0.171	-0.291	-0.178	-0.455	-0.068	-0.288	-0.121	-0.687				
	Rotterdam	-0.459	0.206	0.439	0.755	-0.803	0.184	0.887	0.673	0.386	-0.809				
	's-Gravenhage	0.528	0.524	0.021	0.002	-0.603	0.551	0.029	0.370	-0.152	-0.773				
migrants (%)	Overall	-0.317	-0.342	-0.370	-0.146	0.682	-0.075	-0.671	-0.602	-0.052	0.367	-0.280			
	Groningen	-0.577	-0.794	-0.594	-0.637	0.576		-0.756	-0.879	-0.565	-0.350	-0.218			
	Leeuwarden	-0.363	-0.547	-0.534	-0.111	0.486	-0.686	-0.810	-0.866	-0.291	0.022	-0.084			
	Nijmegen	-0.297	-0.371	-0.263	0.020	-0.091	-0.921	0.111	-0.253	-0.012	-0.058	0.662			
	Rotterdam	0.359	-0.327	-0.204	-0.572	0.808	-0.354	-0.865	-0.835	-0.226	0.602	-0.886			
	's-Gravenhage	-0.400	-0.222	-0.211	0.062	0.601	-0.485	-0.418	-0.731	0.122	0.375	-0.551			
Soc.benefits (%)	Overall	-0.344	-0.396	-0.140	-0.113	0.358	-0.611	-0.296	-0.679	-0.114	0.201	-0.321	0.431		
	Groningen	-0.339	-0.571	-0.396	-0.408	0.349		-0.359	-0.573	-0.232	0.101	-0.096	0.679		
	Leeuwarden	-0.292	-0.494	-0.353	-0.332	0.446	-0.827	-0.816	-0.905	-0.469	0.172	-0.047	0.916		
	Nijmegen	-0.230	-0.305	-0.492	-0.251	0.131	-0.824	0.032	-0.412	-0.141	0.016	0.680	0.874		
	Rotterdam	0.223	-0.466	-0.072	-0.526	0.730	-0.545	-0.669	-0.787	0.013	0.389	-0.717	0.922		
	's-Gravenhage	-0.523	-0.365	0.068	0.159	0.555	-0.692	-0.241	-0.644	0.145	0.286	-0.491	0.664		
Pub.green m2/125buffe	Overall	0.542	0.542	0.302	0.321	-0.539	0.184	0.264	0.272	0.281	-0.420	0.522	-0.158	-0.093	
	Groningen	0.383	0.605	0.411	0.465	-0.559		0.803	0.690	0.725	0.228	0.347	-0.471	0.050	
	Leeuwarden	0.774	0.664	0.468	0.398	-0.670	0.267	0.258	0.225	0.416	-0.300	0.317	-0.052	-0.101	
	Nijmegen	0.063	-0.028	0.489	0.488	-0.683	-0.461	0.572	0.393	0.551	-0.187	0.531	0.664	0.389	
	Rotterdam	0.207	-0.051	0.480	0.175	-0.400	-0.089	0.129	0.181	0.442	-0.484	0.375	-0.172	-0.036	
	's-Gravenhage	0.566	0.626	0.358	0.302	-0.656	0.332	0.251	0.243	0.011	-0.624	0.703	-0.301	-0.192	
Priv.green m2/125buffe	Overall	0.729	0.468	0.356	-0.025	-0.391	0.367	0.386	0.555	0.415	-0.422	0.432	-0.330	-0.313	0.559
	Groningen	0.721	0.660	0.131	0.225	-0.331		0.609	0.543	0.363	-0.007	0.472	-0.545	-0.045	0.780
	Leeuwarden	0.871	0.830	0.680	0.272	-0.705	0.593	0.742	0.720	0.442	-0.171	0.294	-0.575	-0.506	0.638
	Nijmegen	0.869	0.920	0.439	0.014	-0.513	0.518	0.224	0.391	0.296	-0.526	0.288	-0.331	-0.188	-0.003
	Rotterdam	0.237	0.212	0.256	-0.202	-0.378	0.251	0.418	0.558	0.705	-0.417	0.314	-0.407	-0.282	0.197
	's-Gravenhage	0.745	0.272	0.195	-0.212	-0.390	0.535	0.214	0.502	0.372	-0.586	0.500	-0.405	-0.335	0.587

Appendix C. Survey Results

Our survey among approximately 400 people has demonstrated that there is a difference between motivation and behaviour: a larger number of respondents prefer the ecological garden (picture 3) above the paved garden (picture 1, question 1). However, a relatively larger amount of people do have well maintained gardens (picture 2), paved gardens (picture 1) or neglected gardens rather than ecological gardens (picture 3; question 2). This difference is mainly attributed to a lack of money and/or knowledge (question 3). Beumer [30] found the same contradiction, with even more extreme numbers; where 44% of the respondents indicated their outside space looks like a "courtyard", a largely paved terrace intended for sitting outside, only 16% visually preferred the corresponding modern style garden. This contradiction is due to preferences for low maintenance and practical functionality. Out of a total of eight styles, the visual garden design preferences went to the wild garden style (29%, comparable with the ecological garden) and the English romantic garden proved to be second most popular (20%). Our sample was relatively 'greener' possibly because one third of the respondents were parents of students studying some form of ecology.

	1. Which garden do you like best?	*2. Which garden does your garden most resemble?*
1 paved garden	7 (1.8%)	37 (9.3%)
2 well maintained garden	118 (30%)	126 (31.8%)
3 ecological garden	224 (56.9%)	116 (29.3%)
4 neglected garden	45 (11.4%)	61 (15.4%)
5 do not have a garden		56 (14.14%)

1. Paved Garden	**2. Well Maintained Garden**	**3. Ecological Garden**	**4. Neglected Garden**
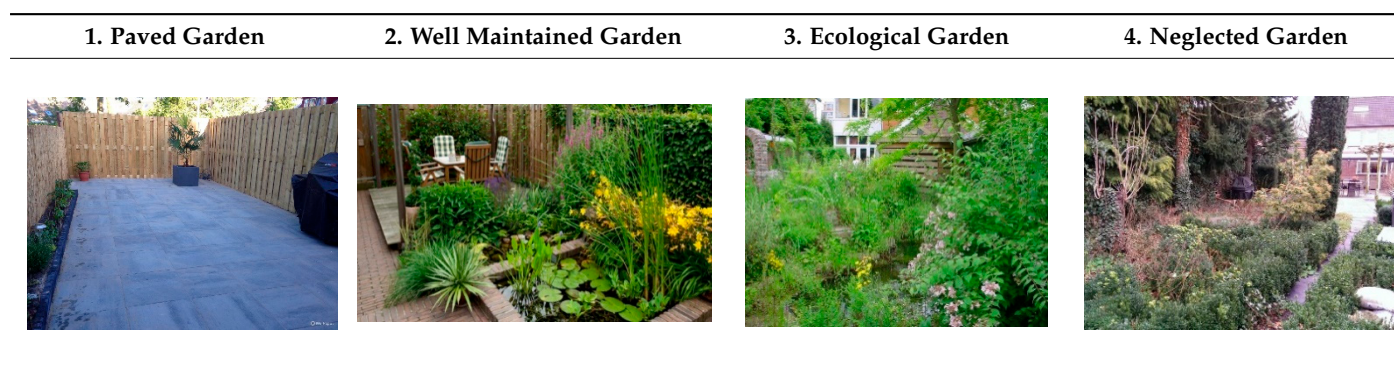
3. When would you be willing to make your garden more ecological?	
More knowledge	151
Financial support	94
My garden has already an ecological lay-out	53
I am not willing to do so	53
Other reasons	46

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