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# The contribution of geographic components in understanding the neighborhood participation process



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# Abstract


> "We [the Dutch society] are currently experiencing a shift from a welfare state to a participation society."

This statement, made by Wijdeven et al. (2013:3), captures the trend towards active citizenship which occurred at the turn of the 21st century. This ongoing process has resulted in a focus on the stimulation of active citizen participation in the public domain (Wijdeven et al. 2013). Part of the public domain in which citizens can play a prominent role is the living environment in which they spend most of their time: their neighborhood. As stated by the Dutch Ministry: to strengthen active and involved citizenship, "citizens have to be mobilized to be involved and act responsibly in the development and livability of their living environment" (Leidelmeijer 2012:1). In light of this statement, the Ministry has ordered for research to better their understanding of citizens participating in their neighborhood and living environment. The main insight gained by Leidelmeijer (2012) is that the level of participation of citizens in their neighborhood positively correlates with the development of the level of livability of that neighborhood. Leidelmeijer (2012) concludes by stating that, given this insight, neighborhood participation deserves to be stimulated.

Building on this theory an exploratory research is done in which an attempt is made to design a data-driven model with new data sources which sheds light on what specific variables make a significant contribution to the explanation of certain forms of participation in the neighborhoods of the city of Amsterdam. The core contribution is the addition of geographic components (such as the amount of sport- and cultural facilities or trees in a neighborhood, the percentage of a neighborhood which is covered by built-up, or the size of the dwellings in a neighborhood). Using a regression model, it is determined if these newly introduced geographic variables add to the understanding of neighborhood participation, in addition to the already formed theory.

The relevance of the intended outcome is twofold. By applying the theory formed by Leidelmeijer on specific examples of neighborhood participation, the theory is tested. Secondly, by introducing geographic variables and using new data sources, an attempt is made to add new insight to the understanding of this phenomenon. By doing so, it is hoped that other researchers and practitioners are inspired to consider geographic information (sources) in their neighborhood participation studies. As physical space can be altered, understanding the contribution of the geographic components has the potential to be valuable to future policy and urban planners. In general, a better understanding helps the government to direct her resources to stimulate forms of neighborhood participation which inhabitants of specific neighborhoods are willing to perform (Brouwer et al. 2015).

In this research it is found that the geographic variables 'amount of sport facilities per 1000 inhabitants' and 'amount of trees per square kilometer in parks and plantations' make a significant contribution to the explanation of the amount of reports about hassle in public space made by neighborhood inhabitants. Furthermore, the share of medium sized houses in an area significantly contributes to the explanation of the amount of neighborhood gardens which are created and/or maintained by neighborhood inhabitants.

# 1. Introduction

Several factors play a role in the willingness of someone to participate in their neighborhood. Social sciences research has mainly focused on explaining this phenomenon by looking at the social environment of a neighborhood. Other research currently focusses on the impact of the wellbeing of a person on their willingness to participate (Gremmen 2016). Today, the use of the physical environment as influential factor is limited to how people experience their neighborhood environment, or it is used as one of many factors to determine the livability in an area. However, physical objects and their attributes can be expected to have an impact on the motivation to participate. One can imagine, for example, that inhabitants are tempted to participate in the creation of a neighborhood garden when green spaces in the neighborhood are absent. Another example is that more people can be expected to engage in reporting hassle in public space when a larger share of the neighborhood surface is covered by roads on which inhabitants can experience hassle.

By determining if including such geographic components in research on neighborhood participation leads to a better explanation of this matter, a contribution is made to the understanding of this phenomenon. By understanding what variables contribute to the explanation of the different forms of neighborhood participation, the municipality can be guided in her wish to stimulate neighborhood inhabitants to take over certain tasks. In addition, a more active and involved neighborhood population leads to a better living environment as experienced by the inhabitants (Leidemeijer 2012).

This contribution is made by undertaking an exploratory research in which data-driven regression models based on variables derived from earlier research, and complemented by geographic variables, are designed. In addition, new (innovatory) data sources are reviewed and when deemed fit for the purpose, used to determine the amount of neighborhood participation. The regression analyses indicate how much of the phenomenon is explained by the variables. In particular, it is explored if geographic variables significantly contribute to this explanation of the phenomenon.

In this chapter, an introduction to the subject of neighborhood participation is given by first placing the occurrence of citizen initiatives (a broader phenomenon which neighborhood participation is part of) in historic perspective, after which a theoretical framework is outlined. This theoretical framework will form the base of this research. In the framework, the dependent and independent variables central to neighborhood participation are determined and defined. Finally, the relevance of this research is discussed.

## 1.1 Explaining Dutch present-day citizen initiatives from a historical perspective

The complexity of the Dutch public relations is illustrated when international (Anglo-Saxon) scientific literature is used to analyze/dissect the Dutch society. A simple division between first, second, and third sector organizations (market, governmental, and the civil society organizations), often made in countries like the United States and the United Kingdom, is not easily made in the Netherlands. This is due to intertwinement of these three sectors as developed over time (Hoogenboom 2011).

### 1.1.1 Citizen and government relations through history

Prior to the French period (1795-1813), the period in which the Netherlands was under predominance of France, status and wealth determined ones position in society. These conditions gave access to governmental positions, which in turn gave access to lucrative economic activities, which paved the way for a dominant position in society (Hoogenboom

2011). In this period, the elite managed to constrain the rise of societal initiatives created by the middle and lower classes through their management positions in societal organizations.

During the French period this situation changed as the power of the elite slowly started to formally dismantle. In 1848, a new constitution was approved which guarantees equal fundamental rights for every inhabitant of the Netherlands by law. Besides this formal birth of the 'citizen', freedom of religion, association, and assemblage was introduced. Over time this showed to be an important development as it allowed for the introduction and growth of private initiatives. After Dutch citizens united themselves into associations driven by their religious beliefs – the pillarization of Dutch society which gradually formed at the end of the 19th century (Burger 2001)– these private initiatives developed into mediating organizations between government and citizen (Blom 2000). The pillar organizations adopted former governmental tasks like education and elderly care, complemented by new social security, welfare, and public health tasks. In other words, in the mid-20th century, a welfare state formed ran by pillar organizations which were financed by the government. Societal needs and whishes were communicated upwards through the pillars to eventually be translated into policy (Burger 2001, Hoogenboom 2011).

Through the financing task, the government found a way to influence the pillar organizations. By making financial aid dependent on agreeing to terms and conditions, the government developed a method to set and achieve their own goals. The once clearly separated government and pillar organizations increasingly grew intertwined. The 'free citizen', introduced by the constitution of 1848, found him/her self-constrained again by the pillarization of Dutch society (Hoogenboom 2011).

In the 70s of the 20th century, the Dutch society depillarized. The pillar organizations lost their connection with their former members as society started to individualize (Van Dam 2015). It became less and less regular that citizens from certain (religious) backgrounds were associated with specific societal organizations. As a result, these organizations started to lose their privileged connection with the government. The organizations stopped acting as mediators resulting in a situation in which citizen and government had to redefine their more direct relationship. Yet, the new situation developed into a similar division of labor as during the pillarized society. This time the citizen was expected to tackle societal issues instead of the pillar organizations. Again, the government adopted a supporting role. The government had to stimulate private initiatives through policy as she could not rely on pillar organizations to perform public tasks any longer (Hoogenboom 2011). Up until today, the government has shown to be unable to break away from the structure formed during the pillarization period. Citizens are expected to contribute to the policy forming process or/and to the implementation of policy. The arising issue in this situation is that citizens are unable to fully fill these shoes which results in governmental interventions to shape them into the desirable partner (Hoogenboom 2011).

Besides the government, Dutch citizens and organizations inherited habits from the pillarization period as well. It is not uncommon for them to ask several forms of aid from the government after setting up initiatives or organizations which are concerned with societal issues. Over time, citizens switched from contributing to initiatives as directed by the pillar organizations to being drawn to initiatives in close proximity to their physical and social living environment (Van de Wijdeven & Hendriks 2010). Their contribution expanded from first and second generation participation (i.e. voice their concern and interactive decision making or cooperation) to third generation participation in which the government is responsive to the initiatives created by the citizen instead of the other way around (Oude Vrielink & Van de Wijdeven 2011). Although self-control is high on the agenda, government aid is often sought for practical reasons.

### 1.1.2 Present-day policy

The present-day relationship between citizen and government regarding citizen participation is best described by the three key concepts introduced by former minister Donner. These concepts are (Verhoeven & Tonkens 2011:419):

- The citizens' ability to cope independently;
- Giving responsibility to concerned citizens;
- Apply a compact government.

The central thought behind these key concepts is that the government has to learn to trust citizens in the domain of citizen participation. Furthermore, Verhoeven and Tonkens (2011) state that this idea is inspired by the 'Big Society' theory originating from the United Kingdom. In short: "the minister looks for ways to help the government in her aim to reduce the amount of tasks she has to fulfill, backed by the assumption that citizens will become more active when the government steps down" (Verhoeven & Tonkens 2011:419). Thus, by stepping down and trusting the ability of citizens to cope with societal issues independently, citizens are given more responsibility and the government becomes more compact by reducing the amount of tasks to direct her energy to. Thus, the government increasingly tries to lessen her historically grown influence on citizen initiatives by limiting her involvement to a supporting role.

However, enabling citizens to take care of societal issues in their physical and social surrounding is not as simple as stepping down and expecting the citizens to carry out these tasks. This assumption is backed by two opposing theories present in the Anglo-Saxon scientific literature on citizen participation. At one end of the discourse it is argued that the government and professionals' involvement is limited to conditional/enabling tasks (i.e. provide pre-conditions). The central thought behind this is that citizens are believed to have the ability to tackle societal issues together. It is believed that if the government is too involved, the involvement, creativity, and solutions of the citizens themselves lessen (Verhoeven & Tonkens 2011).

At the other end of the spectrum it is argued that government involvement can activate the preparedness to volunteer of citizens. It is believed that the complementary effects of the bringing together of people/organizations stemming from different moral backgrounds can lead to fertile cooperation (Verhoeven & Tonkens 2011). Oude Vierlink and Van de Wijdeven (2011:439) strikingly combine the opposing views in the following interpretation of the neighbourhood policies in the Netherlands: "the assumption seems to be that citizens not only specifically know what their neighbourhood needs, they are also capable of producing such initiatives as long as they are given enough space by the government. At the same time, the awareness grows that citizen initiatives do not spontaneously arise." They state that especially in deprived neighbourhoods professional support is needed.

The historically grown custom of citizens to ask for government aid in the unfurl of their initiatives, which often take place close to their living environment (their neighborhood), combined with the habit of the government to get involved in citizen initiatives in the Netherlands, results in an extensive source of information about the majority of neighborhood participation projects held by the government. In this research, it is explored to what extent several governmental data sources can be formed into useable information to measure the amount of neighborhood participation. Usable information is utilized as data source for the dependent variable in the design of neighborhood participation models.

## 1.2 Theoretical framework

The several ways in which neighborhood initiatives can form, ranging from no help at all to support of professionals, makes it particularly challenging to model neighborhood participation. Therefore, more insight is needed in what affects neighborhood participation and how the phenomenon can be influenced. As is discussed in this section, Leidelmeijer (2012) has determined a series of variables which correlate with the form of neighborhood participation performed in Dutch neighborhoods.

Commissioned by the Dutch government, Leidelmeijer researched if neighborhood participation positively influences the development of livability in the neighborhood. Furthermore, he focused on "*which inhabitants, in which situations, are tempted to perform different forms of neighborhood participation*" (Leidelmeijer 2012:I). In the following section, the findings relevant to this exploratory research are discussed.

### 1.2.1 Neighborhood participation

To define participation, Leidelmeijer (2012) uses a division made by Movisie. In essence, a subject (an individual, group, or society) takes part in an object (the matter in which the subject takes part). In line, neighborhood participation refers to inhabitants (the subject) actively partaking in their neighborhood (the object). Furthermore, he divides neighborhood participation in several forms. The differentiation is fourfold:

- Social participation;
- Volunteer work;
- Vertical problem oriented participation;
- Horizontal problem oriented participation.

Social participation refers to maintaining contact with neighbors and organizing or participating in social activities in the neighborhood (Leidelmeijer 2012). Volunteer work, from a policy view, can be described as participation which is not mandatory, not paid for, takes place in an organized setting, and is aimed at the wellbeing of others or society in general (Movisie 2013). The remaining two forms of participation are aimed at solving problems in the neighborhood. Whereas the vertical problem oriented participation refers to the interaction between citizen and problem solving authority (i.e. reporting trouble/nuisance or attending organized meetings), the horizontal participation refers to the cooperation among citizens themselves (i.e. citizen initiatives) in resolving neighborhood problems (Leidelmeijer 2012).

Why this differentiation matters becomes clear when we focus on the first five words of the quote "*which inhabitants, in which situations*, are tempted to perform different forms of neighborhood participation" (Leidelmeijer 2012:I). Leidelmeijer argues that certain characteristics of citizens are of influence on the form of neighborhood participation which they perform. Beside citizen characteristics, the form of neighborhood participation also correlates with the situational characteristics of the neighborhood. What exactly is meant by 'certain characteristics' of citizens and 'certain situations' will now be discussed.

### 1.2.2 Citizen characteristics

Figure 1 depicts a schematic render of the variables which Leidelmeijer finds to be of influence on the form of neighborhood participation which is performed in a neighborhood. The first grey box depicts the citizen characteristics. These include socioeconomic and demographic characteristics, public familiarity, social capital, social cohesion, and

participation out of benefit. These variables and their influence will now be discussed in more detail.

#### *1.2.2.1 Socioeconomic and demographic characteristics*

The specific group of socioeconomic and demographic characteristics which are of influence on neighborhood participation are differences in level of education, household composition, age, gender, ethnic background, and dominant community. Variations in these variables contribute to differences in the forms of neighborhood participations which is likely to be performed. In short, Leidelmeijer (2012) finds that lower educated inhabitants (i.e. primary education/lbo) are less inclined to perform (vertical and horizontal) problem oriented participation compared to inhabitants who are higher educated than this group.

Furthermore, household compositions which are made up of families with children are more inclined to participate in social neighborhood events than two person households and one person households (in that order). In addition, two person households are more inclined to perform vertical problem oriented participation, while families with children are more likely to perform horizontal problem oriented neighborhood participation.

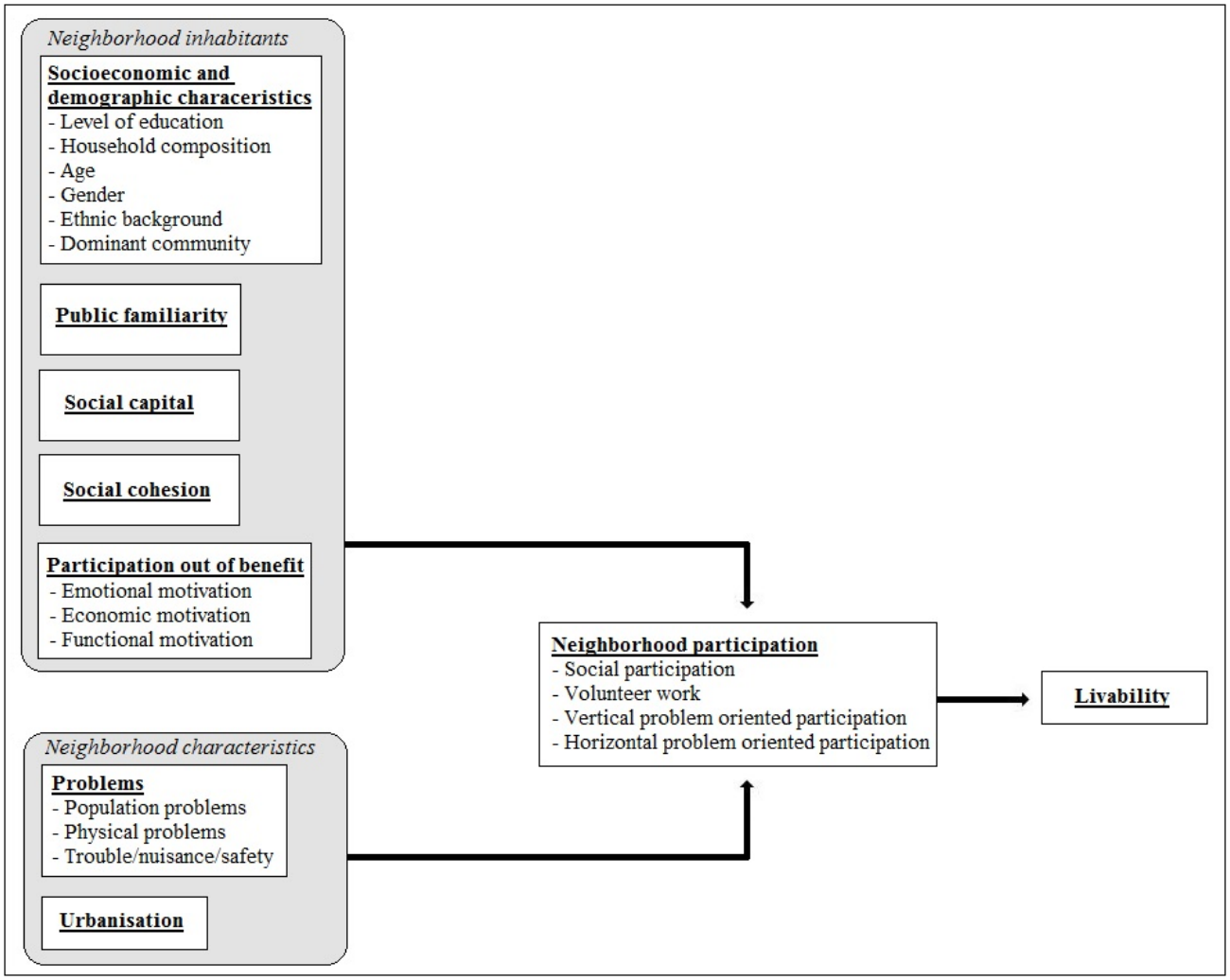
When it comes to age, Leidelmeijer (2012) finds that vertical problem oriented participation and volunteer work within the neighborhood is less likely to be performed by youth. Also, the likeliness of performing these two types of neighborhood participation increases with age.

Regarding the influence of gender, Leidelmeijer (2012) finds that men are slightly more inclined to perform (vertical and horizontal) problem oriented neighborhood participation than woman.

When controlled for characteristics of the neighborhoods, there is no difference in neighborhood participation between indigenous population and non-western inhabitants when it comes to ethnic background. When looking at areas with the same level of livability however, non-western immigrants are more likely to perform social neighborhood participation in areas with livability problems. In these circumstances, non-western immigrants are more likely to perform horizontal problem oriented neighborhood participation than the indigenous population, while indigenous population is more likely to perform vertical problem oriented participation. In areas with positive levels of livability, differences between these two groups are limited to vertical problem oriented participation, with the indigenous population being more likely to perform this form of neighborhood participation. When the livability is good, differences between non-western immigrants and indigenous population disappear.

Lastly, Leidelmeijer (2012) finds that indigenous population is less likely to perform social participation when the share of non-western immigrants in the neighborhood is more than 40 percent.

**Figure 1** Influential variables of the form of neighborhood participation




### *1.2.2.2 Public familiarity*

Leidelmeijer (2012) defines the second variable, public familiarity, as the knowledge one has of his/her neighbors which is gained from interactions in public space. This knowledge contributes to the trust one builds towards their fellow neighborhood inhabitants. It is expected that when public familiarity is high, people are more likely to actively participate in the neighborhood than when public familiarity is low.

### *1.2.2.3 Social capital*

Social capital is defined by Putnam (2000:16) as "connections among individuals – social networks – and the norms of reciprocity and trustworthiness that arise from them." Let us take neighborhood participation as example. People with a large social network enjoy the norms of reciprocity and trustworthiness. They are, thus, likely to give or receive help to/from their neighbors or their neighborhood and build trust among their neighbors. This social embedment results in more likeliness to participate (social, horizontal problem oriented neighborhood participation, and volunteer work) in their neighborhood than people with a low level of social capital. The exception to the rule is that people with low trust in their fellow

neighborhood inhabitants are more likely to perform vertical problem oriented neighborhood participation.

#### *1.2.2.4 Social cohesion*

Social cohesion refers to the coherence of a social system (in this case the neighborhood). It can be defined as the extent to which a citizen shows involvement with the community by cooperating/collaborating with neighbors, showing solidarity, and by identifying with their neighbors/neighborhood. A sensible result of a coherent social system, in this case the neighborhood, is high levels of participation. However, social cohesion can also lead to exclusion when a smaller group (sub group) within the neighborhood forms and excludes other neighbors (Leidelmeijer 2012).

#### *1.2.2.5 Participation out of benefit*

Lastly, citizens can participate out of benefit. If they feel bonded with their neighborhood, they are likely to perform social, horizontal problem oriented participation and volunteer work out of emotional motivation. Inhabitants which are *strongly* bonded to their neighborhood are also more likely to perform vertical problem oriented neighborhood participation.

Inhabitants can also participate out of economic motives when for example they own a home in the neighborhood. As the state of the neighborhood may affect the price of their house, they will benefit economically by improving the neighborhood. Home owners are more likely to perform social, and (horizontal and vertical) problem oriented neighborhood participation than inhabitants who rent.

Finally, one can participate out of functional benefit. If the neighborhood is of high functional use to the inhabitant (when for example making use of several neighborhood facilities), one is expected to care for their living environment and is likely to participate. This is true to a certain extent. People who have a high functional orientation on their neighborhood are more likely to perform social participation and horizontal problem oriented neighborhood participation while people who have a low functional orientation are more likely to perform vertical problem oriented participation.

### 1.2.3 Neighborhood situation

Besides characteristics of its inhabitants, the situational characteristics the neighborhood is in, and the level of urbanization of the neighborhood, are found to be of influence on which forms of citizen participation are practiced in an area (figure 1). Leidelmeijer (2012) found that horizontal problem oriented participation increases when problems in the neighborhood increase (except for when these problems have to do with neighbors). Furthermore, social participation is more apparent when there are little problems, while vertical problem oriented participation is likely to be apparent in neighborhoods which cope with extensive of problems. Lastly, Leidelmeijer (2012) found that the level of urbanization is of influence on social participation and volunteer work. Both of these forms of participation are more often performed in less urbanized areas.

### 1.2.4 Neighborhood participation and livability

Livability can be defined as “to what extent the living environment meets the demands and wishes of the neighborhood inhabitants” (Leidelmeijer 2012:6). Leidelmeijer (2012) found indications that livability in a neighborhood increases when inhabitants are more actively involved in the neighborhood. The thought behind this relationship is that this has mainly to do with the stabilizing effect of neighborhood participation. A more active population is likely

to create more trust (social capital) in the development of the neighborhood resulting in less people leaving the area and thus in a more stable neighborhood (public familiarity). Leidelmeijer (2012) states that the effect of neighborhood participation is greatest in neighborhoods which have a medium level of livability. In these areas, problems are manageable. Areas with strong levels of livability are likely to do well without the population actively participating in the neighborhood. Lastly, low levels of neighborhood participation in neighborhoods with strong levels of livability problems presumably result from feelings that problems are too big to be able to make a difference (Leidelmeijer 2012).

## 1.3 Relevance

The value of better understanding neighborhood participation lies in the positive correlation between participation and livability in a neighborhood. When neighborhood participation is successfully stimulated it will increase the livability as perceived by the inhabitants. If policy makers succeed in the stimulation of the form of participation which inhabitants are willing to perform, the participation energy which is present in the neighborhood can be put to use. On the contrary, if there is a mismatch between how citizens are willing to participate and the form of participation which is stimulated by policy makers, frustration among the participants is likely to grow (Leidelmeijer 2012). This might lead to discouragement of further participation. Kanne et al. (2013) add to this that if problems in neighborhoods do not overlap with the forms of participation which inhabitants are willing to perform, a withdrawing government from its counteracting tasks will lead to a neglect of these problems. In contrast, if inhabitants are willing to participate by tackling neighborhood problems, governments can stimulate these participation forms, diminishing their involvement in these areas.

The value of this exploratory research is twofold. First of all, the use of new (innovatory) data sources in determining the contribution of specific variables in the explanation of the amount of neighborhood participation in an area is explored. These innovate data sources are made accessible by the use of geographic information systems. As was stated in section 1.1.2, the historically grown relationship between the government and the citizens has resulted in potentially valuable information which is held by the government. In many occasions, citizens request financial aid for their initiative. The projects which receive financial aid are recorded in a subsidy register. One of the new data sources is therefore the subsidy register of Amsterdam. Another source which is explored holds data on all the reports made by citizens to the municipality of Amsterdam about hassle in public space (such as broken streetlights, litter on the streets, or hassle caused by pests). In addition, an attempt is made to use social media (twitter) to measure the amount of neighborhood participation. Central to the innovatory use of all these datasets is the transformation of already existing data into usable information. When this is successful, the need to gather information on neighborhood participation through questionnaires is eliminated. Besides access to large amounts of already collected data on vast areas (in this case the city of Amsterdam), the actual outcome of neighborhood participation is measured. This revealed participation is in contrast with the commonly used questionnaires in which inhabitants state their preparedness to participate.

Secondly, the added value of including geographic components as independent variables is explored. The value of knowing the effect of the physical components on neighborhood participation lies in the relative ease with what a great deal of components can be altered (as opposed to harder to influence social neighborhood characteristics). Thus, when geographic components are found to be influential, policy makers are handed a concrete tool to influence participation in the neighborhood.

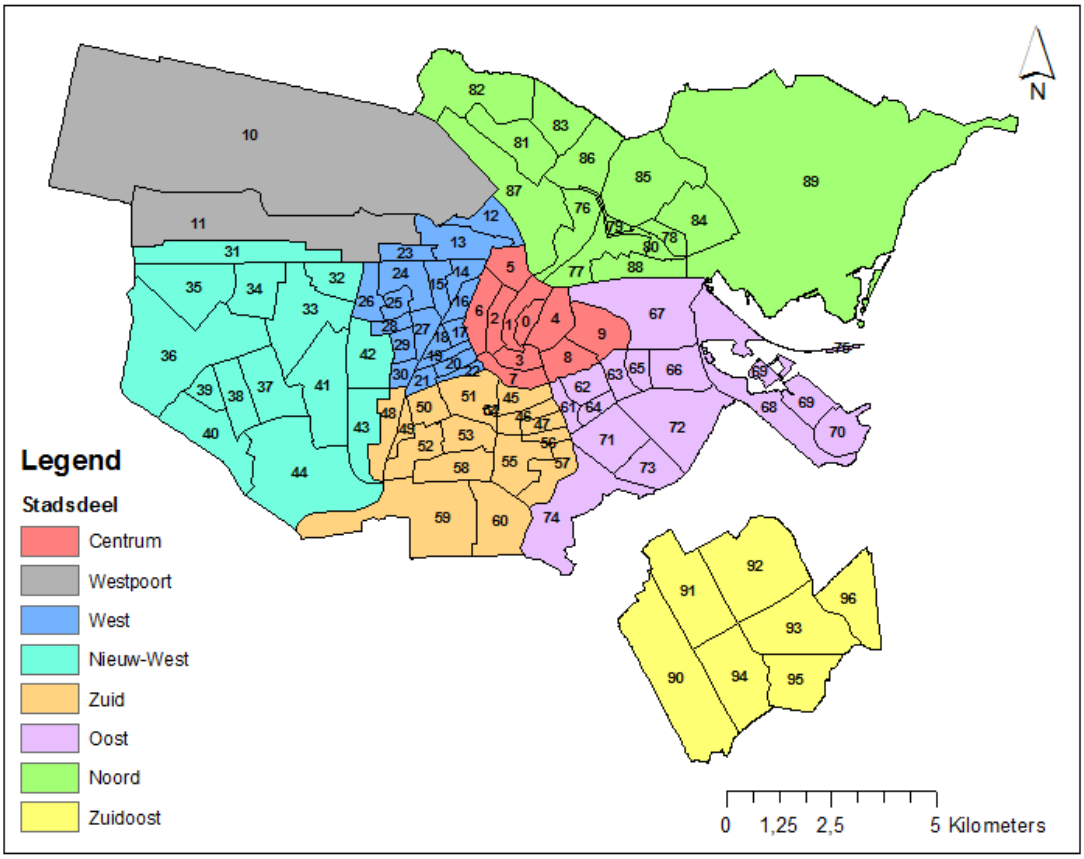
# 2. Introducing the research area

Initially, the plan was to build a model for every neighborhood in the Netherlands. As it is a data-driven model, the presence of the right datasets is essential. While the socioeconomic and demographic characteristics of citizens and the level of livability are available for every neighborhood in the Netherlands, data on public familiarity, social cohesion and social capital, and neighborhood problems are not. The municipality of Amsterdam has its own research and statistics office (OIS) and publishes research on the perceptions of citizens on their neighborhood once in every two years (WiA). Together with the Veiligheidsmonitor datatset (collected by the ministry of safety and justice, municipalities, and the police) these data sources provide the information which is missing on the national scale. Both the CBS and OIS publish data on the 'neighborhood combination' level. As the name suggests, neighborhood combinations are made up out of several neighborhoods. It is the most detailed level at which all of the necessary data is available. The 97 neighborhood combinations of Amsterdam are depicted in figure 2 accompanied by the names which belong to the depicted numbers. The neighborhood combinations belong to one of the eight boroughs (which are called *stadsdelen* in Dutch) of Amsterdam. The color of the neighborhood combination denotes which borough it belongs to.

A further introduction to Amsterdam, its boroughs, and its neighborhood combinations can be given by analyzing the land use within the city of Amsterdam. Figure 3 shows that the northwest of Amsterdam (Westpoort), is mainly an industrial area. The built-up area predominantly has an industrial function. No more than 190 people live in the Westelijk havengebied (see figure 2, number 10), and 210 people live in the Bedrijventerrein Sloterdijk (see figure 2, number 11) (CBS 2015). Other large industrial areas are found in the north, alongside the shore of the river (figure 2, 87 and 88) as well as in the southeast (90). Large green areas are found on the outskirts of Amstersdam. Waterland (89), Spierhorn (31), Eendracht, Luktemeer en Ookmeer (36), and Driemond (96) are the areas where agricultural practices are common land use.

Figure 4 depicts the population density per square kilometer per neighborhood. None of the neighborhoods within the neighborhood combination Westelijk havengebied have a population density of more than 25 people per square kilometer. The 190 people are not clustered within a certain area but are spread out over the different neighborhoods. With two neighborhoods having a population density of 25 or more, the 210 people living in the Bedrijventerrein Sloterdijk combination are spread as well. In the southeast, the population is mainly located in Bijlmer-Centrum, Bijlmer-Oost, Holendrecht/Reigersbos, Gein, and Driemond. The higherst population density can be found in neighborhoods in the west, south, east, and in parts of the center.

**Figure 2** Neighborhood combinations and boroughs of Amsterdam (CBS 2015)




| | | | | | |
|---|---|---|---|---|---|
| 0 | Burgwallen-Oude Zijde | 33 | Slotermeer-Zuidwest | 66 | Indische Buurt Oost |
| 1 | Burgwallen-Nieuwe Zijde | 34 | Geuzenveld | 67 | Oostelijk Havengebied |
| 2 | Grachtengordel-West | 35 | Eendracht | 68 | Zeeburgereiland/Nieuwe Diep |
| 3 | Grachtengordel-Zuid | 36 | Lutkemeer en Ookmeer | 69 | IJburg West |
| 4 | Nieuwmarkt/Lastage | 37 | Osdorp-Oost | 70 | IJburg Zuid |
| 5 | Haarlemmerbuurt | 38 | Osdorp-Midden | 71 | Frankendael |
| 6 | Jordaan | 39 | De Punt | 72 | Middenmeer |
| 7 | De Weteringschans | 40 | Middelveldsche Akerpolder en Sloten | 73 | Betondorp |
| 8 | Weesperbuurt/Plantage | 41 | Slotervaart | 74 | De Omval |
| 9 | Oostelijke Eilanden/Kadijken | 42 | Overtoomse Veld | 75 | IJburg Oost |
| 10 | Westelijk Havengebied | 43 | Westlandgracht | 76 | Volewijck |
| 11 | Bedrijventerrein Sloterdijk | 44 | Sloten- en Riekerpolder | 77 | Ijplein/Vogelbuurt |
| 12 | Houthavens | 45 | Oude Pijp | 78 | Tuindorp Nieuwendam |
| 13 | Spaarndammer- en Zeeheldenbuurt | 46 | Nieuwe Pijp | 79 | Tuindorp Buiksloot |
| 14 | Staatsliedenbuurt | 47 | Diamantbuurt | 80 | Nieuwendammerdijk/Buiksloterdijk |
| 15 | Centrale Markt | 48 | Hoofddorppleinbuurt | 81 | Tuindorp Oostzaan |
| 16 | Frederik Hendrikbuurt | 49 | Schinkelbuurt | 82 | Oostzanerwerf |
| 17 | Da Costabuurt | 50 | Willemspark | 83 | Kadoelen |
| 18 | Kinkerbuurt | 51 | Museumkwartier | 84 | Nieuwendam-Noord |
| 19 | Van Lennepbuurt | 52 | Stadionbuurt | 85 | Buikslotermeer |
| 20 | Helmersbuurt | 53 | Apollobuurt | 86 | Banne Buiksloot |
| 21 | Overtoomse Sluis | 54 | Duivelseiland | 87 | Buiksloterham |
| 22 | Vondelbuurt | 55 | Scheldebuurt | 88 | Nieuwendammerham |
| 23 | Sloterdijk | 56 | IJselbuurt | 89 | Waterland |
| 24 | Landlust | 57 | Rijnbuurt | 90 | Amstel III/Bullewijk |
| 25 | Erasmuspark | 58 | Station-Zuid WTC en omgeving | 91 | Bijlmer-Centrum (D, F, H) |
| 26 | De Kolenkit | 59 | Buitenveldert-West | 92 | Bijlmer-Oost (E, G, K) |
| 27 | De Krommert | 60 | Buitenveldert-Oost | 93 | Nellestein |
| 28 | Van Galenbuurt | 61 | Weesperzijde | 94 | Holendrecht/Reigersbos |
| 29 | Hoofdweg en omgeving | 62 | Oosterparkbuurt | 95 | Gein |
| 30 | Westindische buurt | 63 | Dapperbuurt | 96 | Driemond |
| 31 | Spieringhorn | 64 | Transvaalbuurt | | |
| 32 | Slotermeer-Noordoost | 65 | Indische Buurt West | | |

**Figure 3** Land use map of Amsterdam (TOP10NL 2016)

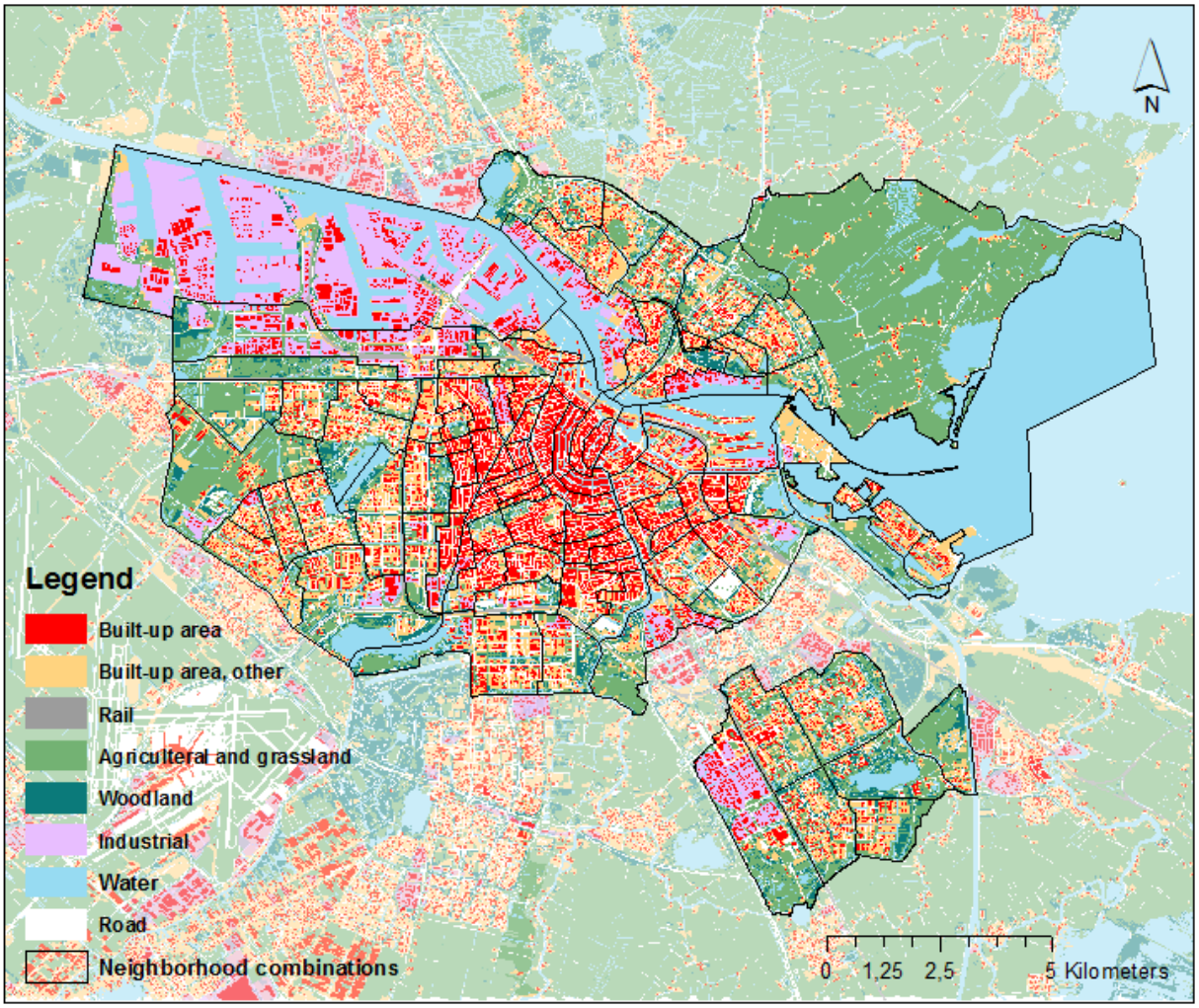
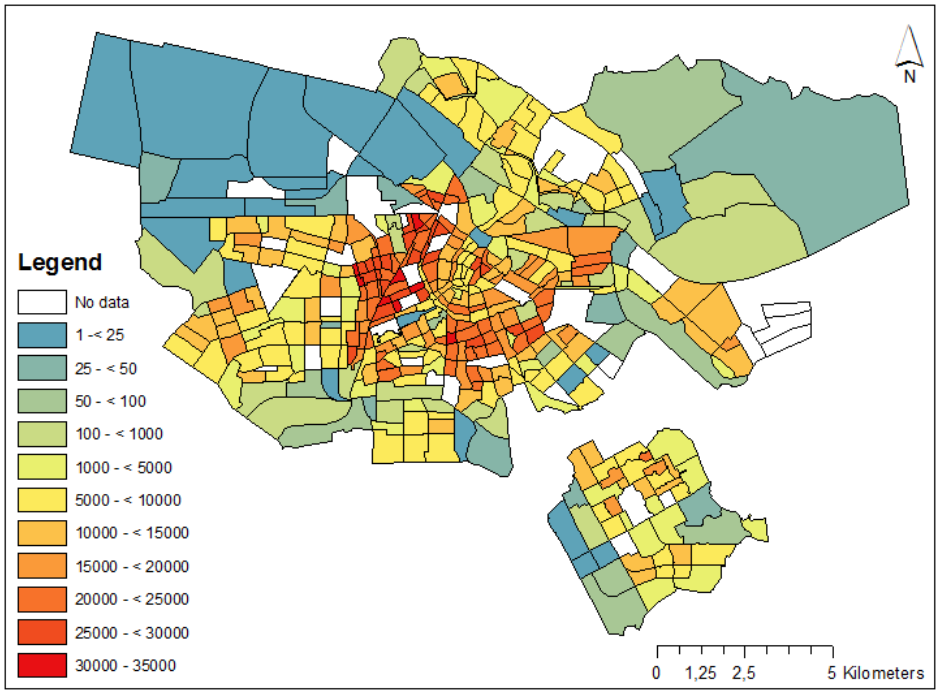



**Figure 4** Population density per square kilometer per neighborhood (OIS 2016)



# 3. Methodology

## 3.1 Research Objective

As stated in the first chapter, the objective of this research is to design a model that on the one hand puts Leidelmeijer's theory to the test by applying it on specific cases, and on the other hand test the relevance of adding geographic components to the model, making using new data sources. The regression model is based on the relationship between the dependent variable 'neighborhood participation' and the independent variables 'characteristics of the neighborhood inhabitants', the 'neighborhood characteristics,' and 'livability', as determined by Leidelmeijer (2012). In addition an extra variable is added to the neighborhood characteristics named 'geographic characteristics.' The main research question is expressed as:

- To what extent do characteristics of neighborhood inhabitants, the livability in the neighborhood, the situational characteristics, and in particular the geographic neighborhood characteristics contribute to the explanation of the amount of neighborhood participation in the neighborhood combinations of Amsterdam?

The first part of the main research question: *to what extent do characteristics of neighborhood inhabitants, the livability in the neighborhood, the situational characteristics (…) contribute to the explanation of the amount of neighborhood participation in the neighborhood combinations of Amsterdam*, can be broken down into the following sub-questions:

- What is the contribution of socioeconomic and demographic characteristics of inhabitants to the explanation of neighborhood participation?
- What is the contribution of social characteristics to the explanation of neighborhood participation?
- What is the contribution of beneficial participation to the explanation of neighborhood participation?
- What is the contribution of the amount of problems present to the neighborhood to the explanation of neighborhood participation?
- What is the contribution of the level of livability to the explanation of neighborhood participation

The second part of the main question: *to what extent do (…) geographic neighborhood characteristics contribute to the explanation of the amount of neighborhood participation in the neighborhood combinations of Amsterdam*, can be broken down into the following sub-questions:

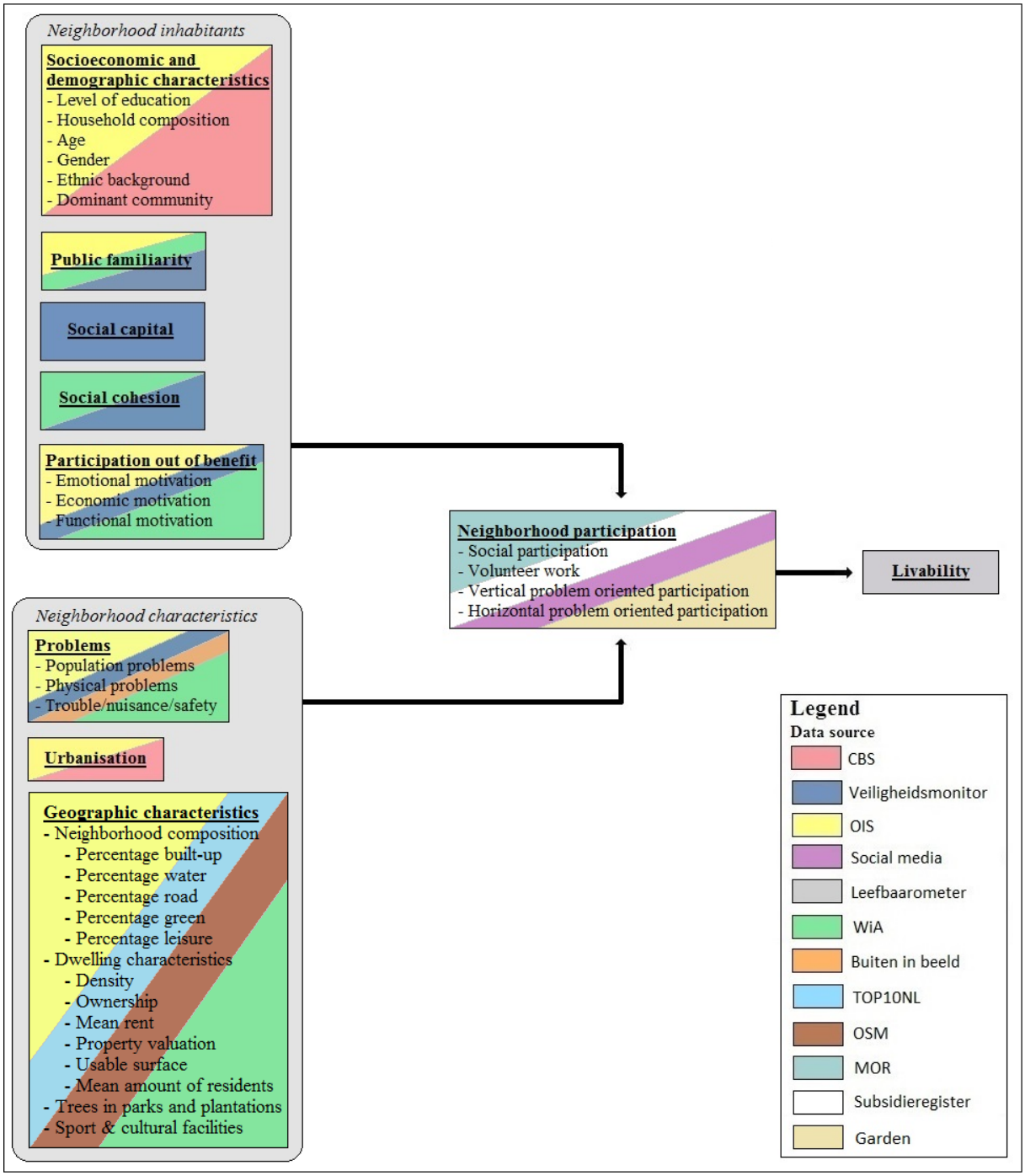
- What is the contribution of the division of type of land cover (neighborhood composition) in a neighborhood combination to the explanation of neighborhood participation?
- What is the contribution of the residential characteristics in a neighborhood combination to the explanation of neighborhood participation?
- What is the contribution of the availability of sport and cultural facilities in a neighborhood combination to the explanation of neighborhood participation?
- What is the contribution of the amount of trees in parks and plantations in a neighborhood combination to the explanation of neighborhood participation?

## 3.2 Operationalization

In order to determine what independent variables contribute to the explanation of the dependent variable, a regression analysis is performed. In essence, correlations between the dependent and the independent variables are determined after which a model is fitted that best describes the data (Field 2009). This 'best fit' is used to explain the variance in the value of the dependent variable.

The first step towards the development of a regression model is to make the variables measurable. Hereafter, data sources are sought which are illustrative for the particular variable. Figure 5 depicts the variables central to this research together with their data source. In the remainder of this section, the method to operationalize and collect the data is discussed for each variable.

**Figure 5** Conceptual model



### 3.2.1 Neighborhood participation

The form of neighborhood participation which is present in the different neighborhood combinations of Amsterdam are determined by the use of four data sources.

First of all, the vertical problem oriented neighborhood participation in the neighborhood combinations is operationalized by the use of the 'Melding Openbare Ruimte' (MOR) dataset collected by the municipality of Amsterdam. By using an app, filling out a form, using an online map, or by making a call, citizens can report something in public space which needs to be sorted (cleaned, fixed, or rearranged). The reports are displayed on an online map. This geographic information is harvested for a period of twelve weeks. While in practice the reports of citizens are not limited to their own neighborhood, the assumption is made that the majority of reports are made within ones neighborhood, as this usually is an important part of their living environment.

A second data source is the subsidy register of Amsterdam which will be made publically available by the time this thesis is published. The subsidy register holds all the subsidies granted over 2015 and 2016. The project names are used in a desktop search to find information on the initiatives. The borough (stadsdeel) which grants the subsidy gives an indication of the area in which the initiatives are carried out. As the unit of analysis is the neighborhood combination, it is essential to find the website of the initiatives to determine the specific neighborhood which the project belongs to. As some of the projects are intended for any inhabitant of the borough, not all the projects in the registry are aimed at a specific neighborhood. Therefore, the websites are also used to determine if the projects are neighborhood specific (aimed at neighborhood inhabitants). All four forms of neighborhood participations are reflected in this registry, as many of the initiatives are aimed at social participation, are carried out by volunteers, or are aimed at improving the neighborhood (socially and physically).

A third data source which is used is the presence of neighborhood (community) gardens in the neighborhood combinations. Over the past several years, citizens of Amsterdam have followed the international trend of the practice of growing food inside the city (Lange 2011). They can choose to do this in their own garden but it is not uncommon that part of public or communal space is transformed into a neighborhood garden. The possibly positive effect these gardens have on social cohesion as a result of increased interaction between inhabitants drives the municipality to support such initiatives (Lange 2011). In some cases, neighborhood inhabitants have initiated the creation of a neighborhood garden and in other cases it is initiated by an organization like housing associations. Inhabitants are asked by these organizations if they would be interested in maintaining a neighborhood garden if one would be build. In all cases, neighborhood inhabitants are involved in maintaining the garden. Given the involvement of the municipality by granting inhabitants the right to maintain part of the public space or by subsidizing the initiatives, the municipality is able to publish a map with the location of the neighborhood gardens. Complemented by external sources (found by a desktop search), this form of neighborhood participation is used as an example case for social and horizontal problem oriented neighborhood participation. As this is a proxy for social and horizontal problem oriented neighborhood participation, it should be kept in mind that neighborhood gardens portray a certain perspective. Using other proxies, one might come to different results.

Lastly, the use of twitter as data source is explored. Often, people post messages and/or pictures of citizen initiatives (like organizing or attending a neighborhood barbeque or cleaning public places in their neighborhood) on social media. By using the 'hashtags' which refer to these initiatives on Twitter, an attempt is made to collect information about the location and form of participation. As some of the initiative takers do not apply for subsidy, Twitter could function as a valuable source for information on these projects.

### 3.2.2 Citizen characteristics: differences between neighborhoods

The data which is used to determine the socioeconomic and demographic characteristics of the neighborhood inhabitants are collected by the CBS (Centraal Bureau voor de Statistiek) and by OIS (Onderzoek, Informatie en Statistiek). The CBS collects and publishes statistics about all neighborhoods in the Netherlands. The collected data on the socioeconomic and demographic characteristics of the inhabitants of a neighborhood are published in summarized form. What this means is that information about individuals is aggregated to the neighborhood (combination) level. This is in line with the unit of analysis of this study: the neighborhood combinations of Amsterdam. OIS operates in similar fashion for all the neighborhood combinations in Amsterdam. When more detailed data is provided by the OIS and when this detail is deemed valuable for the model, OIS data is used.

Public familiarity is operationalized by on the one hand determining to what extent the citizen maintains casual contact with his/her neighbors (greeting and small talk), and on the other hand the feeling of having a stable social order in the neighborhood. The stability can be measured by the extent to what inhabitants move out of the neighborhood (Leidelmeijer 2012). This is an official statistic published by OIS. In addition, respondents of the WiA research are asked how tempted they are to move out of the neighborhood themselves. The extent of casual contact with neighbors is determined by two questions from the veiligheidsmonitor (2015) concerning the actual contact with neighbors and how well one knows his/her neighbors.

Social capital is operationalized by determining the extent of social networks of inhabitants and by asking about the trust they have in their neighborhood and its inhabitants (Leidelmeijer 2012). Information on the extent of social networks within the neighborhood combinations cannot be found in the official datasets. Therefore, this variable is based on trust of respondents in their neighbors which is determined by the answer on the statement ‘when I go on holiday I trust my neighbors with the key to my home’ collected by the veiligheidsmonitor.

Social cohesion is operationalized by asking citizens to what extent they have casual conversations with neighbors, to what extent they encountered social control, neighborhood news, support, involvement in the neighborhood, as well as organized activities. OIS have produced an official statistic of social cohesion based on the following four statements: ‘inhabitants of this neighborhood barely know each other’, ‘inhabitants of this neighborhood treat each other nicely’, ‘I live in a cozy neighborhood with lots of solidarity’, and ‘I feel at home with the inhabitants of this neighborhood.’ In addition, WiA collected data on social control in neighborhoods (2011) as well as how involved the respondents perceive their fellow neighborhood inhabitants to be with their neighborhood (2015). Aspects which are not covered by the datasets are neighborhood news and activities, and mutual support.

Participation out of benefit is measured by the extent to what the inhabitants feel attached to their neighborhood (emotional bond), if they live in a rented or owned house (economic bond), and to what extent they make use of neighborhood facilities (functional bond). Both the CBS and OIS dataset could be used to determine the value of economic bond/benefit through home ownership statistics. In this case however, the OIS dataset is used because it is more recent (2015). The emotional bond is determined by whether inhabitants feel at home in their neighborhood or not, their opinion on the neighborhood environment, how they rate the dwellings, green facilities, and playground facilities in their neighborhood, and how they rate the state of their own home. This information is collected by WiA. In addition, respondents are asked how they believe their neighborhood to develop the coming years (Veiligheidsmonitor 2014). The functional benefit is determined by inhabitants’ opinion on sport facilities, parking facilities, bicycle parking facilities, public transport, care facilities,

and community centers in their neighborhood (WiA 2015). Highly rated neighborhoods are assumed to have adequate facilities while lowly rated neighborhoods lack in such facilities.

### 3.2.3 Neighborhood characteristics

The second part of the model, the neighborhood characteristics, is made up out of level of urbanization, the amount of problems in the neighborhood, and in addition, out of geographic characteristics. These are operationalized as following.

The level of urbanization of a neighborhood combination is determined by the data source 'daily business index' produced by OIS. This statistic holds the mean amount of people per hectares on a mean day in the year as opposed to the mean of the city (given for each neighborhood combination).

The amount and form of problems present in an area is determined by the extent to which inhabitants experience nuisance caused by the following subjects regarding their neighborhood: population composition, cleanness and functioning of the physical environment, facilities, hindrance through sound pollution or strange odors, nuisance/hassle caused by other inhabitants, road safety, and crime (Leidelmeijer 2012).

To determine the physical problems in the neighborhood combinations, the WiA data source is used in which inhabitants are asked to rate the cleanness and maintenance of the neighborhood environment (streets and sidewalks, green facilities, playgrounds, and buildings). In addition to the opinion of inhabitants, a data source from 'Buiten in beeld' is used. Buiten in beeld measured the amount of garbage in, consecutively, hardened public space, grass, and in green public space determined by 100 by 100 meter square in which garbage is counted and assigned a score (OIS 2016). Furthermore, the deprivation index is used in which the index score 100 denotes the mean deprivation in the police district Amsterdam-Amstelland in 2014. This dataset is collected by OOV/OIS.

Similar to physical problems, the problems caused by population in the neighborhood combinations is partly determined by the perception of inhabitants and partly by police statistics. The WiA research asked inhabitants how different groups in the neighborhood handle each other, to what extent they experience nuisance caused by other groups of people or by bars and restaurants. In addition the question 'to what extent do you experience hassle caused by teenagers' from the Veiligheidsmonitor 2014 is used. From the OOV/OIS 2014 dataset the tension index and the person hassle index is used. The tension index reflects the tension in the neighborhood as experienced by its inhabitants. The person hassle index reflects irritating behavior against persons and things. Again, the index score of 100 refers to the mean score in the Amsterdam-Amstelland police district.

The datasets which are used to determine the trouble, nuisance, and safety problems in the neighborhood combinations are quite extensive. First of all, five indices produced by OOV/OIS are used. The safety index indicates the relative safety compared to the mean safety in the Amsterdam-Amstelland police district. The index is based on police statistics and the Veiligheidsmonitor. The crime index is based on police statistics and the victimization section of the Veiligheidmonitor questionnaire. It indicates the amount of crime in an area as opposed to the mean of the police district. The high volume crime and high impact crime indices together make up the crime index. High volume crime is crime which to lesser extent impacts the victim on a personal level. These are burglaries, theft, and property crime. High impact crime is crime which does impact individuals on a personal level. This are offenses in which violence is used. The last index which is used is the unsafety perception index which is produced by the Veiligheidsmonitor. This index is formed out of the three elements 'risk perception', 'unsafety experiences', and 'avoiding behavior.' Respondents are asked to rate the chance of experiencing crime or hassle, the amount of times they feel unsafe or fearful towards crime, and to what extent they avoid certain areas. The remaining datasets which are

used to make up this variable are produced by the Veiligheidsmonitor and the WiA. These datasets hold the perception of inhabitants on their experience of nuisance, feelings of unsafety, crime and drugs related issues, and issues with traffic.

### 3.2.4 Geographic characteristics

In addition to Leidelmeijer's theory, a third sub-set is added to the second part of the model, the neighborhood characteristics (see figure 5). The assumtion is that geographic characteristics of the neighborhood combinations are important in explaining variations in the amount of neighborhood participation which is apparent in the neighborhood combination.

In this research, geographic characteristics are defined as physical objects in a neighborhood combination (e.g. trees, buildings, but also land cover) and their attributes (characteristics) which are part of the normal state of the neighborhood. They distinguish themselves from the other variables in this research, in that the objects are tangible and are not formed by interaction between inhabitants or through experiences of inhabitants. To elaborate, the previously discussed variables either find existence through human interaction (i.e. public familiarity, social capital, and social cohesion), through the experience of inhabitants of their neighborhood (i.e. emotional bond, neighborhood problems, livability), or are attributes of the inhabitants (the socioeconomic and demographic characteristics). With 'normal state' is meant that objects which are prone to change like temporary market stalls, event fences, or temporary art, are not to be considered as geographic components. A specific example of these temporary objects is encountered in the physical neighborhood problems variable. This variable is partly determined through the experience of neighborhood inhabitants and partly by measurement of polluted public space. Although in some cases this pollution is tangible (like litter in public space), these objects are of temporary nature. A variable in which the physical environment and several tangible objects are taken into consideration is in the livability dataset of the Leefbaarometer. However, together with 99 other indicators, the variables are combined into a single value, eliminating the possibility to analyze their individual contribution. In addition, in this research the level of urbanization is determined through the mean amount of people per hectare on a mean day of the year and therefore is not treated as a tangible geographic component.

As depicted in figure 5, the geographic components are grouped into neighborhood composition, dwelling characteristics, trees in parks and plantations, and sport and cultural facilities. Neighborhood composition refers to the division of the elements built-up, water, road, green, and leisure. The percentage built-up, road, and water are collected from the TOP10NL dataset. For each neighborhood combination, the specific elements are selected and clipped to the combination. The clip operation makes sure that all elements which lie outside of the specific neighborhood combination are deleted. The geometry of the elements which lie inside the combination are then calculated. Finally, the square kilometer which the element covers is divided by the total size of the neighborhood combination and multiplied by 100. This results in the percentage of the combination which is covered by the elements built-up, road, and water. The same method is used to calculate the percentage of green and leisure grounds. However, this information is collected from the OpenStreetMap (OSM) database. Therefore, the specific elements are first selected, downloaded, and prepared for use in a geographical information system. The thought behind including these geographic characteristics is that the division might influence the amount of neighborhood participation which is performed. For example, it is presumed that inhabitants of a relatively green neighborhood are less inclined to create their own neighborhood garden but perhaps might report more on neglected green or pests control. In line, a high percentage of landmass covered by roads or built-up might drive inhabitants to make their neighborhood greener and/or give inhabitants more reason to report hassle caused by neglected roads/ buildings.

More leisure possibilities might invite inhabitants to organize activities while a shortage might drive inhabitants to initiated the creation of leisure grounds themselves.

The dwelling characteristics which are collected for each neighborhood combination are the dwelling density, the ownership, the mean rent, the property valuation, the useable surface, and the mean amount of residents. The dwelling density is used as an indication for the proximity with which inhabitants live to one another. Living in close proximity could drive people to interact more which might lead to neighborhood participation. On the other hand, people might seek more privacy as they already encounter neighbors on the streets. The dwelling density is collected from the OIS.

The ownership of the dwellings in a neighborhood refers to the percentage of the buildings which are private rent, or corporation owned (mind that the percentage owned by the residents themselves is used as economic motivation proxy). No particular expectations underlie the inclusion of these variables. It is interesting to explore if inhabitants of private rent dwellings participate differently than inhabitants of dwellings rented out by corporations. The same goes for the inclusion of the mean monthly rent and property valuation. In similar fashion, it is interesting to explore if inhabitants of combinations with a higher mean monthly rent or a higher mean property valuation participate differently from inhabitants of lower scoring neighborhood combinations. Apart from the mean monthly rent, which is collected from WiA, the values of each neighborhood combination are collected from the OIS. Note that the attributes of the physical objects occasionally are made through human interaction with the object (e.g. property valuation or mean amount of inhabitants). As the unit of measurement is the object, these characteristics are treated as geographic variables.

The usable surface includes the percentage of the dwellings which have a usable surface of less than 60 square meters, between 60 and 80 square meters, and more than 80 square meters. The assumption is that people who live in small houses are more inclined to go out which possibly influences the amount of neighborhood participation in an area. In line, a lower mean amount of residents per dwelling is presumed to affect neighborhood participation as people living alone might also be more inclined to participate in activities outside their home. The values are collected from OIS.

The last three geographic characteristics used in this study are the amount of trees in parks and plantations per square kilometer, the amount of cultural facilities per 1000 inhabitants, and the amount of sport facilities per 1000 inhabitants. It is presumed that greener parks and plantation might influence the amount of neighborhood participation. Greener parks might give inhabitants more to report about to the municipality. In addition, a lack of green in a park might drive inhabitants to create and maintain their own neighborhood garden. Increased possibilities to attempt sport and cultural activities in the neighborhood might increase contact between inhabitants which in turn might lead to more neighborhood participation. On the other hand, it might lower the time the inhabitants have to unfurl initiatives. The amount of trees per square kilometer is collected from TOP10NL. They are clipped to the neighborhood combinations and standardized to the square kilometer unit. The amount of cultural and sport facilities are collected from WiA.

### 3.2.5 Livability

The livability of every neighborhood combinations in the Netherlands is determined by leefbarometer.nl. The value of this variable is a combined score on 100 indicators dispersed over five dimensions. The housing stock dimension values neighborhood combinations on the characteristics of the residential building (e.g. year of construction, size, or vacancy). The physical environment dimension values neighborhood combinations on indicators like the proximity to railroads, wind turbines, and power pylons, the presence of monuments, or the noise pollution. The facilities dimension mainly base the value of an area on the proximity of facilities. The inhabitants dimension values neighborhood combinations on the characteristics of her inhabitants. Lastly, the safety dimension values areas on hassle and acts of crime. The indicators are determined by thorough statistical research (Leidelmeijer et al. n.d.).

# 4. Data sources in detail

In this chapter, the data sources which are used in the process of designing a regression model are mapped and the patterns which are apparent on the maps are discussed. One neighborhood combination is reviewed in more detail in each section (and several in the geographic neighborhood characteristics section). The sole purpose of this is to get more feeling for the research area: the city of Amsterdam. After all the independent variables are looked at in detail, two regression analyses are done in chapter 5. When interpreting the map, the English translations of the boroughs of Amsterdam are used. Thus, 'city center' refers to the borough 'Centrum', 'west' refers to the borough 'West', 'new west' refers to 'Nieuw-West', 'east' refers to 'Oost', 'north' refers to 'Noord', and 'southeast' refers to 'Zuidoost.' 'Westpoort' is the exception. No English terminology is used to refer to this borough.

## 4.1 Citizen characteristics

### 4.1.1 Socioeconomic and demographic characteristics

To give more insight into the composition of level of education in the neighborhood combinations, more detail is created by not only displaying the level of education of the most dominant group but also of the less dominant groups within the neighborhood combinations. Figure 6 shows that the neighborhood combinations which house inhabitants with the highest possible composition of level of education are located in the city center, the west, south, east, and three combinations in the north. The lowest possible composition is found in the new west, north, southeast, and two combinations in the east.

Because the single household composition is dominant in every neighborhood combination in the city, figure 7 displays the second dominant household composition. The figure shows that married couples which have children are the second largest group in most of new west and in the outer neighborhood combinations of the city, while unmarried couples without children are second largest in the inner city, west, and in parts of the south and east. Single parents are the second largest group in parts of the southeast and north while married couples without children are dominant in parts of the north, Westpoort, south, and southeast.

Figure 8 denotes the largest age groups per neighborhood combinations. It strikes that the older age group (45 to 64) is largest at the edge of the city while the age group 25 to 44 is largest in the rest of the city.

Figure 9 displays the largest gender group in the neighborhood combinations. Woman are dominant in most of the neighborhood combinations surrounding the city center.

Similar to the dominant household composition, figure 10 displays the second dominant community, as the Dutch nationality is most dominant in all of the neighborhood combinations. Strikingly, inhabitants from the U.K. dominate in the city center, west, and in the south, inhabitants with origins in Ghana dominate in Amsterdam southeast, while people with origins in Morocco and Turkey dominate in the new west, north, and east. The descriptive statistics of the socioeconomic and demographic variables used in this section are summed up in table 1.

Figure 11 depicts the physical environment of the neighborhood combination Bijlmer-Oost (see figure 3 for the legend). This area is made up out of the E, G, and K neighborhoods which were developed along the principle of the separation of functions (living space, working space, recreational space, and traffic space) in the 60s and 70s of the 20$^{th}$ century. This principle appeared to cause unforeseen problems which led to the start of the redevelopment of the area in the 90s (Gemeente Amsterdam 2015a). The majority of the 26755 people (CBS 2015) living in this area are lower educated. Furthermore, the second

biggest household composition is the single parent household. In addition, the majority of the inhabitants are between the 25 and 44 years old, are woman, and the second dominant community is Ghanaian.

**Figure 6** Level of education (OIS 2012)

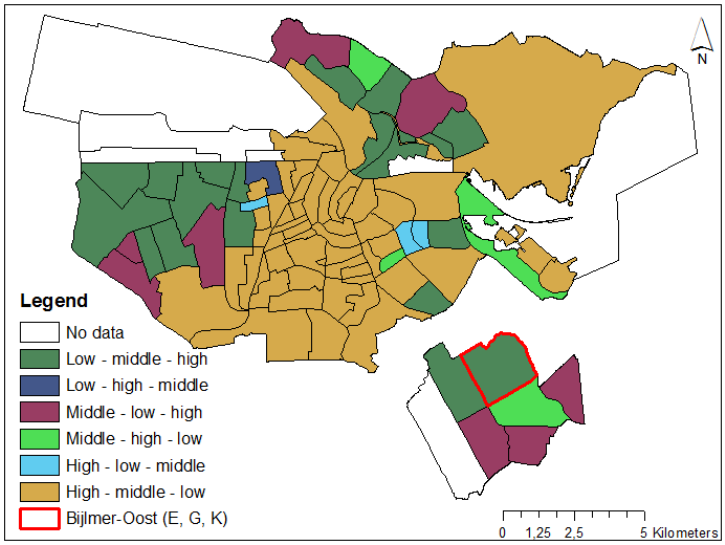



**Figure 7** Second biggest household composition (OIS 2015)

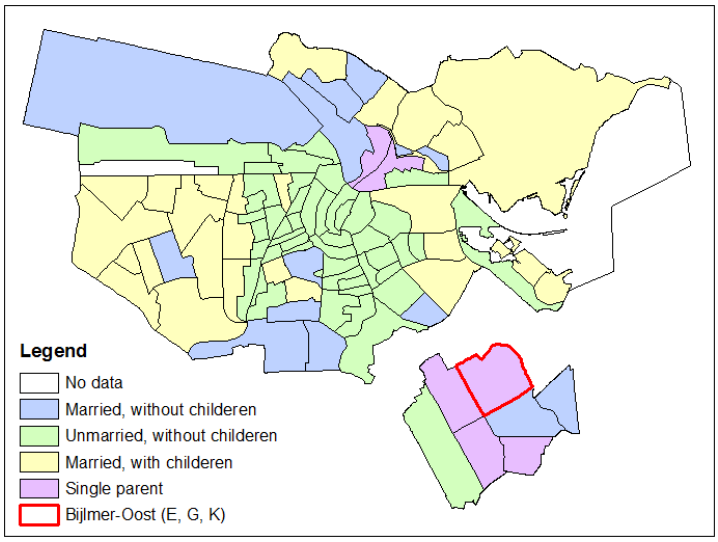



**Figure 8** Largest age group (CBS 2015)

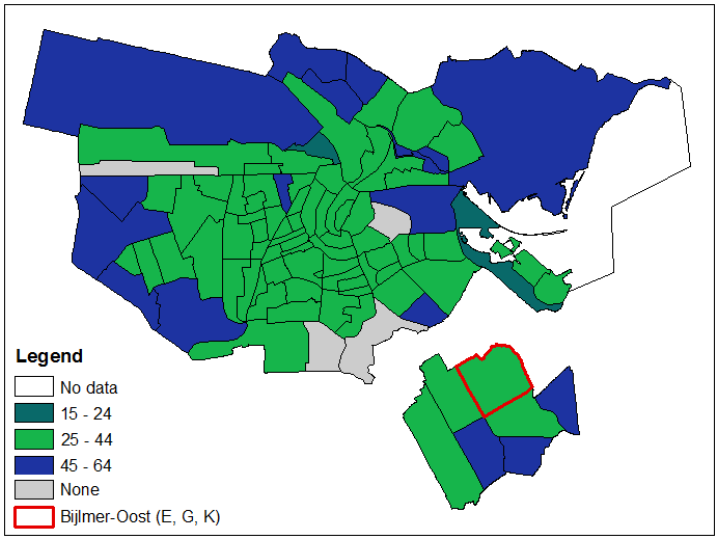



**Figure 9** Largest gender group (CBS 2015)

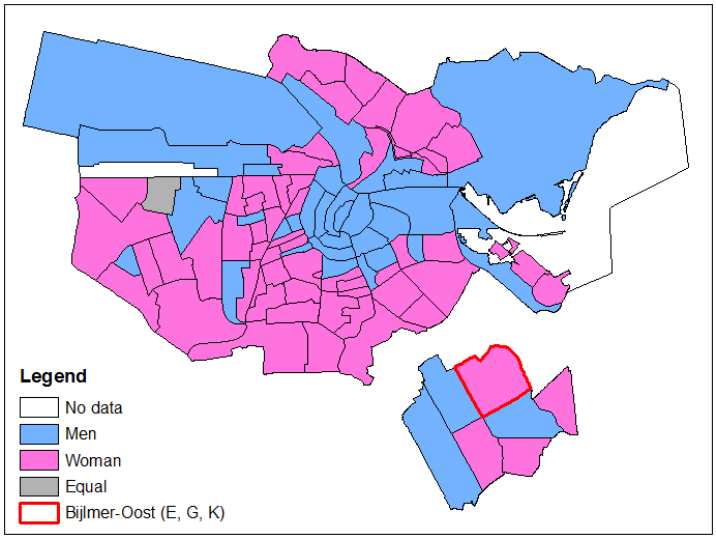



**Figure 10** Second dominant community (OIS 2015)

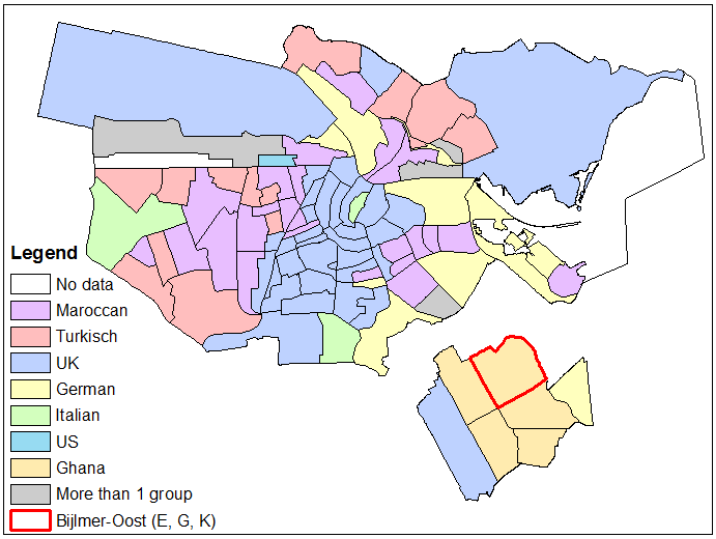



**Figure 11** Neighborhood combination Bijlmer-Oost

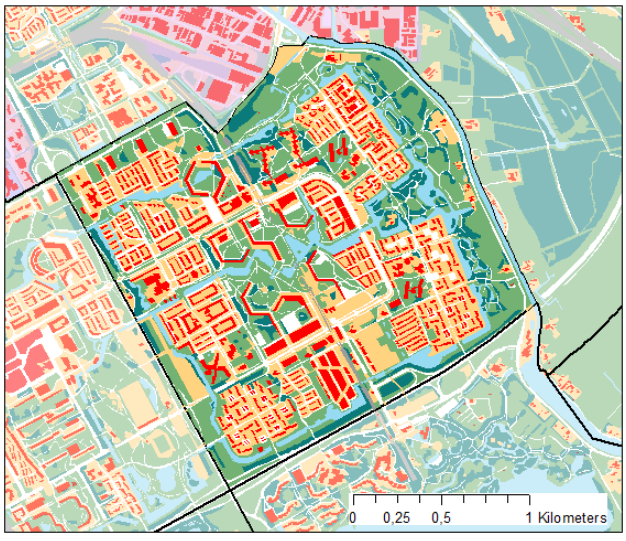


**Table 1** Descriptive Statistics socioeconomic and demographic characteristics

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Level of education | 90 | 1 | 6 | 4.46 | 2.100 | -0.827 | 0.254 |
| Second biggest household composition | 95 | 2 | 6 | 3.33 | 0.950 | 1.122 | 0.247 |
| Largest age group | 96 | 2 | 4 | 3.171 | 0.437 | 0.783 | 0.246 |
| Largest gender group | 95 | 1 | 3 | 1.65 | 0.500 | -0.389 | 0.247 |
| Second dominant community | 95 | 1 | 10 | 3.16 | 2.340 | 1.750 | 0.247 |

### 4.1.2 Public familiarity

The first two maps in figure 12 display how familiar neighbors are with each other. The striking difference between the two images is explained by the difference in the questions which were asked. While map A. displays the percentage of neighborhood inhabitants who have a lot of contact themselves, map B. shows how the inhabitants perceive the social contact between other inhabitants to be in the neighborhood. It is remarkable to see that, relatively speaking, inhabitants of a couple of neighborhood combinations in new west themselves have a lot of contact with other inhabitants while they perceive others to often barely know each other. Areas in which a small percentage of the inhabitants have a lot of contact with others and a large percentage perceive others to barely know each other are mainly located in the city center and in the south of Amsterdam.

The familiarity of inhabitants with each other is also tied to the stability of a neighborhood. Figure 13 shows the average length of the inhabitants living on their current address. The figure shows that people who live at their address for a relatively long time mainly live at the outskirts of Amsterdam. Map C. of figure 12 displays the percentage of inhabitants which perceive other neighborhood inhabitants not to feel at home. The neighborhood combination in which 30 percent of the respondents or more believe this to be true are mainly located in the new west and north of Amsterdam. Lastly, map D. of figure 12 shows the percentage of inhabitants who plan to move out of their neighborhood in the coming (two) years (the source dates from 2013). The largest percentages are found in neighborhood combinations which are located in the west and east of the city. Table 2 displays the descriptive statistics of the public familiarity variables discussed in this section.

The physical environment of the neighborhood combination Jordaan is depicted in figure 14. The Jordaan was developed in 1612 as working-class neighborhood and due to a period of pauperization in the 19$^{th}$ century, the neighborhood was renovated in the 70s of the 20$^{th}$ century. The neighborhood now houses a new generation of artists, students, and young entrepreneurs (JordaanInfo n.d.). The neighborhood combination is inhabited by 19 390

**Figure 12 A.** Contact with other inhabitants (Veiligheidsmonitor 2015) **B.** Fellow inhabitants barely know each other (Veiligheidsmonitor 2015) **C.** Fellow inhabitants not feeling at home (Veiligheidsmonitor 2015) **D.** Inhabitants who plan to move out of the neighborhood (WiA 2013)

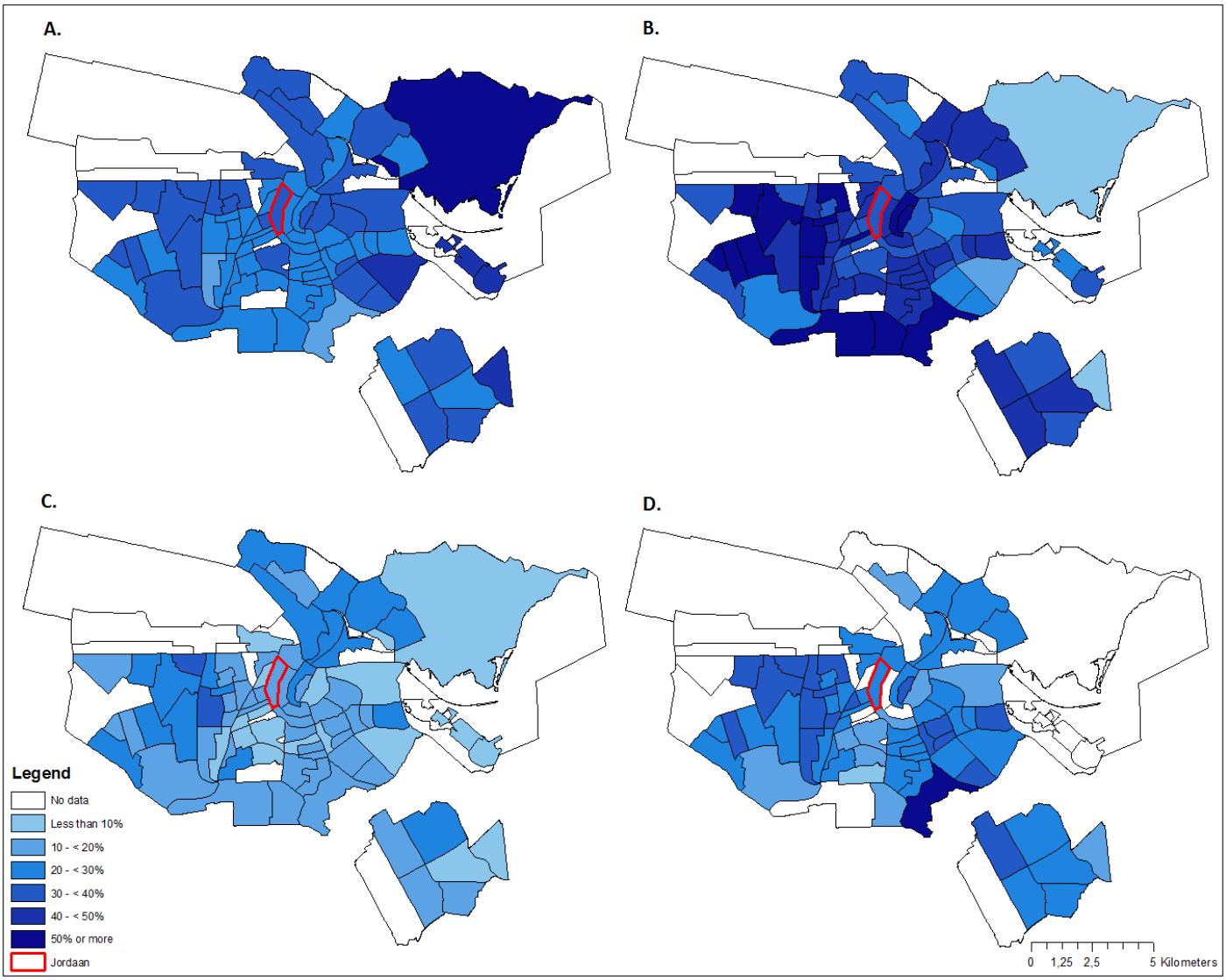



**Figure 13** Average length of residence (OIS 2015)

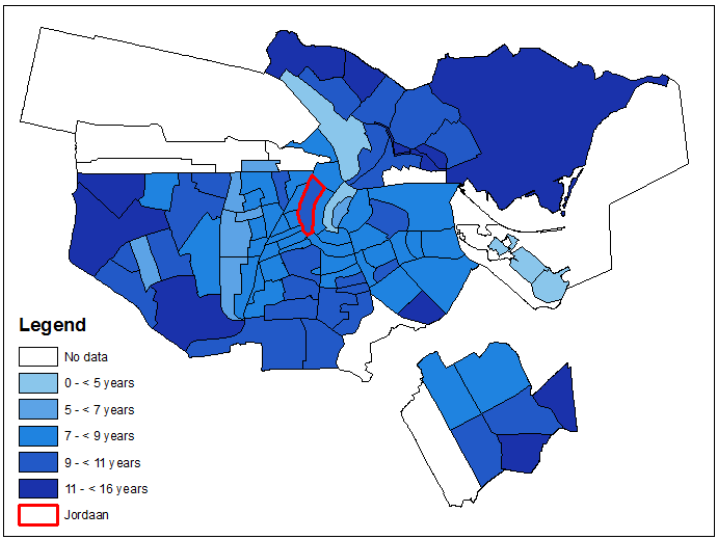
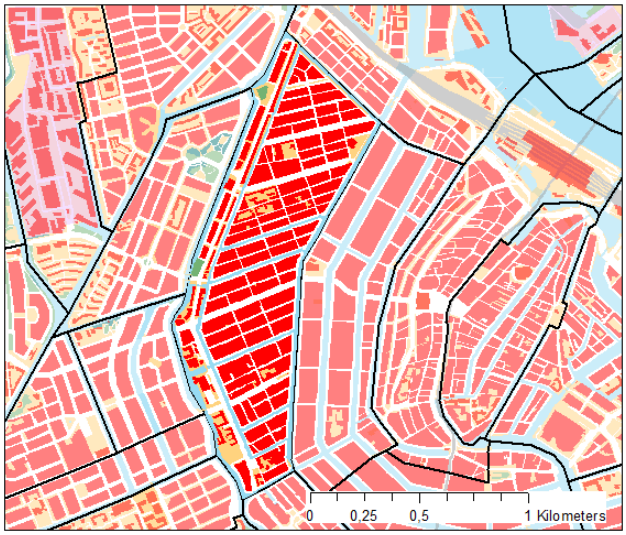



**Figure 14** Neighborhood combination Jordaan



people (CBS 2015). The maps discussed in this section show that 30 to 40 percent of these inhabitants have contact with other inhabitants, the same amount perceive other inhabitants to barely know each other, 10 to 20 percent of the inhabitants perceive their fellow inhabitants not to feel at home, and 20 to 30 percent plan to move out. Lastly, the average length of residence is 9 to 11 years.

**Table 2** Descriptive statistics public familiarity variables

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Contact with other inhabitants | 80 | 11.11 | 64.86 | 30.102 | 8.266 | 1.559 | 0.269 |
| Fellow inhabitants barely know each other | 80 | 4.55 | 65.33 | 40.626 | 10.980 | -0.827 | 0.269 |
| Fellow inhabitants not feeling at home | 80 | 3.75 | 32.02 | 15.172 | 6.646 | 0.540 | 0.269 |
| Inhabitants who plan to move out | 69 | 0 | 53 | 25.471 | 7.452 | 0.172 | 0.289 |
| Average length of residence | 88 | 1 | 5 | 3.40 | 0.977 | -0.273 | 0.257 |

### 4.1.3 Social capital

The level of social capital present in the neighborhood combinations is determined by if respondents trust their neighbors with the key to their home when going on holiday. Figure 15 shows that the neighborhood combinations in which respondents have the least amount of trust in their neighbors are Bijlmer-Centrum (51 percent), Osdorp Midden (46 percent), followed by Volewijck and Bijlmer-Oost (both 42 percent) and De Kolenkit (40 percent). The neighborhood combinations in which less than 10 percent of the respondents do not trust their neighbor with their key are located in the south (Helmersbuurt, Museumkwartier, Willemspark, and Apollobuurt), one in the city center (Weesperbuurt/Plantage), one in the east (Middenmeer), and one in the new west (Middelveldse Akerpolder en Sloten). In the rural north of Amsterdam (Waterland), all of the respondents trust their neighbors with their key. The disciptive statistics of the social capital variable is displayed in table 3.

The neighborhood combination Osdorp-Midden houses 15 735 inhabitants (CBS 2015) and is depicted in figure 16. It is part of a larger area called the Westelijke Tuinsteden (Western garden cities). It was first developed in the 50s and 60s of the 20$^{th}$ century. In the 90s a urban renewal process was started which resulted in a differentiation of the housing stock (Gemeente Amsterdam 2015b). With 46 percent of the 15 735 inhabitants, the lack of trust in neighbors in this combination is among the highest of the city.

**Figure 15** Lack of trust in neighbors (Veiligheidsmonitor 2015)

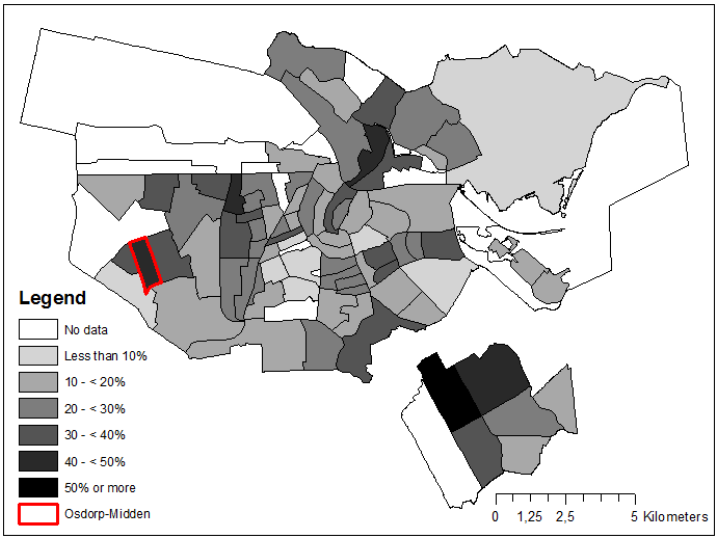



**Figure 16** Neighborhood combination Osdorp-Midden

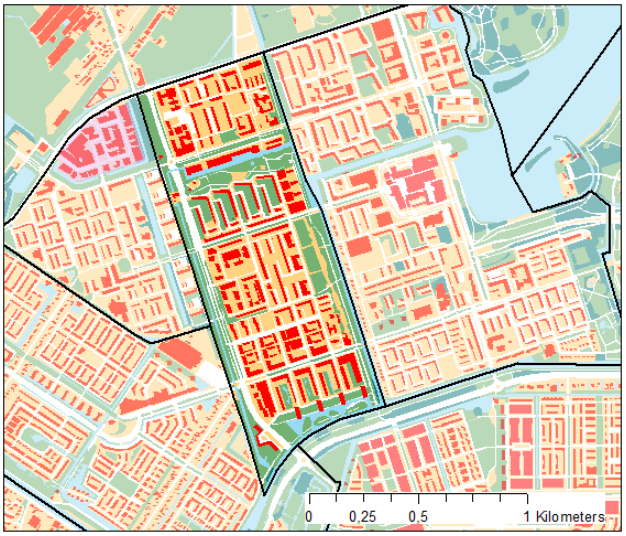



**Table 3** Descriptive statistics social cohesion variable

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Lack of trust in neighbors | 80 | 0 | 51.18 | 22.774 | 10.409 | 0.394 | 0.269 |

### 4.1.4 Social cohesion

Map A. in figure 17 shows the official social cohesion score as determined by OIS (1 being very poor and 10 being excellent). The highest scoring neighborhood combination is located in the rural north (Waterland) and scores a 7. The group of neighborhood combinations which have a slightly lighter tint of purple have a score in the 6 range. The lowest scoring neighborhood combinations are located in the new west of Amsterdam with scores between 4 and 5.

A somewhat similar pattern is displayed on map B. This map depicts involvement of fellow neighborhood inhabitants as perceived by the respondent. The lowest scoring neighborhood combinations are located in the new west of the city (between 5.5 and 6). Most of the other neighborhood combinations score between 6 and 7 with a few scoring between 7 and 8.

The next indicator of the level of social cohesion in the neighborhoods is the presence of social control as perceived by the respondents. Figure 18 shows that the highest scoring neighborhood combinations are located along the canals in the city center, in the south, in the east (Driemond in the southeast), and in the north (Nieuwendammerdijk/Buiksloterdijk and Waterland).

Lastly, the perception of inhabitants on the social quality in their neighborhood is used. Figure 19 shows that the higher scoring neighborhood combinations are located in the city center, the south, the east (Driemond in the southeast), and in the north of Amsterdam. Table 4 denotes the descriptive statistics of the social cohesion variables.

**Figure 17 A.** Social cohesion (OIS 2014) **B.** Involvement of fellow neighborhood inhabitants (WiA 2015)

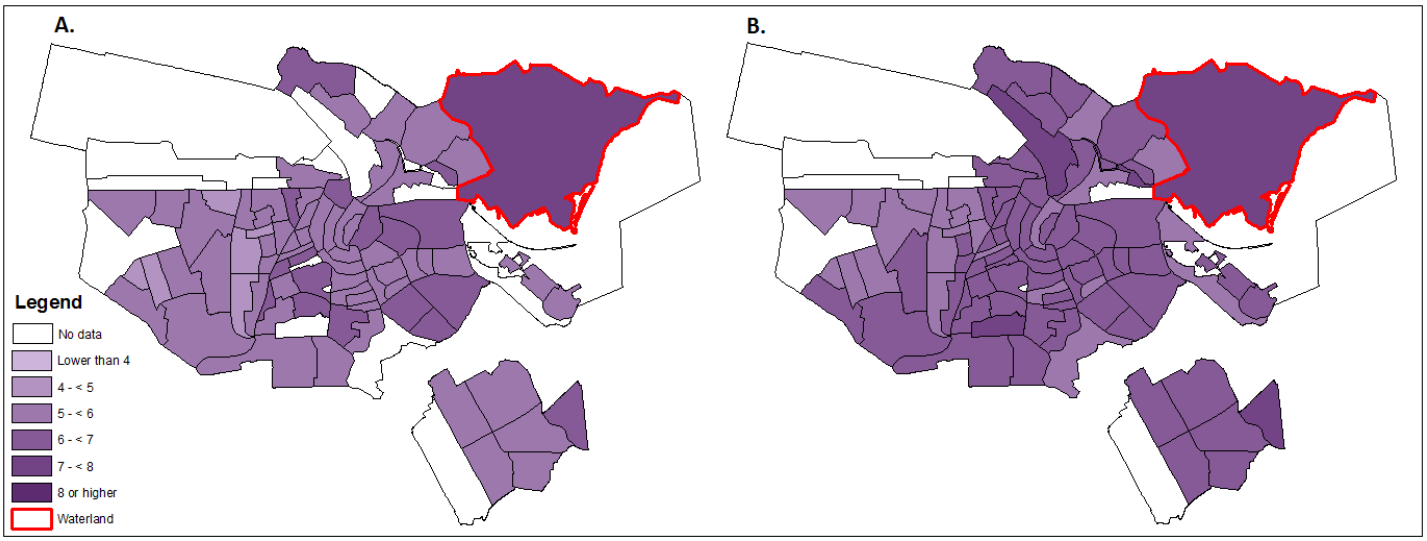



**Figure 18** Social control (WiA 2011)

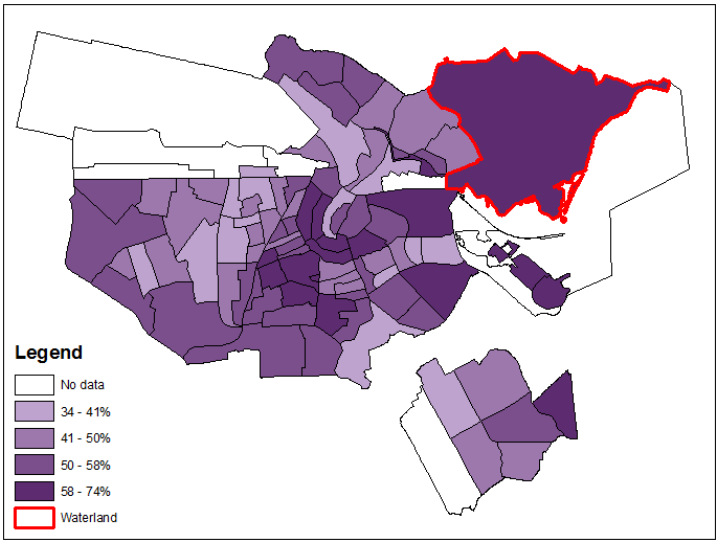



**Figure 19** Positive social quality (Veiligheidsmonitor 2014)

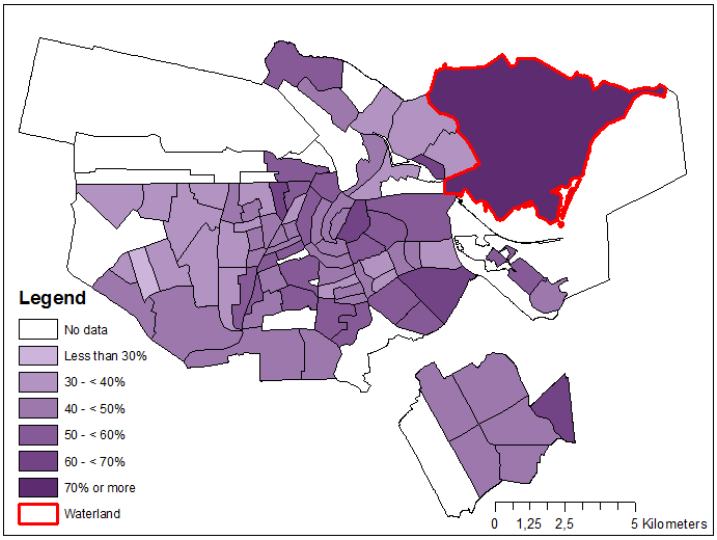



**Figure 20** Neighborhood combination Waterland

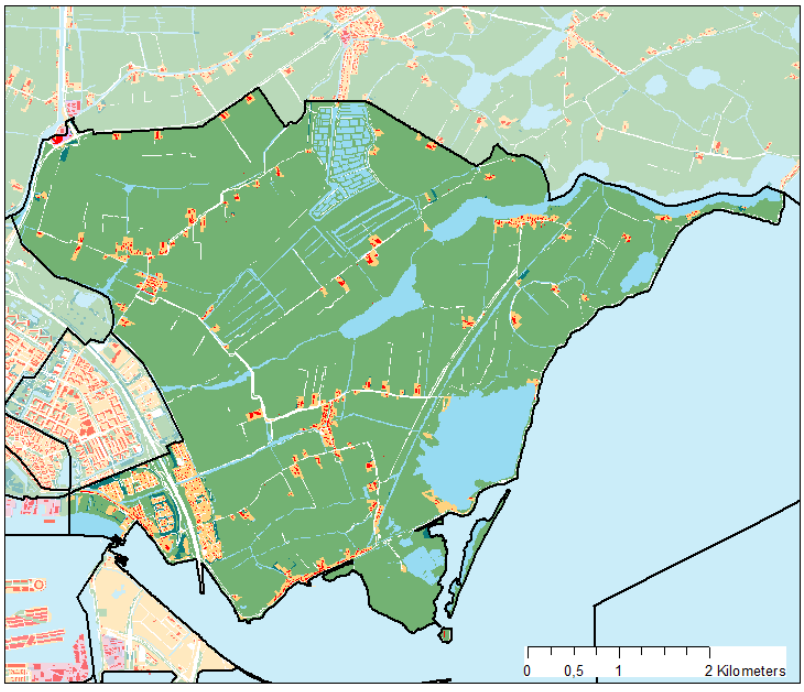


Figure 20 depicts the land use in the neighborhood combination Waterland. This rural area encompasses a fifth of the total surface of Amsterdam (Gemeente Amsterdam 2015c). The five villages which are located in this area are inhabited by 2 160 inhabitants. The social cohesion and involvement of fellow inhabitants are rated in the 7 to 8 range. Furthermore, 58 to 74 percent of the inhabitants experience social control, and 70 percent or more experience a positive social quality.

**Table 4** Descriptive statistics social cohesion

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Social cohesion | 79 | 4.60 | 7 | 5.619 | 0.492 | 0.380 | 0.271 |
| Involvement of fellow inhabitants | 88 | 5 | 7.60 | 6.274 | 0.486 | 0.345 | 0.257 |
| Social control | 89 | 1 | 4 | 2.584 | 0.989 | -0.104 | 0.255 |
| Positive social quality | 79 | 26 | 76 | 45.696 | 9.176 | 0.682 | 0.271 |

### 4.1.5 Participation out of benefit

The participation out of benefit variable is determined through three types of bonds an inhabitant can have with his/her neighborhood. Firstly, an inhabitant can feel an emotional bond with his/her neighborhood which might be a motive to participate. Secondly, by improving the neighborhood an inhabitant can benefit economically through neighborhood participation. Finally, an inhabitant can have a functional bond with the neighborhood when he/she often makes use of neighborhood facilities.

#### 4.1.5.1 Emotional benefit

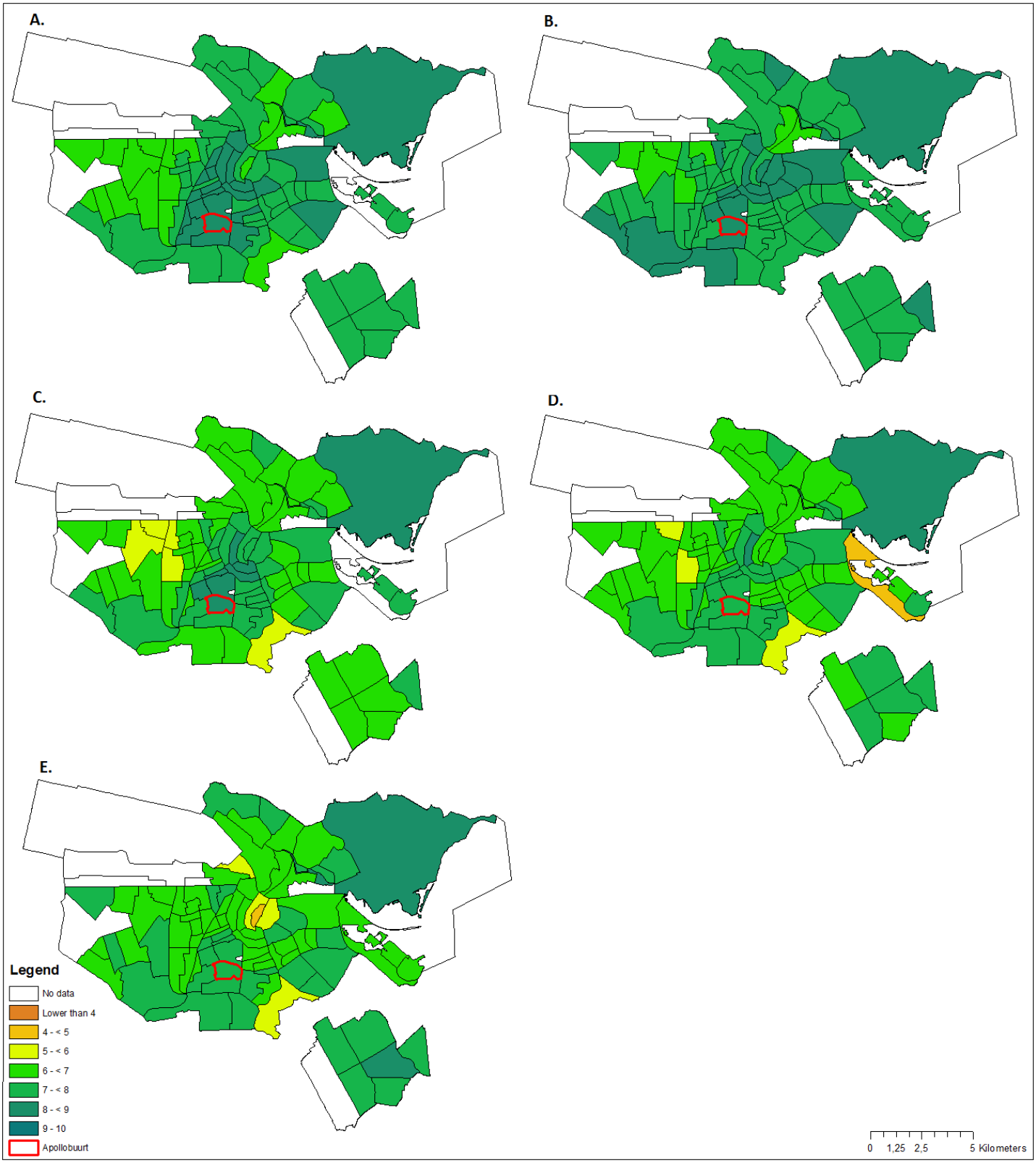
A series of contentment questions collected by the Wonen in Amsterdam (WiA) research is used to determine the emotional bond of inhabitants with their neighborhood. On a series of subjects, neighborhood combinations are given a mark between 1 and 10 with 1 being very poor and 10 being excellent.

Map A. in figure 21 depicts the overall contentment with the neighborhood. The highest scoring neighborhoods are located in the city center, in the south, partly in the east, and in the rural north (Waterland). The lowest scores (between 6 and 7) are mainly located in the new west of Amsterdam as well as in the north. When comparing map A. and B., it strikes that inhabitants of some of the neighborhood combinations give their neighborhood a lower mark than their own home. On the contrary, inhabitants in some of the high scoring neighborhoods in map A. are less content with their own home.

When asked how content the inhabitants are with the appearance of other homes in their neighborhood (map C.), the area which ranks between 8 and 9 shrinks to just a few in the city center, Amsterdam south, and rural north. Four neighborhood combinations in the west (Slotermeer-Zuidwest/Noordoost, de Kolenkit, and Overtoomse Veld) and De Omval in the east of the city rank lowest (between 5 and 6).

Only two neighborhoods remain in the 8 to 9 scoring range (Grachtengordel-West, Waterland) when respondents are asked their opinion on the appearance of the neighborhood

**Figure 21** Contentment with: **A.** Neighborhood (WiA 2015) **B.** Own home (WiA 2015) **C.** Appearance of dwellings in the neighborhood (WiA 2015) **D.** Neighborhood environment (WiA 2015) **E.** Appearance of green in the neighborhood (WiA 2015)




environment (map D.). The lowest scoring neighborhood combination is Zeeburgereiland/Nieuwe Diep. Slotermeer Noordoost, Overtoomse Veld, and De Omval once again score between 5 and 6.

Lastly, map E. shows the contentment with appearance of green in the neighborhood. All combination except for parts of the city center (Burgwallen-Nieuwe Zijde, Burgwallen-Oude Zijde, Nieuwmarkt/Lastage), De Omval, and Houthavens, score a 6 or higher.

Besides contentment, the emotional bond of inhabitants with their neighborhood is also determined by to what extent respondents feel at home in their neighborhood (figure 22, map A.) and how they view the future development of the neighborhood (figure 22, map B.). Again, the highest scoring neighborhood combination on map A. is Waterland. Other high scoring neighborhood combinations are mainly located in the center, south, east, and west of Amsterdam. Once more, the lowest scoring neighborhood combinations are located in the west (and Zeeburgereiland/Nieuwe Diep in the east).

The expected development of the neighborhood combinations are quite similar to the pattern in the former figure. Waterland and a couple of neighborhood combinations in north, west, and the south, rank highest while the bulk of the neighborhood combinations in the center, west, south and east score between 7 and 8. The three lowest scoring neighborhood combinations are located in the new west. Table 5 denotes the descriptive statistics of the variables discussed in this session.

**Figure 22 A.** Feeling at home in neighborhood (WiA 2015) **B.** Expected development of the neighborhood (WiA 2015)

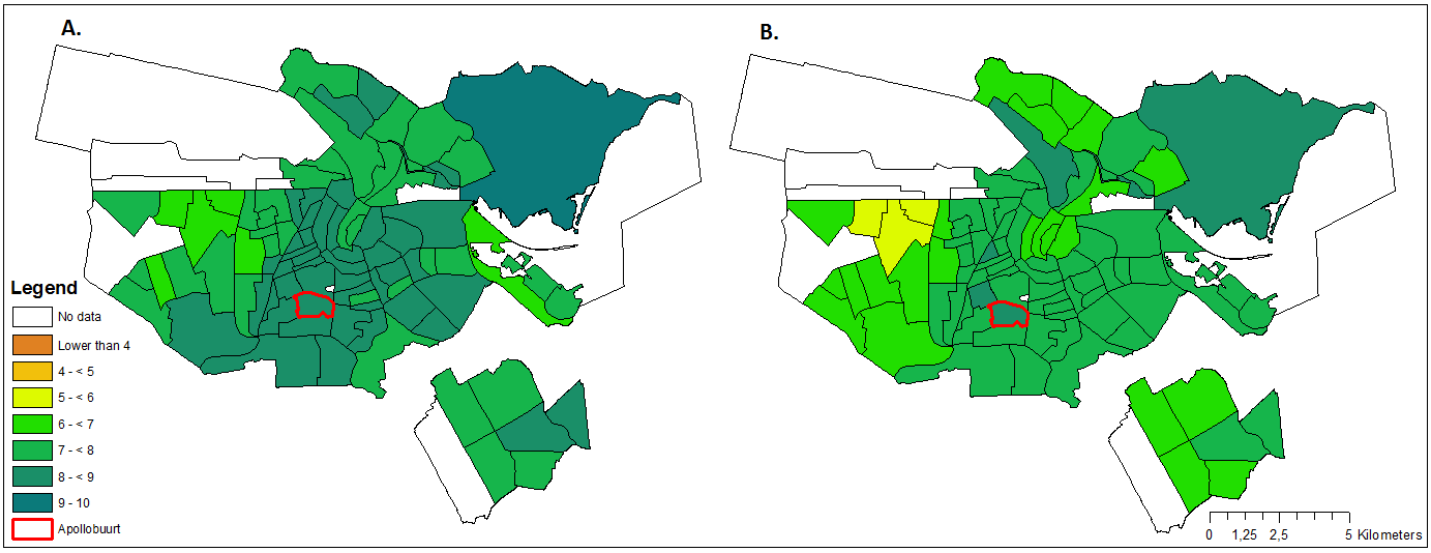



**Figure 23** Neighborhood combination Apollobuurt

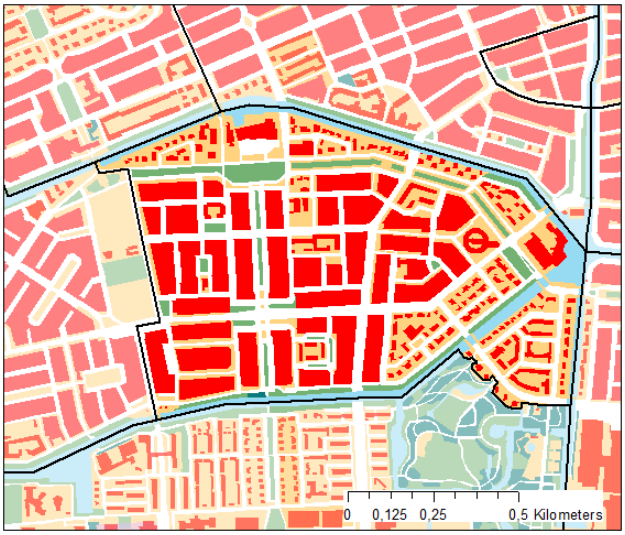


Figure 23 depicts the Apollobuurt neighbourhood combination. This neighbourhood is described by the municipality of Amsterdam (Gemeente Amsterdam 2015d) as living area for the affluent. Furthermore, it is described as being part of "the by Berlage planned Plan Zuid [southward expansion of the city] and exists of a combination of monumental formed traffic axes and smaller designed curvy neighbourhood streets" (Gemeente Amsterdam 2015d:1). The neighbourhood combination is inhabited by 8 645 inhabitants (CBS 2015). The inhabitants rank their contentment with the neighbourhood, their own home, and the appearance of other dwellings in the 8 to 9 category. Furthermore, they give a similar ranking to the extent of feeling at home and the expected development of the neighbourhood. Finally, they rank the neighbourhood environment and the appearance of green in the neighbourhood in the 7 to 8 range.

**Table 5** Descriptive statistics emotional benefit variables

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Contentment with neighborhood | 87 | 6.1 | 8.9 | 7.552 | 0.630 | -0.318 | 0.258 |
| Contentment with own home | 88 | 6.1 | 8.9 | 7.681 | 0.495 | -0.185 | 0.257 |
| Contentment with appearance of dwellings | 87 | 5.4 | 8.8 | 6.937 | 0.667 | 0.252 | 0.258 |
| Contentment with neighborhood environment | 88 | 4.7 | 8.1 | 6.861 | 0.547 | -0.640 | 0.257 |
| Contentment with appearance of green | 88 | 4.8 | 8.4 | 6.887 | 0.627 | -0.304 | 0.257 |
| Feeling at home | 88 | 5.5 | 8.2 | 7.202 | 0.612 | -0.730 | 0.257 |
| Expected development | 88 | 6.4 | 9.2 | 7.906 | 0.568 | -0.495 | 0.257 |

#### 4.1.5.2 Economic benefit

The economic motivation of people to participate and better their neighborhood is determined by the share of the dwellings in the neighborhood combination which are owned by the inhabitants. Figure 24 shows that the highest percentage of homeownership is found in the north (Waterland). The lower percentages (30 percent and lower) are scattered over the city with clusters in the west, center, north, south, and east. The descriptive statistics of this variable are denoted in table 6.

The Indische Buurt Oost (figure 25) was built at the beginning of the 20$^{th}$ century. Parts of the Indische Buurt were renewed in the 80s and other parts around the turn of the century (Gemeente Amsterdam 2015e). It now houses 10 150 people (CBS 2015). With 10 to 20 percent home ownership in the neighborhood combination, the economic benefit to participate in the neighborhood is expected to be low.

**Figure 24** Home ownership (OIS 2015)

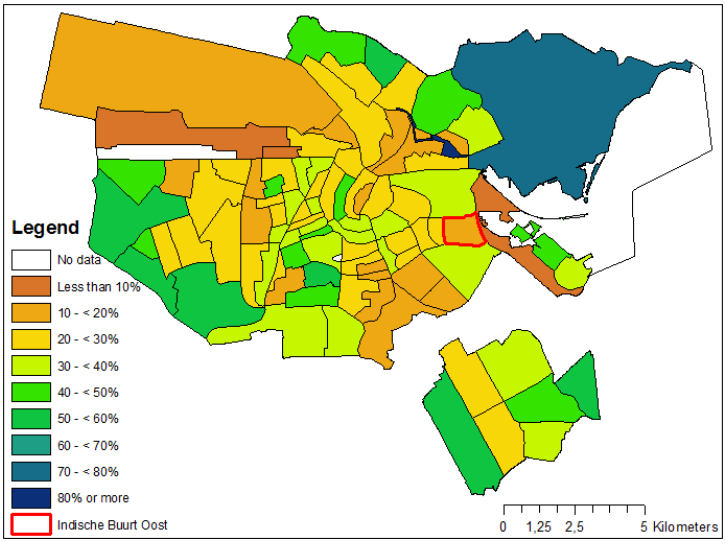



**Figure 25** Neighborhood combination Indische Buurt Oost

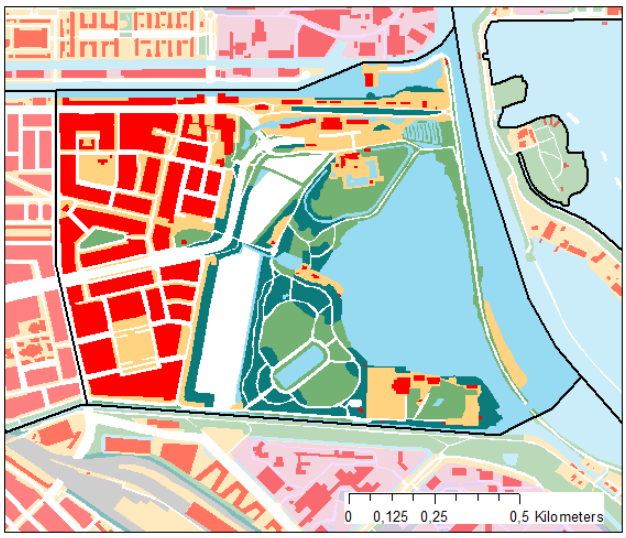



**Table 6** Descriptive statistics economic benefit

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Home ownership | 94 | 0 | 89.90 | 30.390 | 14.337 | 1.136 | 0.249 |

### 4.1.5.3 Functional benefit

The score of the functional benefit variable is determined by the verdict of neighborhood inhabitants on a series of neighborhood facilities. The first three maps in figure 26 (A, B, and C) display a pattern which is characteristic for a busy inner city: a shortage of parking facilities for cars and bicycles, and to a lesser extent a shortage of playground facilities for kids.

In line, the opposite pattern is shown when the supply of public transport (map D.) and bars and restaurants (map E.) is rated. The supply is ranked highest in the inner city and, especially in the case of bars and restaurants, gradually lowers when moving away from the city center.

The four maps in figure 27 display less of a pattern. The primary schools (map D.) are all ranked sufficient (6 or higher) except for in the neighborhood combinations Burgwallen-Nieuwe Zijde, Eendracht, Betondorp, De Omval, and IJburg Zuid. Map A. shows that mainly inhabitants of neighborhood combinations on the edge of Amsterdam and in the south highly rank the sport facilities in the neighborhood (7 or higher). The contentment with community centers (map B.) is ranked sufficient in most of the neighborhood combinations except for a few in the north, center, south and southeast of Amsterdam. Lastly, neighborhood care facilities (map C.) are ranked well except for in Buiksloterham, De Omval, and in Driemond. It is remarkable to note that the neighborhood combinations located in the south of Amsterdam are positively perceived on almost all of the functional benefit variable indicators. The descriptive statistics of the discussed variables can be consulted in table 7.

**Figure 26** Contentment with supply of: **A.** Parking facilities (WiA 2015) **B.** Bicycle parking facilities (WiA 2015) **C.** Playground facilities (WiA 2015) **D.** Public transport (WiA 2015) **E.** Bars and restaurants (WiA 2013)

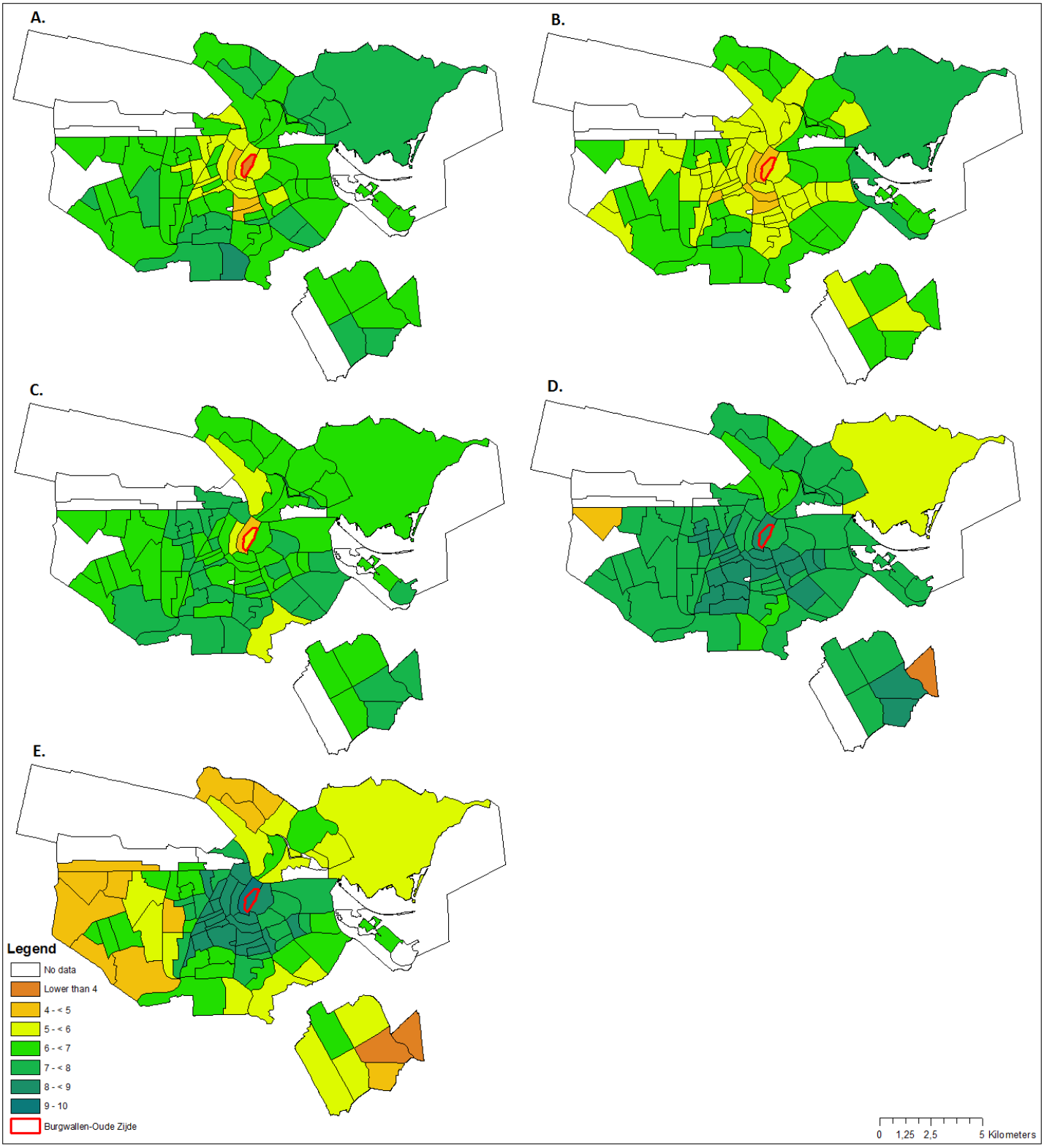


**Figure 27** Contentment with supply of: **A.** Sport facilities (WiA 2015) **B.** Community centers (WiA 2015) **C.** Care facilities (WiA 2015) **D.** Primary schools (WiA 2013)

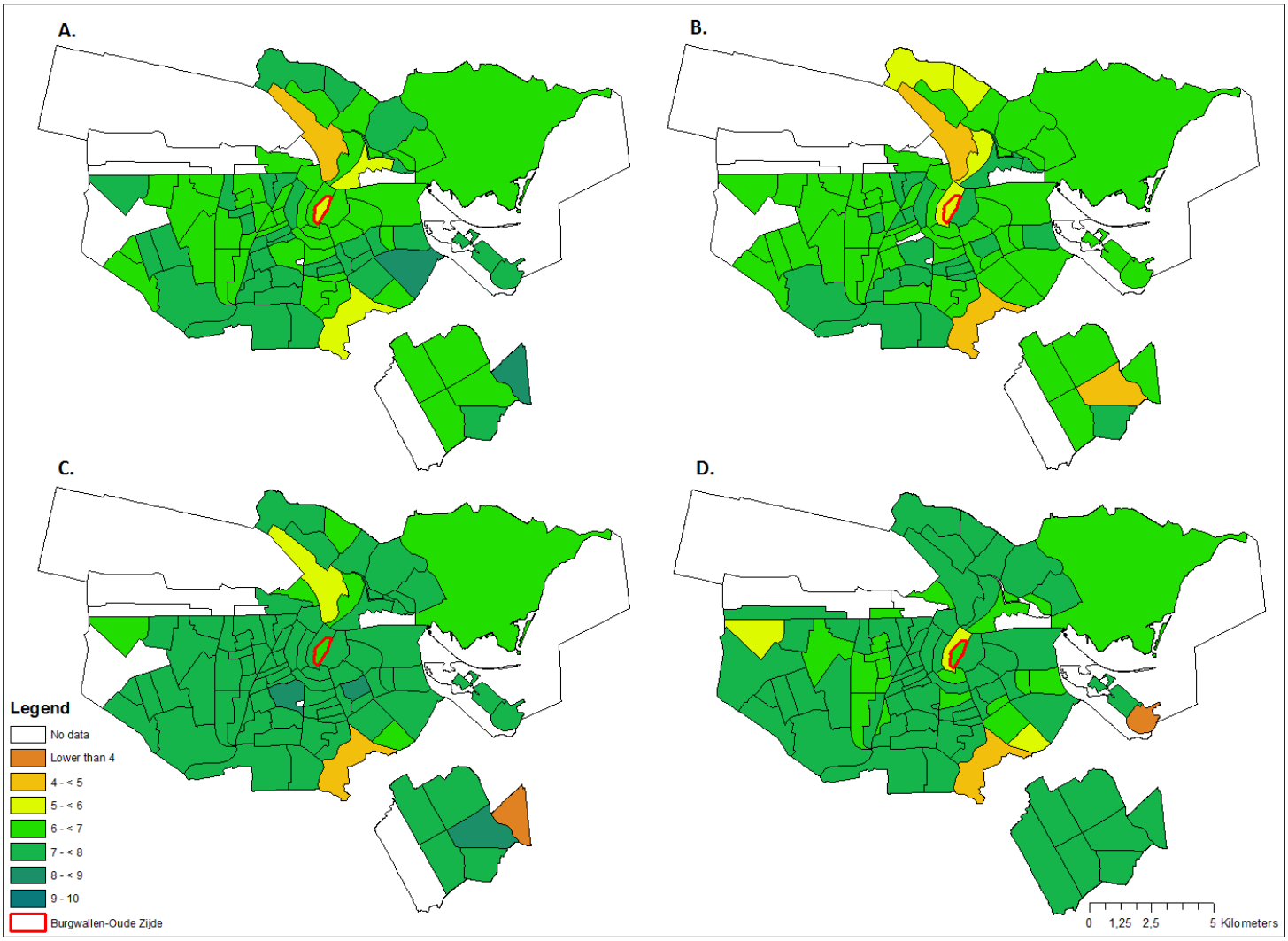
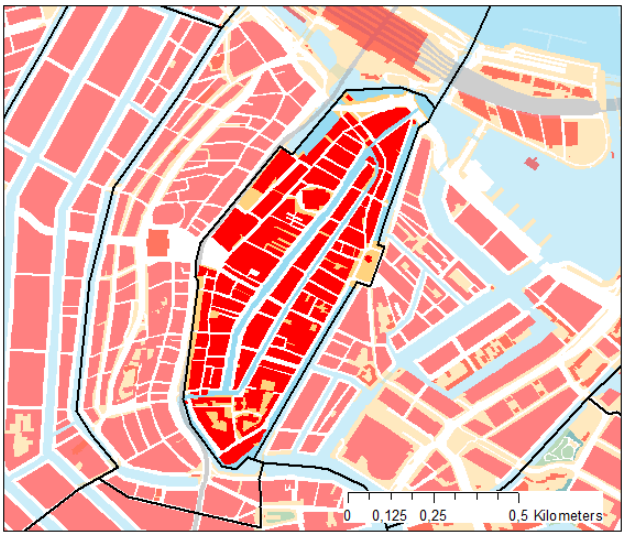



**Figure 28** Neighborhood combination Burgwallen-Oude Zijde



The Burgwallen-Oude Zijde depicted in figure 28 is part of the oldest area of Amsterdam. Together with the neighboring combination, Burgwallen-Nieuwe Zijde, it forms the medieval core of the city which organically extended till the end of the 16th century (Gemeente Amsterdam 2015f). Today, it houses 4 250 people (CBS 2015) and as it still is the core of the inner city, its facilities are characteristic for an urban area. With a 3 to 4, the inhabitants perceive parking facilities for cars to be poor. The same goes for parking facilities for bicycles (4 to 5). The supply of playgrounds for children are also perceived to be insufficient (5 to 6). On the other hand, inhabitants perceive the supply of public transport (8 to 9) and bars and restaurants (9 to 10) as being excellent. The supply of sport facilities and community centers are ranked 5 to 6. Lastly, the supply of care facilities and schools are perceived as being sufficient (6 to 7).

**Table 7** Descriptive statistics functional benefit variables

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Contentment with supply of parking facilities | 87 | 3.6 | 8 | 6.368 | 0.765 | -0.839 | 0.258 |
| Contentment with supply of bicycle parking facilities | 88 | 4.3 | 7.7 | 5.844 | 0.596 | 0.006 | 0.257 |
| Contentment with supply of playground facilities | 86 | 4.7 | 7.6 | 6.777 | 0.515 | -1.42 | 0.26 |
| Contentment with supply of public transport | 88 | 2.2 | 8.9 | 7.6 | 0.872 | -3.585 | 0.257 |
| Contentment with supply of bars and restaurants | 89 | 2.69 | 9.08 | 6.661 | 1.376 | -0.298 | 0.255 |
| Contentment with supply of sport facilities | 86 | 4.9 | 8.3 | 6.835 | 0.519 | -0.587 | 0.26 |
| Contentment with supply of community centers | 85 | 4.4 | 7.4 | 6.621 | 0.556 | -1.876 | 0.261 |
| Contentment with supply of care facilities | 87 | 2.6 | 8.1 | 7.322 | 0.732 | -4.129 | 0.258 |
| Contentment with supply of primary schools | 89 | 4.42 | 7.86 | 7.058 | 0.504 | -2.413 | 0.255 |

## 4.2 Neighborhood characteristics

### 4.2.1 Level of urbanization

The level of urbanization is determined through the daily business index (mean amount of people per hectares on a mean day in the year) which is published by OIS. Figure 29 shows that besides the busy city center, neighborhood combinations in the west, east, and south also score above average.

One of these above average scoring combinations is the Haarlemmerbuurt which depicted in figure 30. This area located in the northwest of the city center houses 9 290 people (CBS 2015) and dates from the 17th century (Gemeente Amsterdam 2015f, Bakker n.d.). Recently, new houses were built on the Westerdokeiland, located in the northeast of the area. Apart from a busy shopping street, the neighborhood combination also contains more quiet side streets which are beloved by the inhabitants. The mean amount of people per hectares on a mean day of the year is more than two times as much as the mean of the city. The descriptive statistics of the Daily Business Index can be consulted in table 8.

**Figure 29** Daily Business Index (OIS 2014)

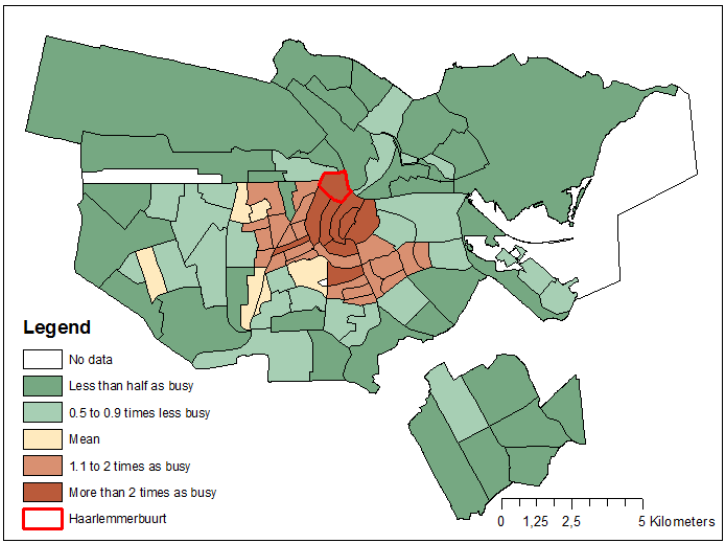



**Figure 30** Neighborhood combination Haarlemmerbuurt

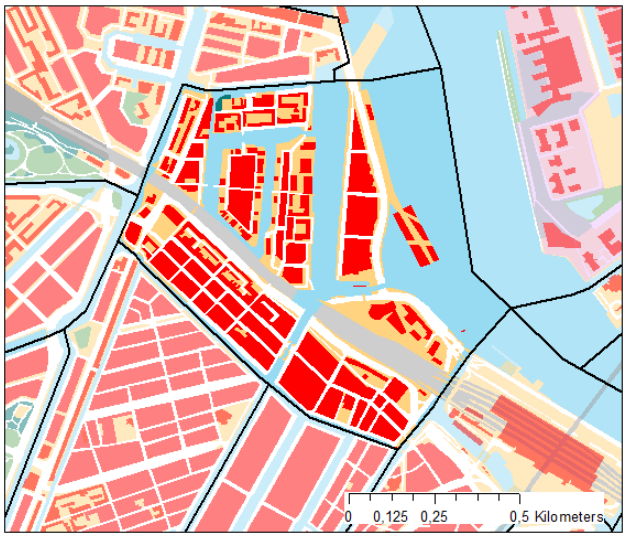



**Table 8** Descriptive statistics level of urbanization

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Daily Business Index | 94 | 1 | 578 | 99.362 | 92.88 | 2.374 | 0.248 |

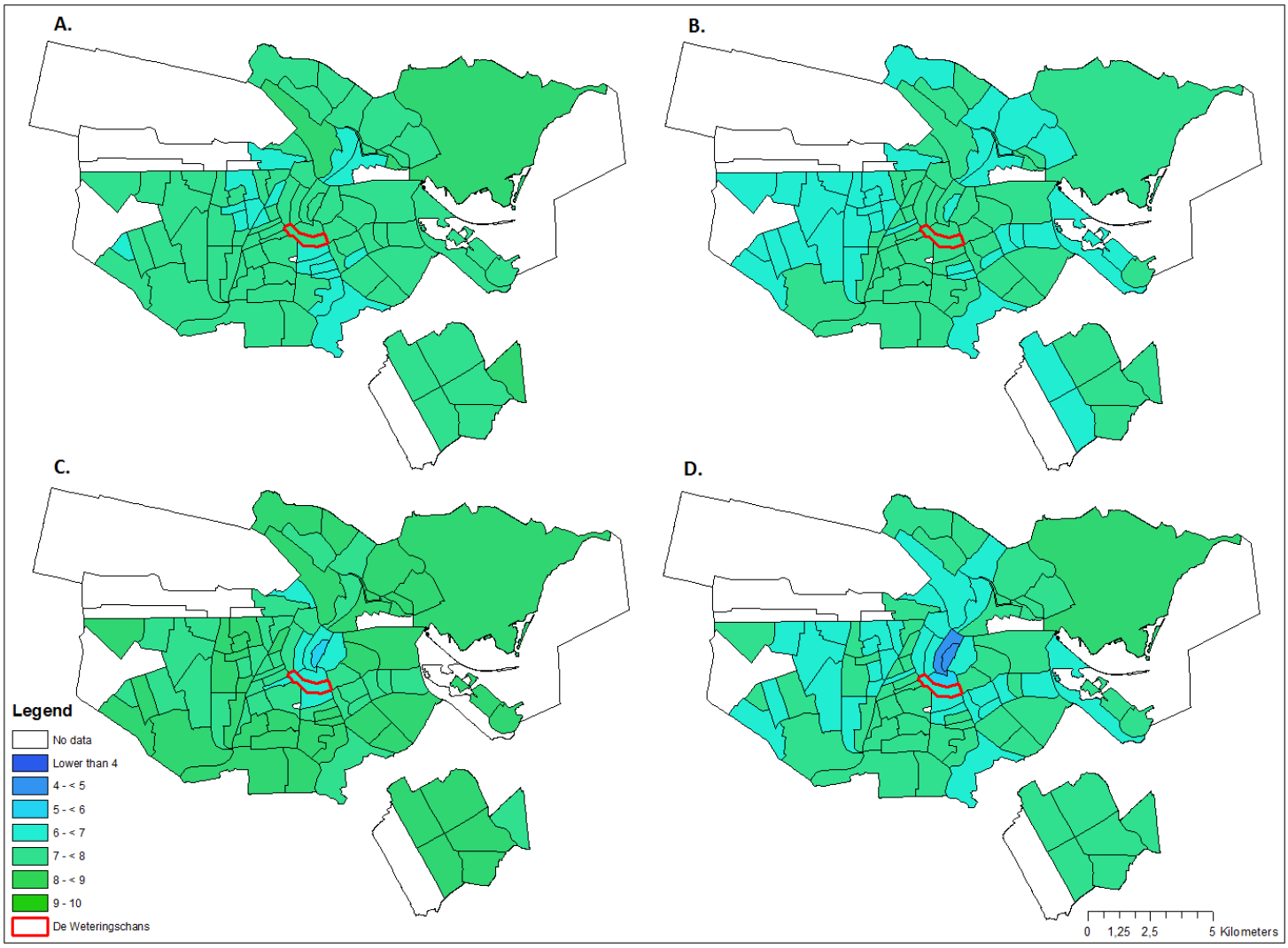
### 4.2.2 Neighborhood problems

#### *4.2.2.1 Population problems*

The problems in the neighborhood combinations which are caused by people are determined by a combination of data sources from WiA and OIS. Map A. of figure 31 displays to what extent inhabitants of the neighborhood combinations experience nuisance caused by their neighbors. While none of the neighborhood combinations score below 6, the combinations which score between 6 and 7 appear to be clustered. Slightly larger clusters are apparent on map B. Different groups are perceived to handle each other slightly less well in the new west of Amsterdam as well as in parts of the north, east, and southeast.

When looking at the next two maps (map C. and D.), insufficient scores (below 6) are displayed in the city center. The 6 to 7 range is limited to the city center with regard to nuisance caused by bars and restaurants. The 6 to 7 range is scattered over the city in less orderly fashion when it comes to nuisance caused by other groups of people.

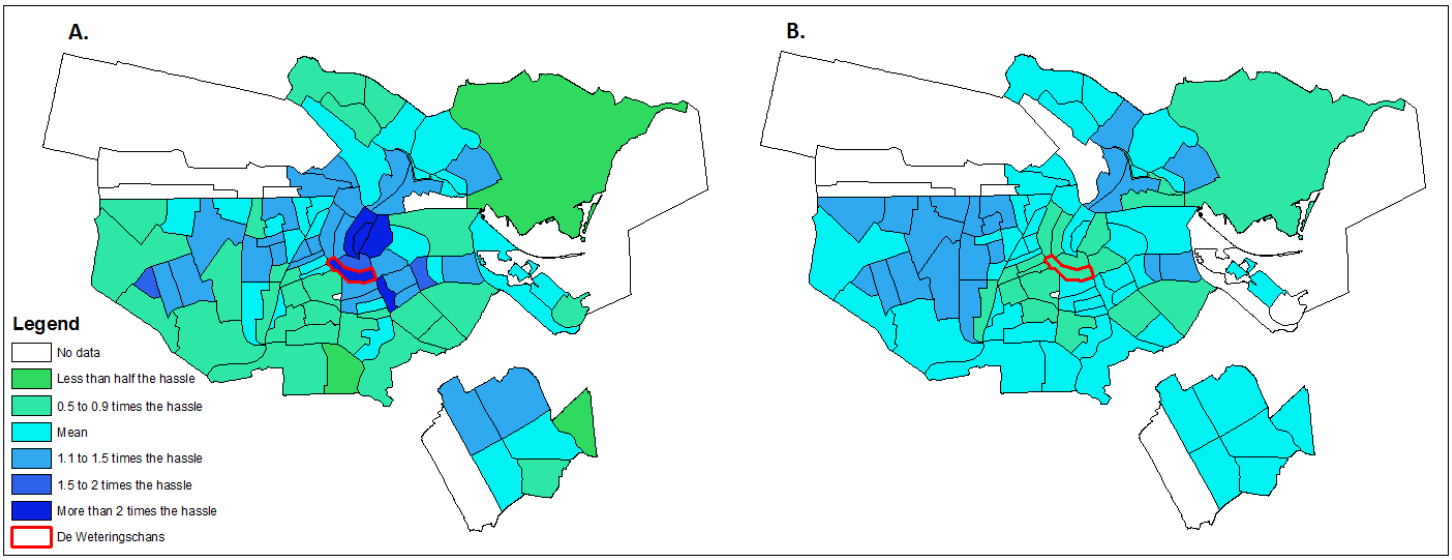
**Figure 31 A.** Nuisance caused by neighbors **B.** Contact between different groups **C.** Nuisance caused by bars and restaurants **D.** Nuisance caused by other groups (WiA 2015)




A more differentiated pattern is displayed on the indices produced by OIS (figure 32). The person hassle index (map A.) shows that irritating behavior against persons and things is more often experienced in the city center, and in parts of west, north, south, and east which border

the city center. Some of the neighborhood combinations in the new west and southeast also score above mean. Map B. shows an index which displays the experience of tension within the neighborhood. It strikes that the bulk of the neighborhood combinations in which more tension is experienced than Amsterdam's mean are located in the new west. It also strikes that the neighborhood combinations which scores above average in the person hassle index, score below average on the experience of tension. The descriptive statistics of the variables central to this section are denoted in table 9.

**Figure 32 A.** Person Hassle Index (OOV/OIS 2014) **B.** Tension Index (OIS 2014)




A neighborhood combination which scores more than two times the mean when it comes to person hassle is the Weteringschans which is depicted in figure 33. This combination is part of the city center and is regarded as a neighborhood for the affluent. In the west of the combination, nightlife facilities are located around the Leidseplein (a square) (Gemeente Amsterdam 2015g). Except for the person hassle, the 7 350 inhabitants seem to experience little other nuisance caused by population. Little nuisance is caused by neighbors and different groups seem to handle each other well (7 to 8). Scoring a 6 to 7, nuisance caused by bars and restaurants and other groups of people seem not to be a problem but it could be better. Lastly, the tension as experienced by the inhabitants is below average.

**Figure 33** Neighborhood combination De Weteringschans

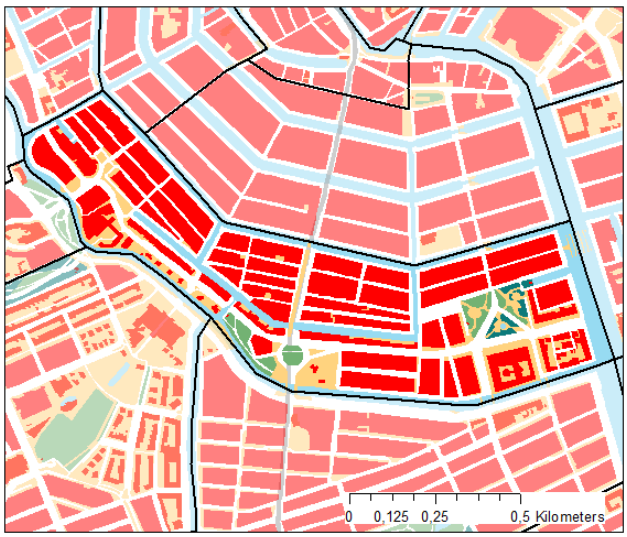


**Table 9** Descriptive statistics population problems variables

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Nuisance caused by neighbors | 88 | 6.5 | 8.8 | 7.299 | 0.382 | 0.635 | 0.257 |
| Contact between different groups | 88 | 6.3 | 7.9 | 7.024 | 0.381 | 0.015 | 0.257 |
| Nuisance caused by bars and restaurants | 87 | 5 | 8.9 | 7.76 | 0.662 | -1.591 | 0.258 |
| Nuisance caused by other groups | 88 | 4.1 | 8.2 | 7.015 | 0.576 | -2.032 | 0.257 |
| Personal Hassle Index | 89 | 27 | 473 | 110.39 | 61.083 | 3.588 | 0.255 |
| Tension index | 87 | 77 | 125 | 100.36 | 11.071 | -0.024 | 0.258 |

#### *4.2.2.2 Physical neighborhood problems*

To determine to what extent inhabitants experience physical problems in their neighborhood, the answer to a series of questions, asked by WiA researchers, is used. Besides this data source, which captured the perception of inhabitants, the Buiten in Beeld source is used which determined the factual litter in the neighborhood combinations. In addition, the deprivation index is determined by official police statistics as well as from questionnaires.

The first three maps in figure 34 depict sequentially the appearance, cleanness, and maintenance of green in the neighborhood combinations. Besides the low scoring inner city (Burgwallen Oude/Nieuwe-zijde), it strikes that the north and new west of Amsterdam score higher on the appearance of green (map A.) than on cleanness and maintenance of green.

Map D. displays the physical arrangement of the neighborhood surrounding as perceived by the inhabitants. The bulk of the neighborhood combinations in the south, east, north, and new west score similar to on map C., with the new west and north scoring slightly lower than the city center , south, and part of the east. The lowest scoring neighborhood combination is De Omval.

Map E. and F. depict the cleanness and maintenance of streets and sidewalks as perceived by the inhabitants. The highest scoring neighborhood combinations are located in parts of the city center, south, east, and southeast. The lowest scoring combinations are mainly located in the new west and north.

The next series of maps (figure 35) depicts sequentially the cleanness (A.) and maintenance of playgrounds (B.), the appearance of dwellings (C.), the maintenance state of dwellings in the neighborhood (D.), and the hassle caused by pollution as experienced by inhabitants (E.). The bulk of the city scores between the 6 and 7 when it comes to cleanness and maintenance of playground facilities while the neighborhood combinations scoring between 7 and 8 are scattered over the south, west, east, and southeast of the city. The neighborhood combinations scoring between 5 and 6 are located in parts of the city center, new west, north, and De Omvang in the east of Amsterdam.

The appearance of dwellings are most highly ranked in parts of the city center and south. Combinations which score a 7 to 8 are located adjacent to these highly ranked areas as

well as in parts of the new west, east, and north (map C.). Together with De Omval, three neighborhood combinations in the new west are perceived to be insufficient.

**Figure 34 A.** Appearance of green (WiA 2013) **B.** Cleanness of green (WiA 2015) **C.** Maintenance of green (WiA 2015) **D.** Physical arrangement of neighborhood surrounding (WiA 2013) **E.** Cleanness of streets and sidewalks (WiA 2015) **F.** Maintenance of streets and sidewalks

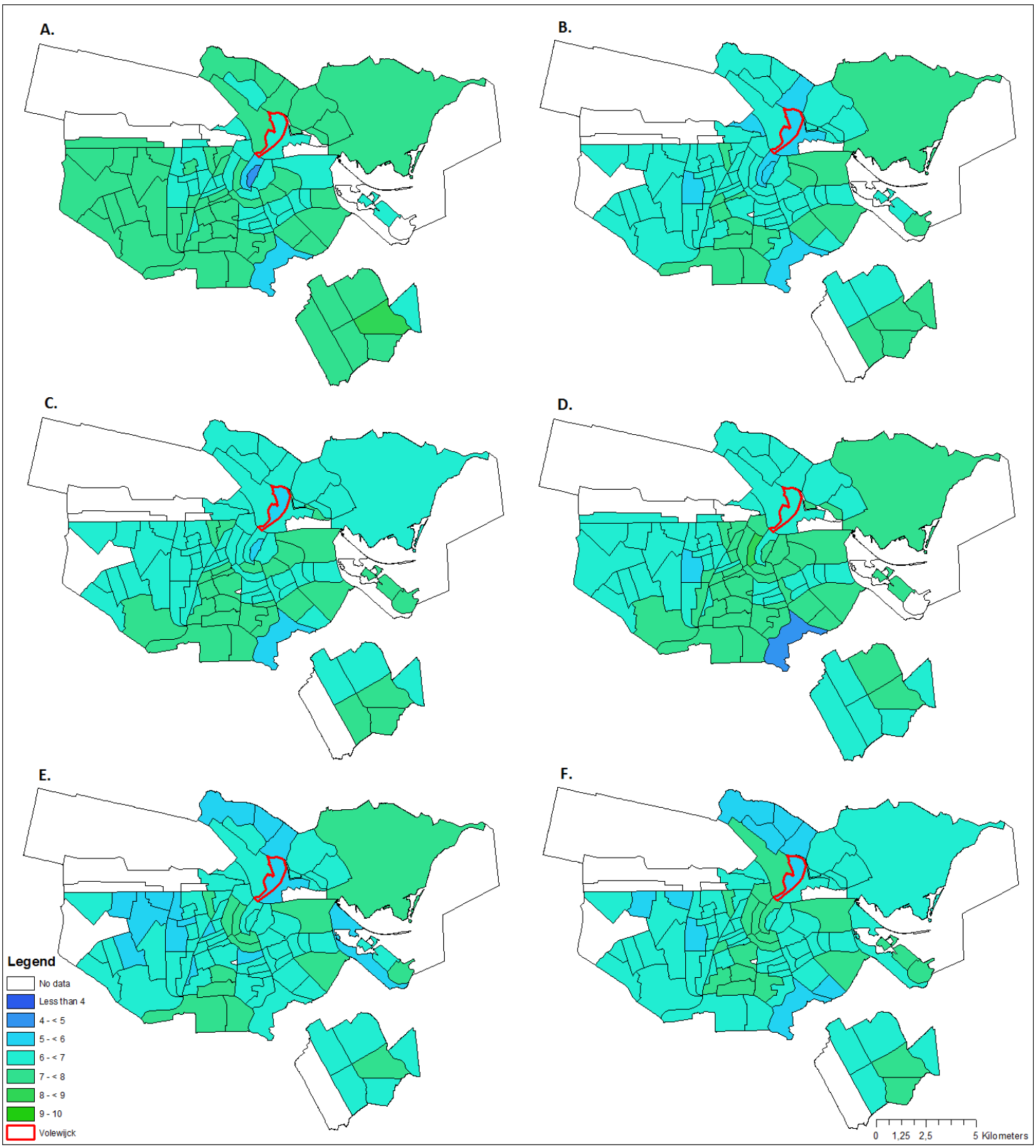
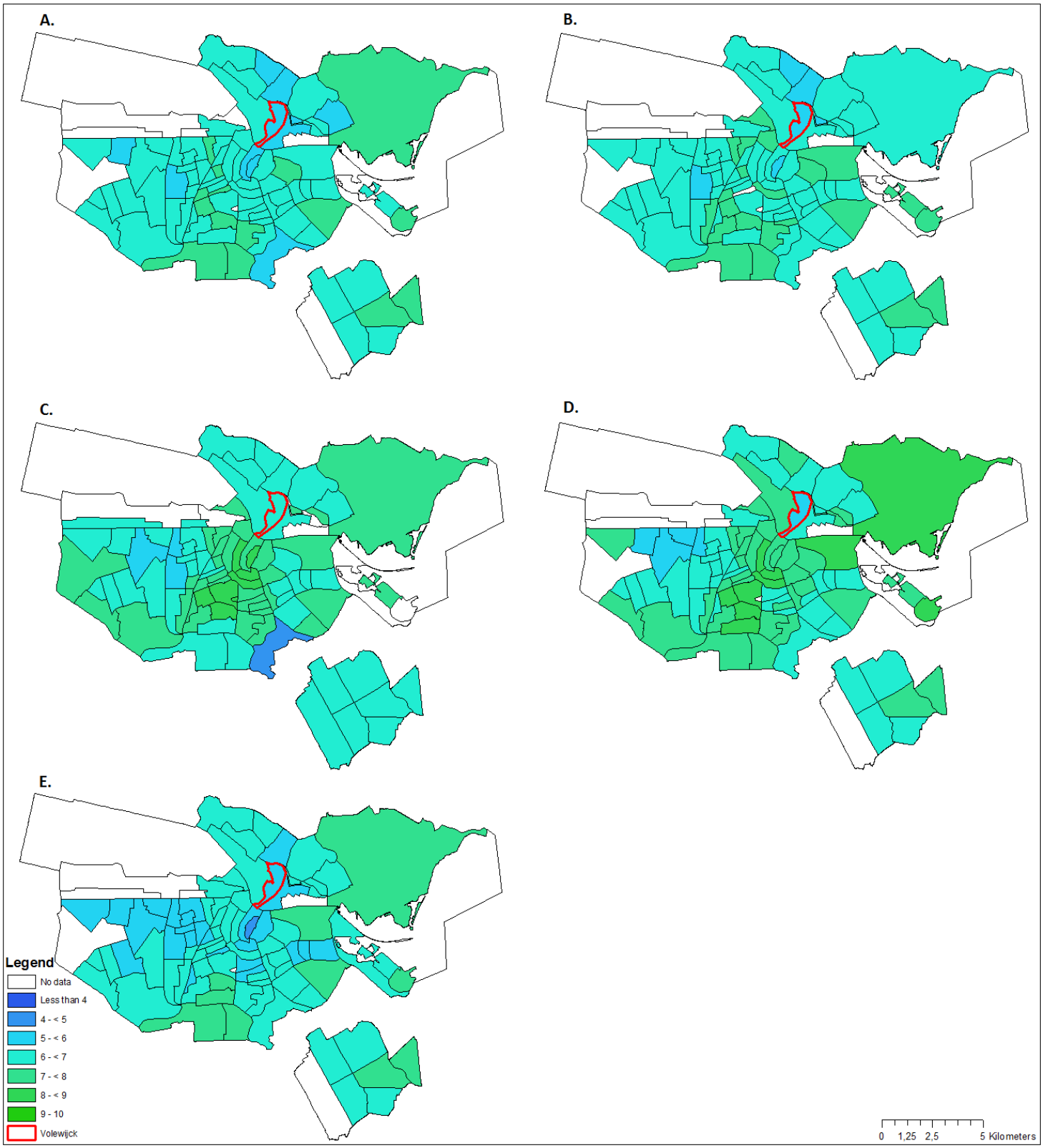


**Figure 35 A.** Cleanness of playgrounds (WiA 2015) **B.** Maintenance state of playgrounds (WiA 2015) **C.** Appearance of neighborhood dwellings (WiA 2013) **D.** Maintenance state of dwellings (WiA 2015) **E.** Experienced pollution in the neighborhood (WiA 2015)



Map D., displaying the maintenance state of dwellings in the combinations, shows a somewhat similar pattern. Some of the neighborhood combinations rank a class higher or lower. This has likely to do with the fact that the data displayed on map C. is collected in 2013 while map D. dates from 2015.

Lastly, map E. shows that the inhabitants which live in parts of the inner city, new west, north, south, and east perceive their neighborhood to be polluted. The highest scoring neighborhood combinations are located in the rural north, east, southeast, and south.

Figure 36 depicts the deprivation index for the neighborhood combinations of Amsterdam. The mean refers to the average of the police district Amsterdam-Amstelland. The score represents the presence of irritating behavior against persons and things which are not always a criminal offence but which are experienced as influencing the social security in the neighborhood. Amongst others, these are things like graffiti, vandalism, and debris.

The three maps in figure 38 depict the extent of litter in sequentially green public space (map A.), public grass (map B.), and hardened public space (map C.). In squares of 100 by 100 meters, the location containing the most litter is sought and ranked from A+ to D (with A+ being assigned to areas which contain no litter, and D to areas which contain a great deal of litter). Per neighborhood combination, the scores are added up after which the mean score is calculated for 90 percent of the area, ignoring the 10 percent with the lowest scores (OIS 2016).

Map A. depicts the scores regarding small and large litter found within plantations. The cleanest neighborhood combinations are found in the north and new west. The bulk of Amsterdam scores a C or lower. The neighborhood combinations scoring a D are clustered in the southeast and north, and are scattered around south, east, west, and new west.

Map B. displays the score regarding small and large litter in public grass areas. A large part of the inner city and west contain no data. Seemingly, these neighborhood combinations do not contain public grass areas. The lowest scoring combinations are located in the west, north, east, southeast, and south.

Lastly, the score regarding small and large litter as well as ‘sweep litter’ in hardened public space is depicted on map C. The neighborhood combinations scoring a D are located in parts of the city center, south, southeast, east, north, west, and in Osdorp in the new west. The rural north (Waterland) is the only combination scoring an A. The descriptive statistics of the variables discussed in this section are denoted in table 10.

Figure 37 depicts the land use pattern of the neighborhood combination Volewijck. Volewijck belongs to the old part of Noord which was built in the 20s and 30s of the 20$^{th}$ century. The dwellings were built by housing associations and were initially designed for lower to middle class families. The housing associations now sell some of their stock which attracts young families which often are new to the city. The results in a more diversified population. The demographics of the 9 670 people (CBS 2015) living in this neighborhood combination are right on the city average while poverty is not uncommon in this area (Gemeente Amsterdam 2015g). The cleanness and maintenance of green, streets and sidewalks, playgrounds, the maintenance of dwellings, and the experience of pollution are all perceived as being insufficient (scoring a 5 to 6). The appearance of green, the physical arrangement of the neighborhood surrounding, and the appearance of neighborhood dwellings score sufficiently (with a 6 to 7). Furthermore, with a score of 1.5 to 2 times the average, Volewijck is ranked amongst the most deprived areas in Amsterdam. When it comes to litter in public space, Volewijck scores a B with regard to litter in green space, a C when it comes to litter in grass, and a D with regard to litter in hardened public space.

**Figure 36** Depriving Index (OOV/OIS 2014)

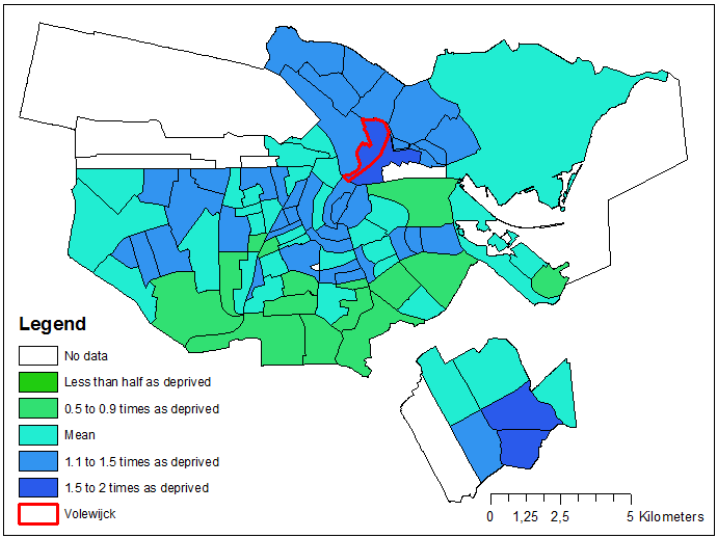



**Figure 37** Neighborhood combination Volewijck

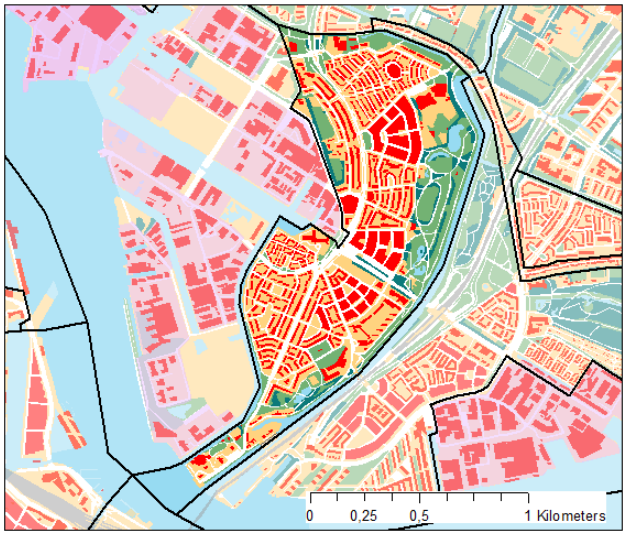



**Figure 38 A.** Litter in green spaces **B.** Litter in grass spaces **C.** Litter in hardened spaces (Buiten in Beeld 2015)

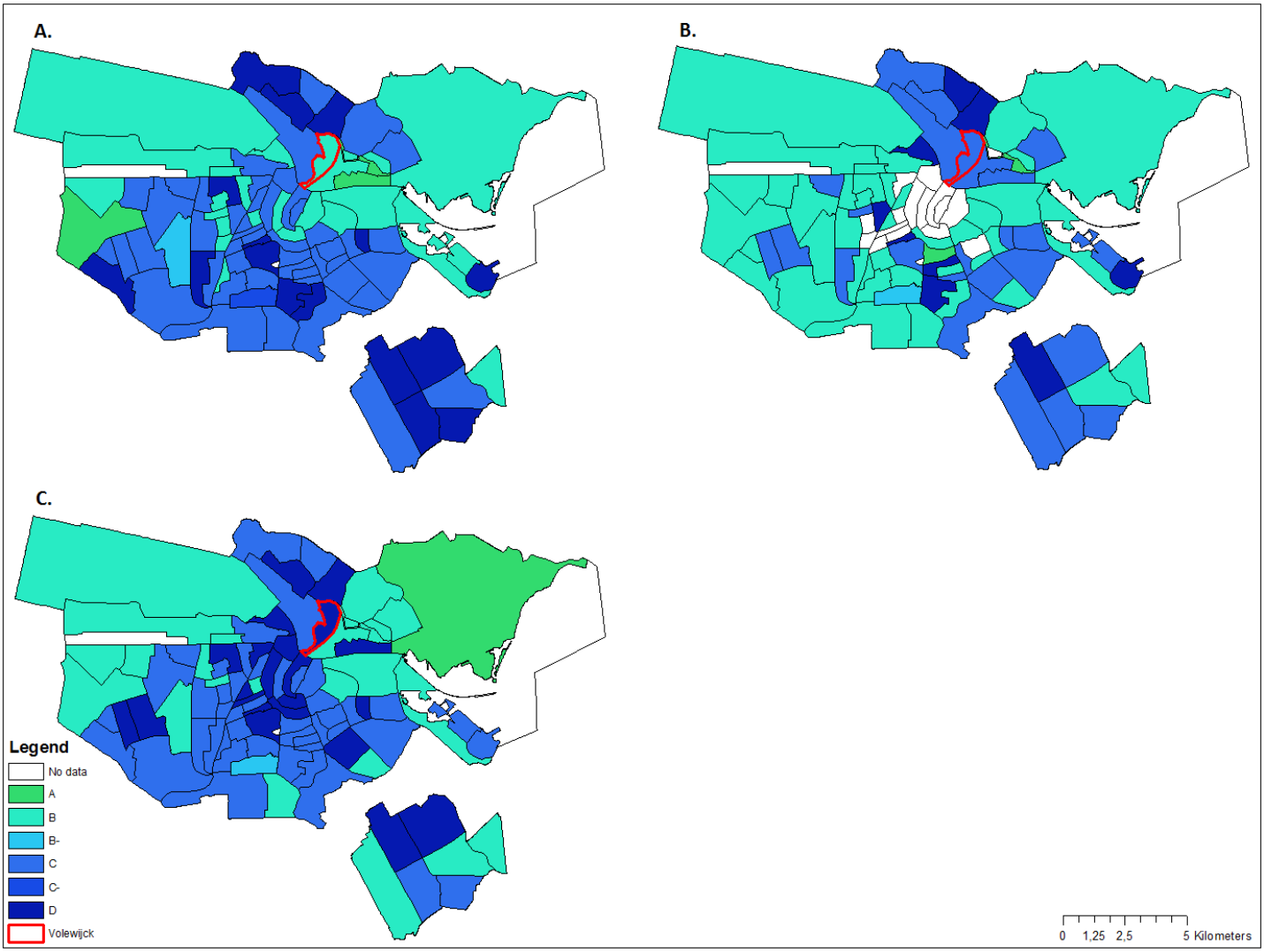


**Table 10** Descriptive statistics physical neighborhood problems

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Appearance of green | 89 | 4.69 | 8.52 | 6.967 | 0.595 | -1.022 | 0.255 |
| Cleanness of green | 87 | 5.5 | 7.5 | 6.6 | 0.446 | -0.37 | 0.258 |
| Maintenance of green | 87 | 5.6 | 7.7 | 6.767 | 0.416 | -0.393 | 0.258 |
| Physical arrangement of neighborhood surrounding | 89 | 4.55 | 8.11 | 6.849 | 0.504 | -0.823 | 0.255 |
| Cleanness of streets and sidewalks | 88 | 5.2 | 7.4 | 6.41 | 0.496 | -0.292 | 0.257 |
| Maintenance of streets and sidewalks | 88 | 5.3 | 7.5 | 6.61 | 0.472 | -0.552 | 0.257 |
| Cleanness of playgrounds | 86 | 5.2 | 7.4 | 6.51 | 0.458 | -0.558 | 0.26 |
| Maintenance stat of playgrounds | 86 | 5.5 | 7.5 | 6.652 | 0.426 | -0.596 | 0.26 |
| Appearance of dwellings | 89 | 4.76 | 8.61 | 6.858 | 0.656 | 0.093 | 0.255 |
| Maintenance state of dwellings | 87 | 5.4 | 8 | 6.959 | 0.543 | -0.328 | 0.258 |
| Experienced pollution in the neighborhood | 88 | 4.8 | 7.8 | 6.245 | 0.551 | 0.212 | 0.257 |
| Depriving Index | 89 | 73 | 191 | 110.56 | 22.132 | 0.887 | 0.255 |
| Litter in green spaces | 94 | 2 | 5 | 3.84 | 0.7413 | -0.220 | 0.249 |
| Litter in grass spaces | 78 | 2 | 5 | 3.532 | 0.731 | 0.602 | 0.272 |
| Litter in hardened spaces | 94 | 2 | 5 | 3.952 | 0.733 | -0.082 | 0.249 |

#### *4.2.2.3 Trouble/nuisance/safety*

The third and final set of data to determine the extent of neighborhood problems is the category ‘trouble/nuisance/safety.’ Figure 39 A. depicts the overall experience of hassle in the neighborhood by inhabitants. It shows that more than 40 to 50 percent of the inhabitants of two neighborhood combinations in the inner city, as well as in a combination in north, experience nuisance within their neighborhood. Neighborhood combinations with 30 to 40 percent of the inhabitants experiencing hassle are mainly located in the north and new west, and one combination in the west. Neighborhood combinations where less than 10 percent of

the inhabitants experience hassle can mainly be found in the south of Amsterdam as well as in parts of the east, and in Driemond (southeast) and Waterland (north). Figure 28 B. depicts the percentage of inhabitants who experience nuisances in their neighborhood caused by speeding traffic. Driemond is the combination which scores highest, while other high scoring combinations are located in the new west, and in north.

**Figure 39 A.** Experience hassle in neighborhood **B.** Nuisance caused by speeding traffic (Veiligheidsmonitor 2014)

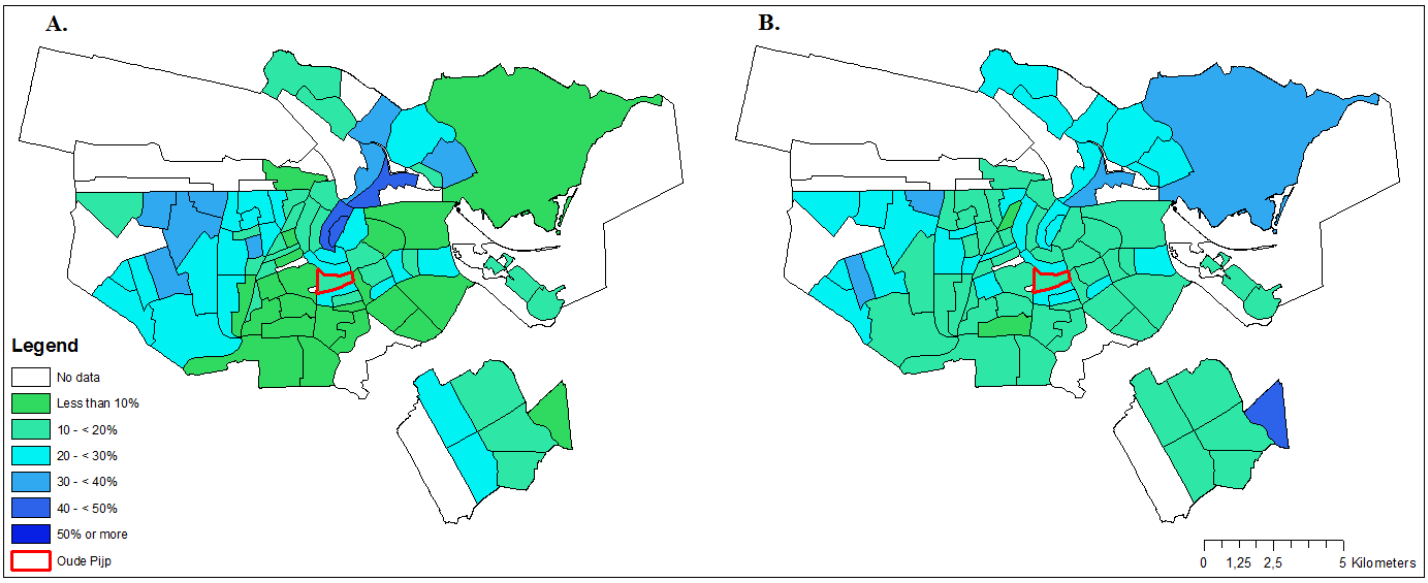


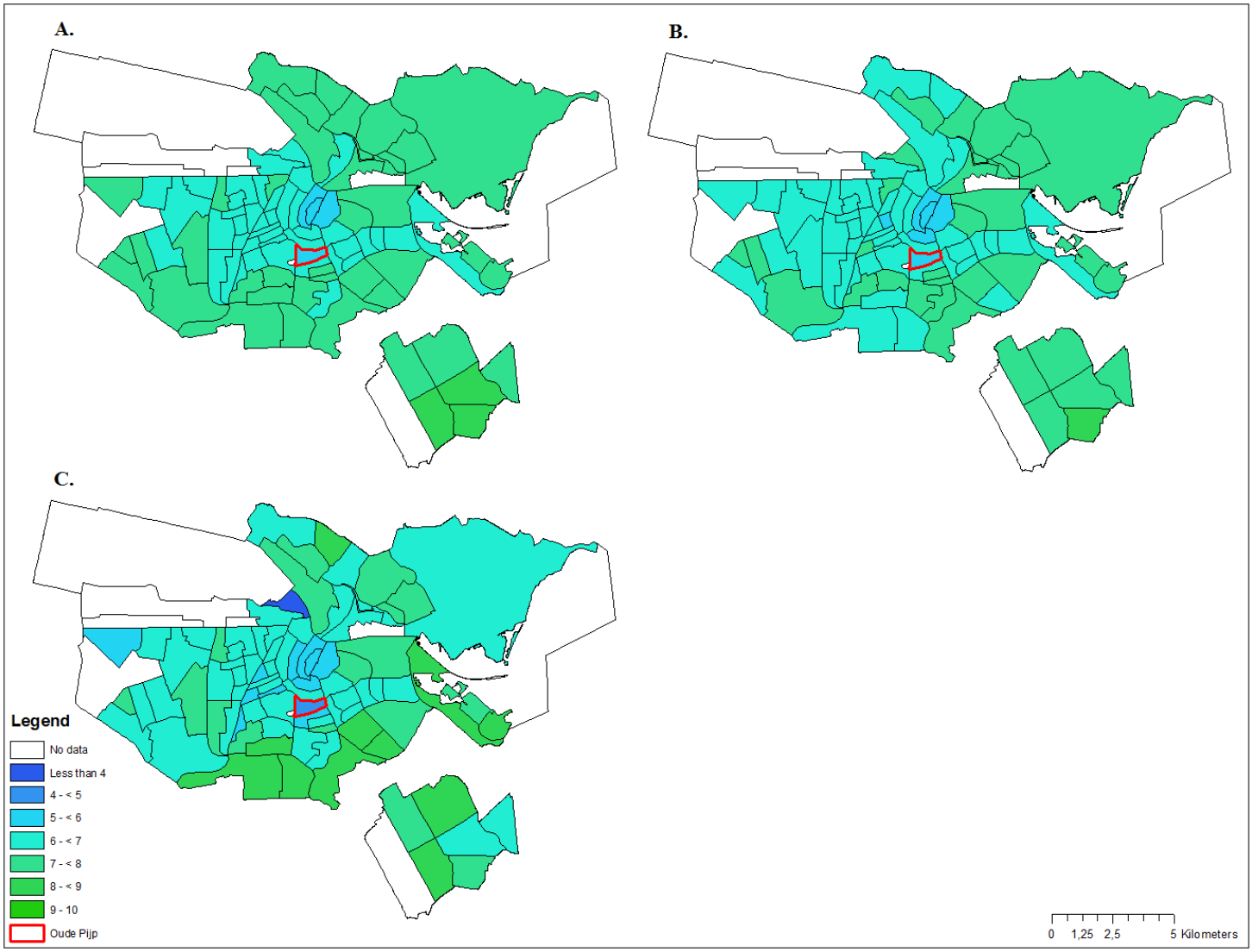

Figure 40 A. depicts the neighborhood combinations ranked by its inhabitants on the nuisance caused by traffic in general. All neighborhood combinations, except three in the city center and south (Oude Pijp), score sufficiently. Combinations scoring in the 7 to 8 range are located near the edge of the city, while three neighborhood combinations in the southeast score highest. Map B. shows a somewhat similar picture with two more neighborhood combinations scoring insufficiently (Grachtengordel-Zuid and Da Costabuurt). Some combinations in the new west, south, and north rank one category lower compared to the former subject. Map C. displays the neighborhood combinations ranked by the inhabitants on nuisance caused by parking. Two combinations (Houthavens and Oude Pijp) score below 5. Other combinations which score insufficiently are located in the city center, south, west, and Eendracht in new west.

The first three maps depicted in figure 41 are based on police statistics combined with questionnaire results from victims. Map A. displays high volume crime. These are common delicts which impact the victim to a lesser extent on a personal level. This mainly refers to theft and burglary of personal belongings. Waterland (north) and De Weteringschans (center) experience more than 2 times the amount of high volume crime than the average in the police region, followed by Burgwallen-Nieuwe Zijde and Grachtengordel-Zuid (center). Neighborhood combinations scoring 1.1 to 1.5 times the average are mainly located in the new west, north, and east.

Map B. depicts high impact crime. These are delicts which do impact the victims on a personal level. This refers to crime in which physical or physiological (i.e. threatening) violence is used against the victims. Areas which rank above average are mainly located in the city center, new west, north, east, and southeast. Map A. and B. combine into map C. With 1.5 to 2 times the crime compared to the regions mean, this map depicts the indexed total crime. The highest ranking neighborhood combinations are located in the city center

(Grachtengordel-Zuid and De Weteringschans). Other combinations scoring above average are mainly located in the center, north, new west, east, and southeast.

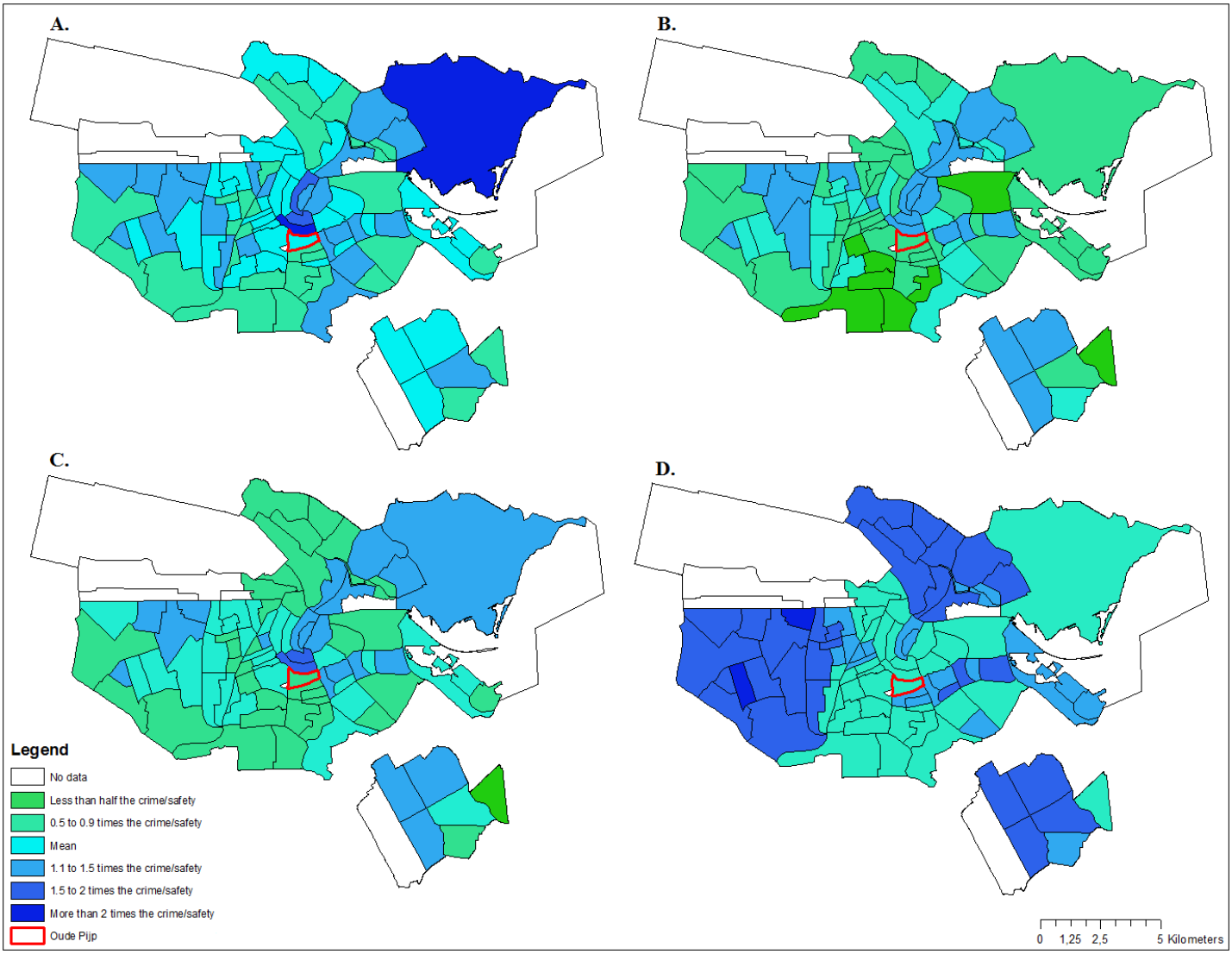
**Figure 40 A.** Nuisance caused by traffic **B.** Nuisance caused by traffic noise **C.** Nuisance caused by parking (WiA 2015)

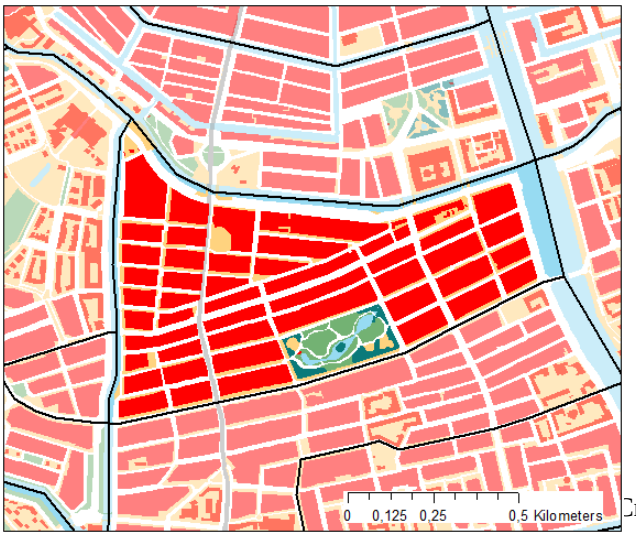



Finally, map D. pictures the unsafety index as perceived by the neighborhood inhabitants. The difference between this index, based on perception, and the other three maps in figure 41, which are based on official statistics, is remarkable. The whole borough of new west and a large part of north are perceived to be less safe than the regions' mean while several of the neighborhood combinations belonging to these boroughs rank below average on the official crime statistic (meaning there is less crime than the region's mean). This suggests that official crime statistics may be one of several factors on which people base their perception of safety. The descriptive statistics of the variables discussed in this section are denoted in table 11.

The neighborhood combination which is zoomed in on in this section is the Oude Pijp (figure 42). Together with the neighboring city center, this in the 19th century developed neighborhood is a busy area. The well know Alber Cuypmarkt (market) and Marie Heinekenplein (square) are located within its boundaries (Gemeente Amsterdam 2015h). The 14 975 inhabitants (CBS 2015) are residents of the building blocks and narrow streets as depicted in figure 42. 10 to 20 percent of the respondents from this neighborhood combination experience hassle in their neighborhood as well as nuisance caused by speeding traffic. With a

5 to 6, they indicate that they experience hassle caused by traffic and the noise it produces. Furthermore, they indicate that parking problems are apparent (4 to 5). The Crime Index




rime Index **C.** Crime Index **D.** Unsafety Perception Index (OOV/OIS 2014)

denotes that the neighborhood combination scores below mean. In more detail, high impact crime is below average while the high volume crime is average.. Lastly, the neighborhood is perceived relatively safe by its inhabitants, scoring below average on the Unsafety Perception index.

**Table 11** Descriptive statistics trouble/nuisance/safety variables

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Experience of hassle in neighborhood | 80 | 0 | 47 | 17.65 | 10.648 | 0.539 | 0.269 |
| Nuisance caused by speeding traffic | 80 | 0 | 40 | 18.538 | 6.832 | 0.778 | 0.269 |
| Nuisance caused by traffic | 88 | 5.3 | 8.1 | 6.951 | 0.53 | -0.487 | 0.257 |
| Nuisance caused by traffic noise | 88 | 5.3 | 8 | 6.849 | 0.486 | -0.359 | 0.257 |
| Nuisance caused by parking | 87 | 4.8 | 7.9 | 6.632 | 0.621 | -0.379 | 0.258 |
| High Volume Crime Index | 89 | 53 | 214 | 101.69 | 30.25 | 1.271 | 0.255 |
| High Impact Crime Index | 89 | 32 | 151 | 90.242 | 27.309 | 0.034 | 0.255 |
| Crime Index | 89 | 44 | 181 | 96.051 | 24.699 | 0.682 | 0.255 |
| Unsafety Perception Index | 89 | 64 | 154 | 100.26 | 23.889 | 0.448 | 0.255 |

**Figure 42** Neighborhood combination Oude Pijp

### 4.2.3 Geographic neighborhood characteristics

As discussed in section 3.2.4, geographic characteristics are defined as physical objects in a neighborhood combination (e.g. trees, buildings, but also land cover) and their attributes (characteristics). These characteristics will now be discussed in detail. For sake of comparison, the population density variable is presented in this section but will not be treated as geographic characteristic in further analyses.

Figure 43 depicts the percentage of the land surface of the neighborhood combinations which is covered by buildings (map A.), green (B.), and the percentage of the total surface of the neighborhood combination which is covered by water (C.). These maps are produced by clipping the TOP10NL and OpenStreetMap datasets to the neighborhood combinations (see appendix B for the script), calculating the geometry of areas covered by buildings, green, and water, and calculating the percentage of of the landmass (total size – area covered by water) these components cover or, in case of water, of the total size of the neighborhood combination. The formula which is used is:

(A / B) * 100

A is the total size of the particular component (buildings, green, water), and B is the total land surface size or in case of water, the total surface of the neighborhood combination.

The TOP10NL dataset is produced by Kadaster (the register of real estate and geographic information). It is the most detailed topographic data source provided by them (Kadaster 2016). Like in most other datasets, specific elements like land use or terrain type, are grouped into classes. A class can be described as "A set of entities grouped together on the basis of shared attribute values" (Esri n.d.). For example, in the TOP10NL data set, all buildings are grouped into the class 'gebouw' (building). This class contains dwellings but also stores, offices, schools, police departments etcetera. These classes can be used to produce certain information like in this case the areas which are occupied by buildings or areas which are covered by roads or water.

The OSM dataset calls these classes 'tags.' For this research, it is important to know how much of the landmass of a neighborhood combination is covered by green. To produce this piece of information, the following several tags are used to select and download all of landmass which is covered by green:

- land use tags 'conservation', 'city_green', 'grass', 'forest', 'village green', and 'meadow', 'farmland', 'orchard';
- natural tags 'scrub', 'wetland', 'grassland', 'heath', and 'wood';
- and the leisure tag 'nature_reserve'.

The geometry of these polygons are calculated for each neighborhood combination in a similar way as described earlier in this section.

The resulting maps of these operations are displayed in figure 43 and 44. Map A. of figure 43 shows that the neighborhood combinations which are covered for at least 40 percent by buildings are located in parts of the center, south, and west. Neighborhood combinations which are covered for 30 to 40 percent by buildings are located in the east and in parts of west. Combinations which are covered for less than 20 percent are mainly located in the new west, north, and southeast. Combinations which are covered for less than 10 percent are located at the edges of the city. Not coincidental, these are the combinations in which grassland, woodland, and agricultural land use are dominant, as was seen in figure 3 (page 15).

Map B. depicts the percentage of the neighborhood combination's landmass which is covered by green. Combinations in the city center, west, and parts of the south and east are covered for less than 10 percent by green. The highest scoring neighborhood combinations are Waterland, Slotermeer-Zuidwest, and Nellestein. The latter two contain a lake with green areas around the shoreline.

Lastly, map C. shows that, unsurprisingly, the neighborhood combinations surrounding the river score highly. Furthermore, the combinations in the category 20 to 30 percent located at the edge of the city contain lakes. The city center contains cannels while the neighborhood combinations surrounding the city center contain less than 10 percent urban water.

Map A. of figure 44 depicts the percentage of the landmass of the neighborhood combination which is covered by road. The map shows that most of the neighborhood combinations are covered for 20 to 30 percent. The city center scores highest, together with neighborhood combinations in the west and south .The combinations which are covered for less than 10 percent are all located on the edge of the city.

Map B. depicts the percentage of landmass covered by leisure activities. This data is collected by selecting and downloading all polygons in the Amsterdam region which have a ‘leisure’ tag (joined by the land use ‘recreation ground’). The map depicts that neighborhood combinations with a large percentage covered by leisure activities are predominantly located in the south. A few combinations in the east, west, and new west, and north rank highly as

**Figure 43 A.** Percentage of landmass covered by built-up (TOP10NL 2016)
**B.** Percentage of landmass covered by green (OSM 2016) **C.** Percentage of total size covered by water (TOP10NL 2016)

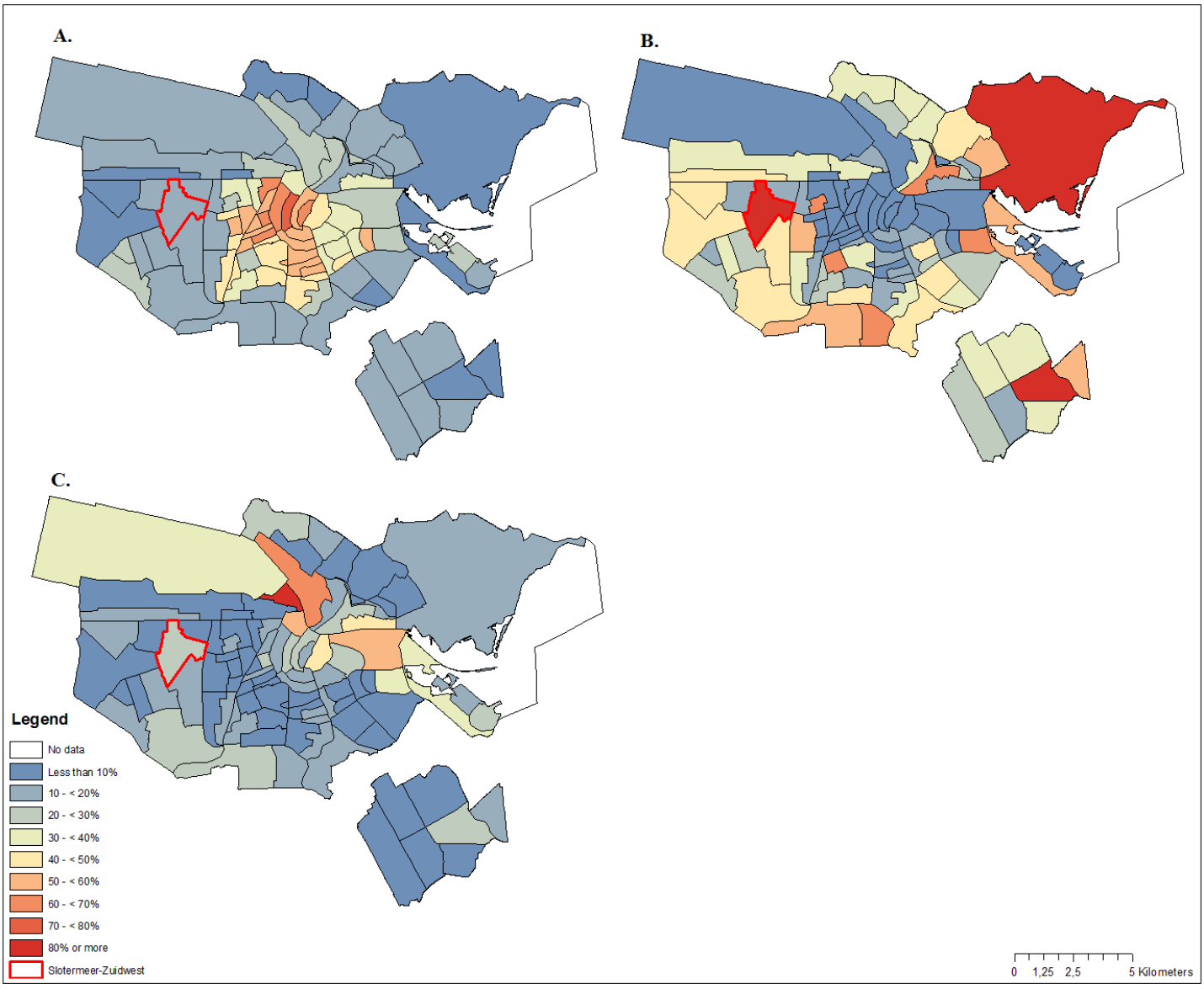
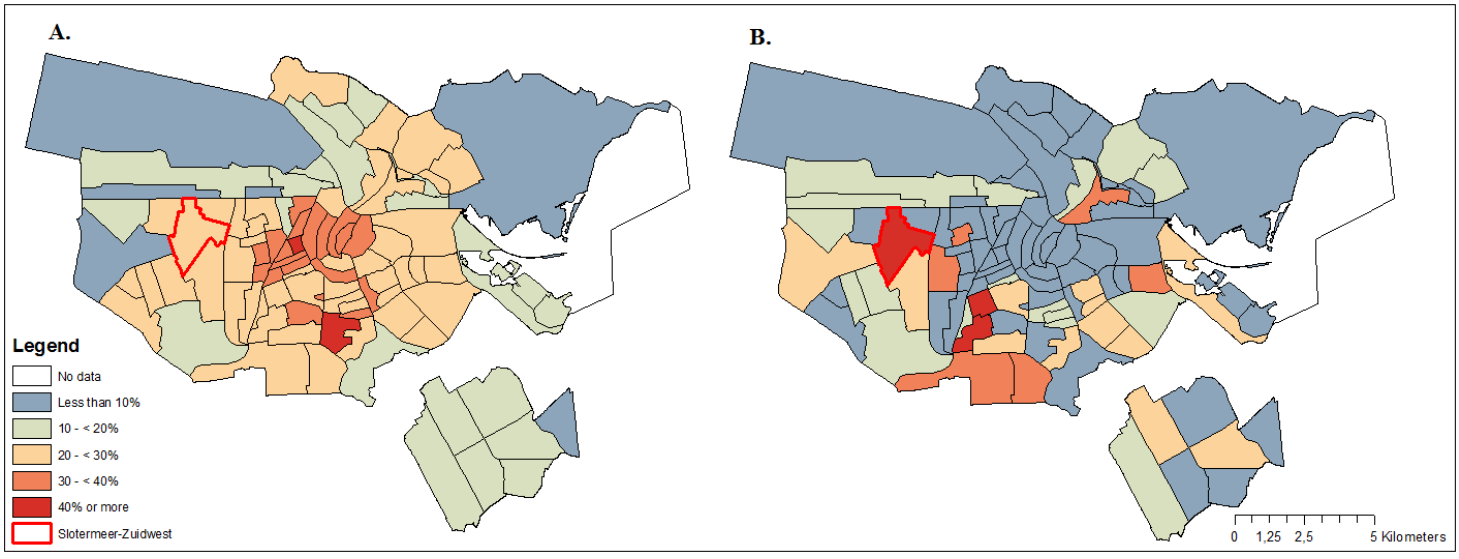



**Figure 44 A.** Percentage of landmass covered by road (TOP10NL 2016) **B.** Percentage of landmass covered by leisure grounds (OSM 2016)



well. The descriptive statistics of the variables displayed in figure 43 and 44 are denoted in table 12.

One of the greenest neighborhood combinations with a large amount of leisure grounds is Slotermeer-Zuidwest (figure 45). The neighborhood was built in the 50s and 60s of the 20th century as part of an extension plan of Amsterdam. The key concept was to plan open allotment by which the amount of natural light within dwellings is maximized. A large proportion of the combination is preserved green city scape (Gemeente Amsterdam 2015i). Slotermeer-Zuidwest is inhabited by 17 000 inhabitants. As figure 43 and 44 display, 20 to 30 percent of the landmass is covered by road, more than 40 percent is covered by leisure grounds, 10 to 20 percent is covered by buildings, 80 percent is covered by green, and 20 to 30 percent of the total surface is covered by water.

**Figure 45** Neighborhood combination Slotermeer-Zuidwest

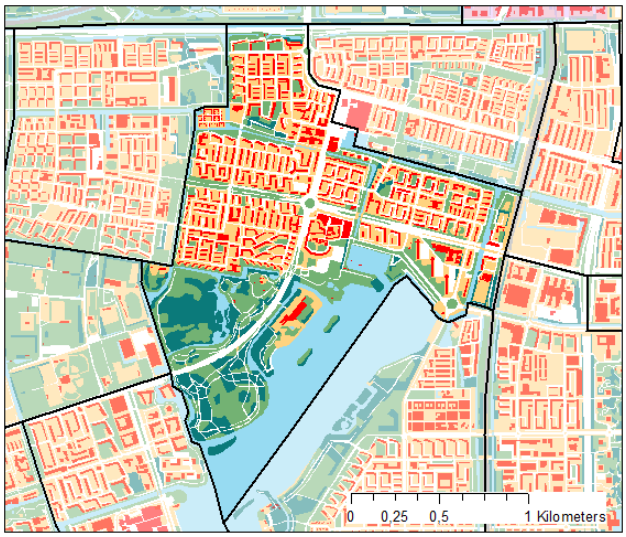



**Table 12** Descriptive statistics of neighborhood composition variables

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Percentage road | 97 | 0 | 47.4 | 23.61 | 8.527 | -0.283 | 0.245 |
| Percentage leisure | 97 | 0 | 50.52 | 11.272 | 12.211 | 1.337 | 0.245 |
| Percentage built-up | 97 | 0 | 77.5 | 28.954 | 18.992 | 0.448 | 0.245 |
| Percentage green | 97 | 0 | 86.96 | 24.777 | 21.386 | 0.884 | 0.245 |
| Percentage water | 97 | 1.11 | 87.52 | 14.514 | 13.928 | 2.739 | 0.245 |

OpenStreetMap is a geographic database filled with information about streets, rivers, boundaries, and areas produced by volunteers (OpenStreetMap Nederland n.d.). The project results in a worldwide map which can be freely used and edited. As the data is crowd sourced (produced by the crowed who uses it), it is interesting to see how this data relate to the official statistics published by DRO (Dienst Ruimtelijke Ordening). Figure 46 displays these official statistics. To make the OSM map and DRO map comparable, the landmass size of each neighborhood combination as determined by DRO are used to calculate the percentages. The

classes of both maps are compared to each other by extracting the classes from figure 44 map B. from the ones in figure 46 (formula: figure 44 map B. – figure 46 = figure 47). Figure 47 displays the result. The classes of both datasets match in the green neighborhood combinations. Neighborhood combinations color blue when the OSM value is at least a class lower than the DRO value. The combinations are purple when OSM values are at least a class higher than the DRO values. It strikes that the largest share of neighborhood combinations are colored purple. Thus, in these areas, the OSM data indicates that the percentage of the landmass which is covered by green is more than is indicated by the DRO. Besides the DRO, data on land use is published in the TOP10NL dataset. For two particular reasons, the OSM dataset is used in this research, instead of these official data sources. First of all, it is highly up-to-date. Every hour of every day, users can make contributions. Especially in situations of rapid change, this up-to-date character can proof to be valuable (Information Resources Management Association 2013). In this particular case, it may play a role in the difference between the DRO and OSM classes as the DRO dataset dates from 2014. More recent data will not explain large differences but it certainly could be that within these two years, a neighborhood combination moved up or down a class due to new green areas or former green areas which are replaced by buildings or roads.

The second reason is that contributors often possess detailed local knowledge (Information Resources Management Association 2013). For example, an aerial photo which is used to produce a topographic map might miss a small patch of green because at time of the photo, the patch was arid or covered by rain water excess. A contributor who lives next to the area is able to correctly classify this area based on his local knowledge. To determine the true cause of the difference between the datasets, a separate study would have to be done.

**Figure 46** Percentage of landmass covered by green (DRO 2014)

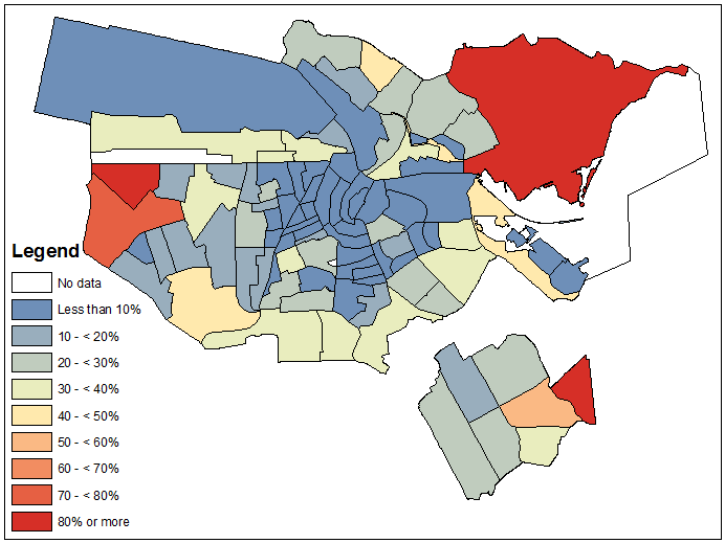
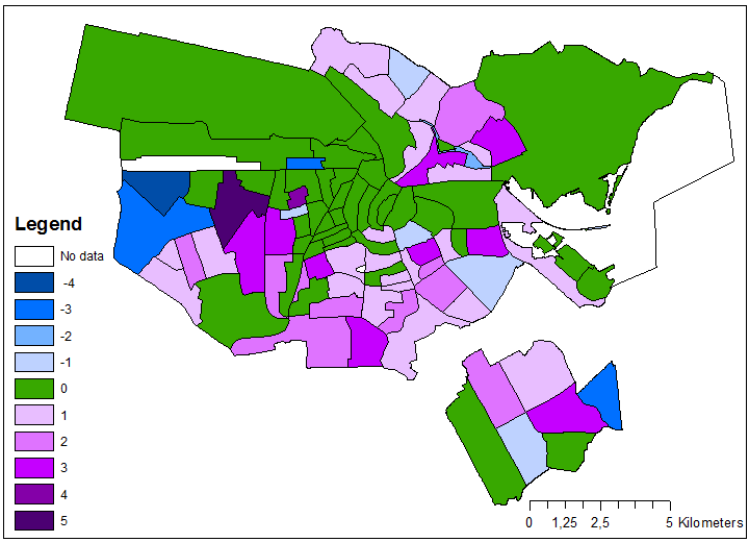



**Figure 47** Amount of class difference between the OSM and DRO dataset



In a similar way as described before, the trees are extracted from the TOP10NL dataset, clipped to the neighborhood combination boundaries and added up. Figure 48 shows the amount of trees located in parks and plantations per square kilometer for each neighborhood combination. The city center alongside bordering neighborhood combinations in west, south, east, and north have the least amount of trees. Highly ranking combinations are found in the northwest of north, new west, and southeast.

**Figure 48** Amount of trees in parks and plantations per square kilometer (TOP10NL 2016)

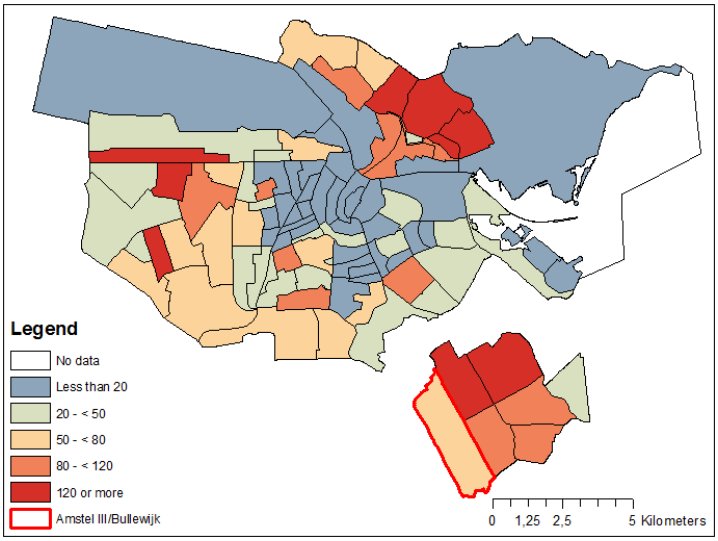



**Figure 49** Neighborhood combination Amstel III/Bullewijk

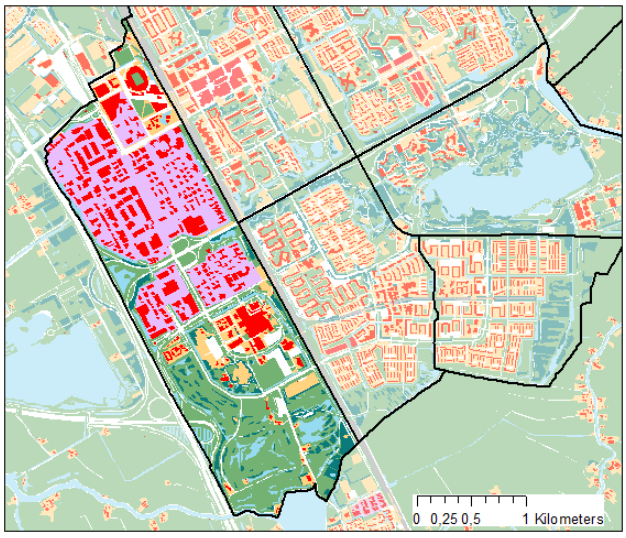
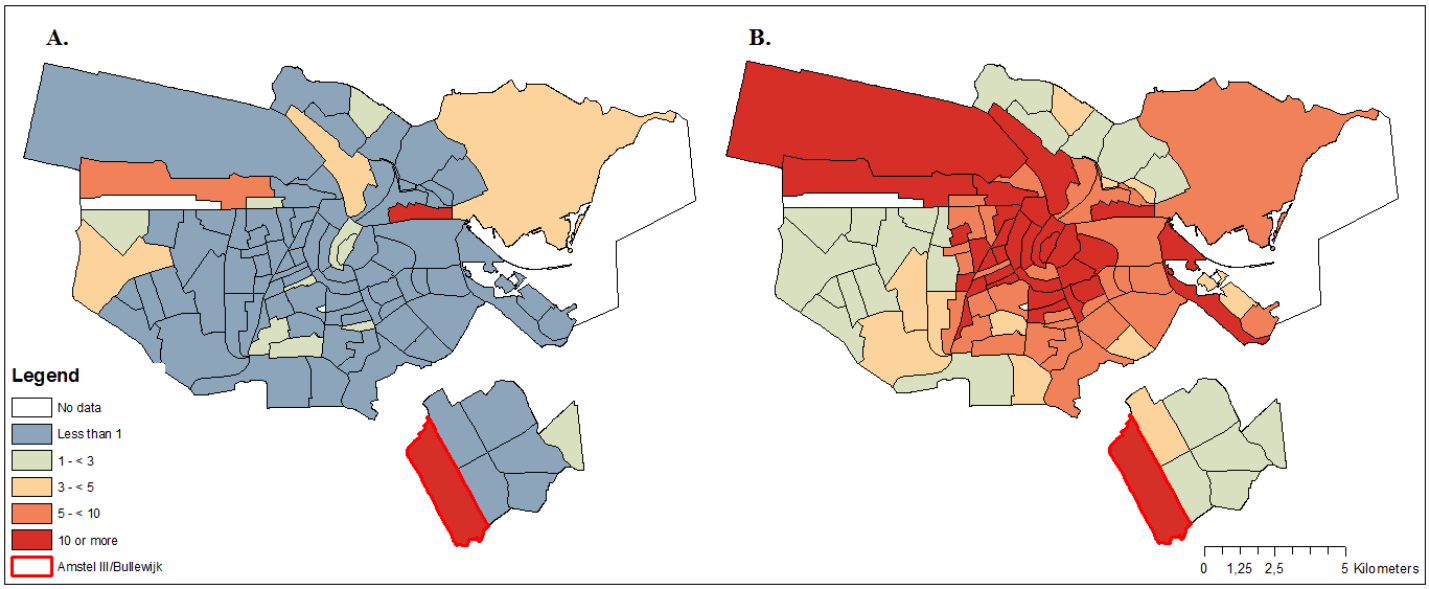



Figure 50 depicts the amount of sport facilities per 1000 inhabitants (map A.) and the amount of cultural facilities per 1000 inhabitants (map B.) for each neighborhood combination. Map A. shows that the bulk of the combinations contain less than one sport facility per 1000 inhabitants. Combinations with 1 to 3 facilities per 1000 inhabitants are located in the city center, south, new west, and north, while combinations with 3 or more facilities are found in the north, southeast, new west, and in Westpoort.

Map B. shows that, unsurprisingly, the bulk of the neighborhood combinations with 10 or more cultural facilities per 1000 inhabitants are located in the city center. The highly ranking neighborhood combinations in Westpoort can be explained by the small amount of inhabitants (190 in the Westelijk Havengebied and 210 in the Bedrijventerein Sloterdijk) living in these neighborhoods. The same goes for Nieuwendammerham (140) in the north of Amsterdam. The neighborhood combinations adjacent to the city center score in the categories 5 to 10 and 10 or more. The lowest offer of cultural facilities per 1000 inhabitants (1 to 3) are present in the bulk of new west, and in parts of southeast, the edge of north and in Buitenveldert-West in the south. Table 13 denotes the descriptive statistics of the variables displayed in figure 48 and 50.

**Figure 50 A.** Sport facilities per 1000 inhabitants (WiA 2015) **B.** Cultural facilities per 1000 inhabitants (WiA 2015)




In both of the maps in figure 50, the neighborhood combination Amstel III/Bullewijk (figure 49) ranks highly. Similar to the earlier discussed Bijlmer Oost, the area was planned in the 60s and 70s of the 20th century along the functional segregation principle. As shown in figure 49, most of the area is either covered by green or has an industrial function in which nearly 50 000 people are employed. In addition, the area has several big nightlife and leisure facilities which attract 16 million visitors a year (Gemeente Amsterdam 2015a). No more than 275 inhabitants inhabit the area (CBS 2015). This explains the 10 or more sport and cultural facilities per 1000 inhabitants displayed in figure 50. The amount of trees per square kilometer in parks and plantations is 50 to 80.

**Table 13** Descriptive statistics sport & cultural facilities and trees

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Amount of trees | 97 | 0 | 163.42 | 46.881 | 43.006 | 0.956 | 0.245 |
| Sport facilities | 94 | 0 | 28.57 | 1.3 | 4.185 | 6.031 | 0.249 |
| Cultural facilities | 94 | 1.1 | 77.5 | 8.598 | 10.486 | 5.205 | 0.249 |

The next four figures consecutively depict the population density (figure 51), the residential density (figure 52), the mean amount of inhabitants of a residence (figure 53), and the percentage of the dwellings which is private rent (figure 54).

The first two figures show a somewhat similar pattern. Neighborhood combinations with a high residential density have a high population density as well. These combinations are located in west, south, east, and the Jordaan in the city center. The least densely populated areas are located at the edge of the city. Similarly, residential density is low in these areas.

Figure 53 shows that the mean amount of residents per building in the city center and the surrounding neighborhood combinations is 1.1 to 2. The neighborhood combinations located further away from the city center house 2 to 3 residents on average.

The pattern in figure 54 displays that neighborhood combinations with a low percentage of private rent (below 20 percent) are located in the north, southeast, and new west. The few residential buildings which are located in Westpoort and Nieuwendammerham are mostly private rent. Furthermore, parts of the city center and south have, relatively speaking, a high share of private rent. The numbers on the share of home owners in the neighborhood combination are already discussed in section 4.1.5.2 (page 34). The descriptive statistics of the four variables are denoted in table 14.

**Figure 51** Population density (km²) (OIS 2015)

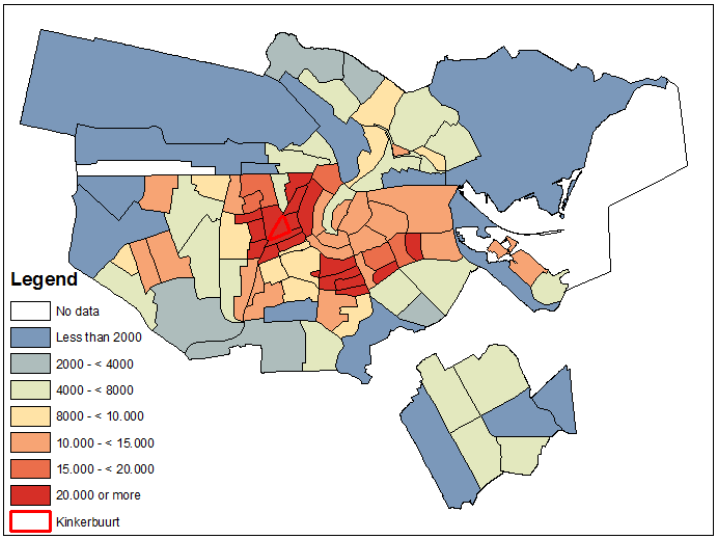



**Figure 52** Residential density (km²) (OIS 2015)

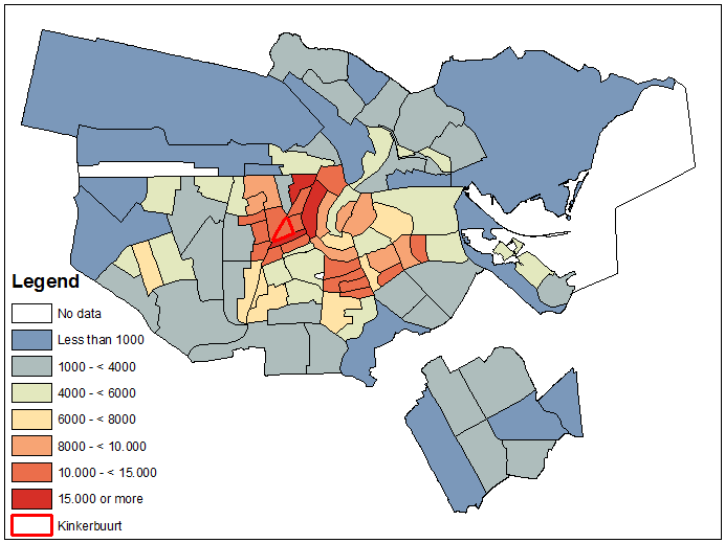



**Figure 53** Mean amount of residents per dwelling (OIS 2015)

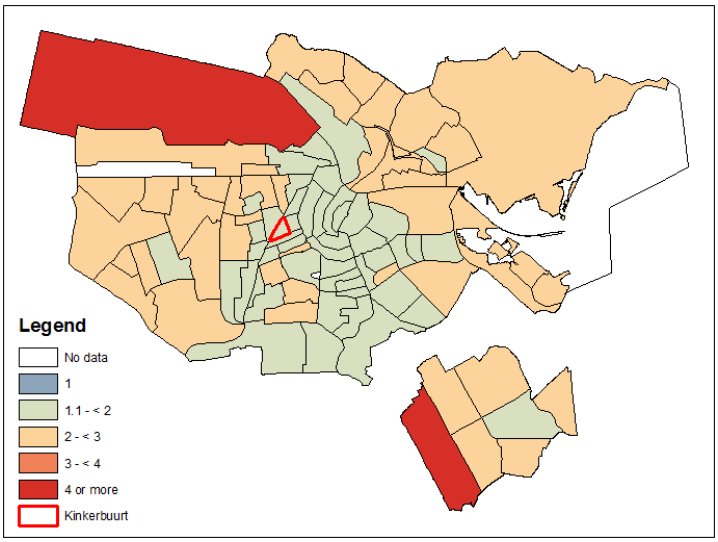
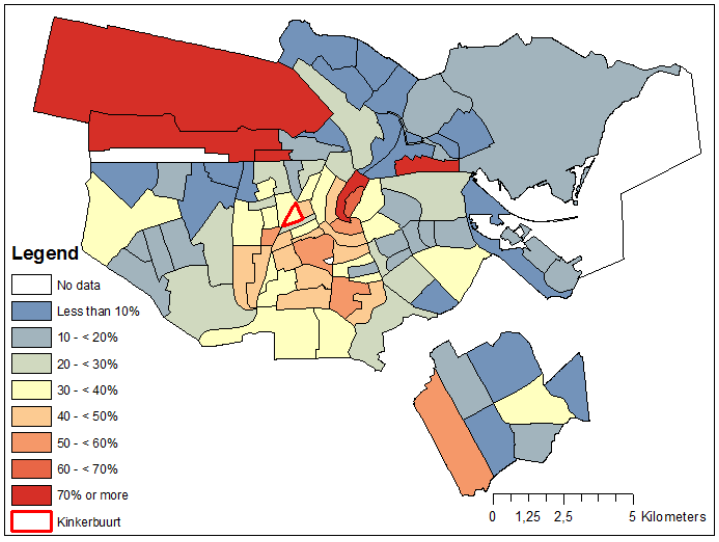



**Figure 54** Percentage private rent (OIS 2015)




As depicted in figure 51, the neighborhood combination Kinkerbuurt (figure 55) ranks among the most densely populated areas in Amsterdam. The area was built in early 20th century and houses 6 195 people (CBS 2015). Overtime, the area deteriorated until the process of gentrification started 20 years ago (Gemeente Amsterdam 2015j). The dwelling density in the neighborhood combination is categorized in the 10 000 to 15 000 dwellings per square

kilometer class. On average, a dwelling houses 1.1 to 2 people. Finally, 30 to 40 percent of the dwellings are private rent.

**Table 14** Descriptive statistics of population and residential density, number of residents, and private rent

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Population density | 95 | 10 | 28599 | 10950 | 7956 | 0.587 | 0.247 |
| Residential density | 94 | 2 | 17759 | 5887 | 4601 | 0.767 | 0.249 |
| Mean amount of residents per dwelling | 94 | 1.5 | 20 | 2.222 | 1.894 | 9.086 | 0.249 |
| Percentage private rent | 94 | 1 | 97.7 | 28.178 | 20.653 | 1.034 | 0.249 |

**Figure 55** Neighborhood combination Kinkerbuurt

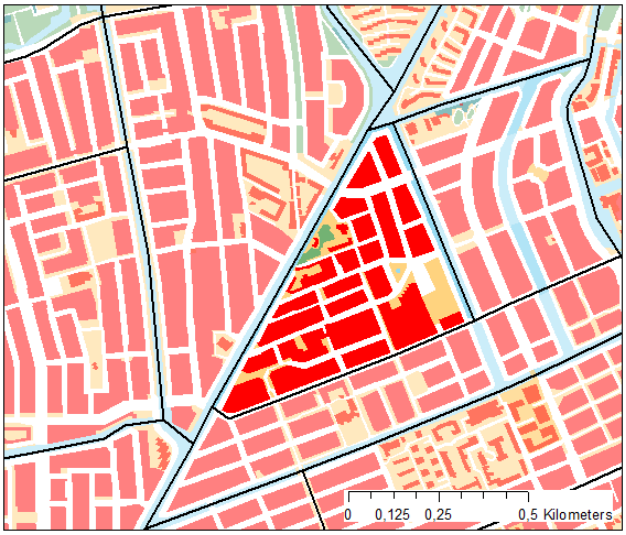
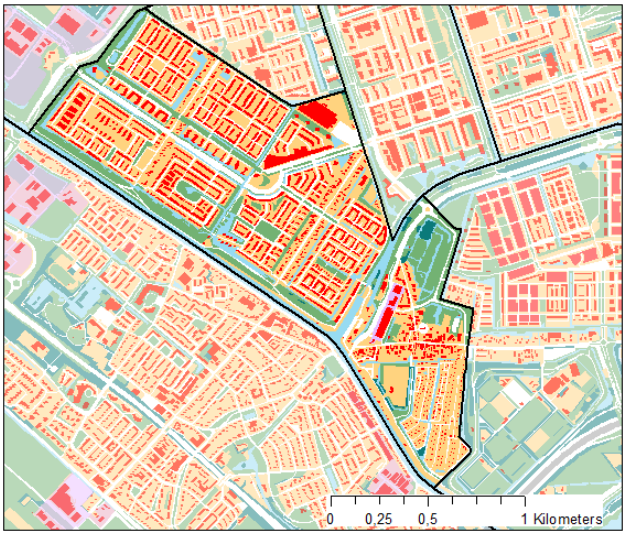



**Figure 56** Neighborhood combination Middelveldsche Akerpolder/Sloten




The figure on property valuation (figure 57) shows that the most expensive neighborhood combinations are located along the cannels of two particular areas (the Grachtengordel-West and South), as well as in the rural north and in the south of Amsterdam. The lowest valuations are located in the southeast, Slotermeer (new west), and Zeeburgereiland/Nieuwe Diep in the east.

Figure 58 depicts the mean monthly rent for each neighborhood combination. It shows that a mean monthly rent of more than 930 euro is paid in Willemspark and the Apollobuurt in the south. In the bulk of the neighborhood combinations the mean rent lies between 426 and 665, however, several data is missing.

Lastly, the two maps displayed in figure 59 show the share of dwellings which have a usable surface of less than 60 square meter (map A.) and a useable surface of more than 80 square meters (map B.). Map A. shows that neighborhood combinations in the west, and two in the south have a higher percentage of small dwellings than combinations located more to the outside of the city. To a lesser extent, this is also true for combinations in the center, east, and parts of the north of Amsterdam. On the contrary, map B. shows that the share of large dwellings is higher on the outskirts of the city than in the center and surrounding

neighborhoods. The descriptive statistics of the variables depicted in figure 58, 59, and 60 can be found in table 15.

**Figure 57** Property valuation (DBGA/O+S 2015)

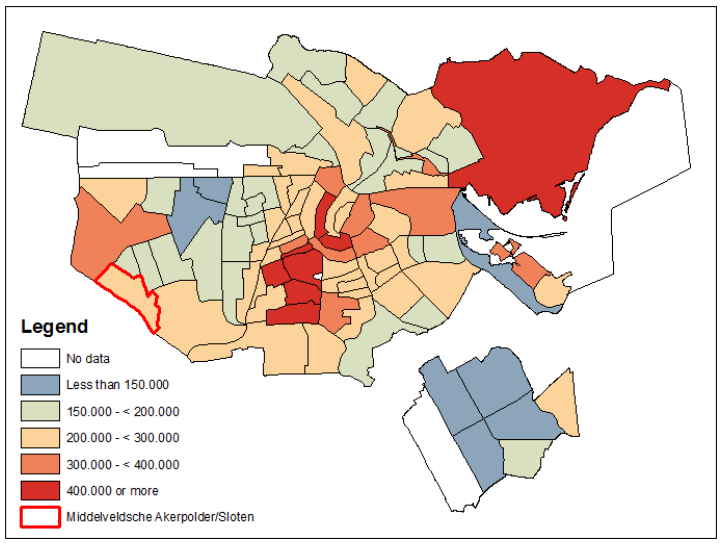
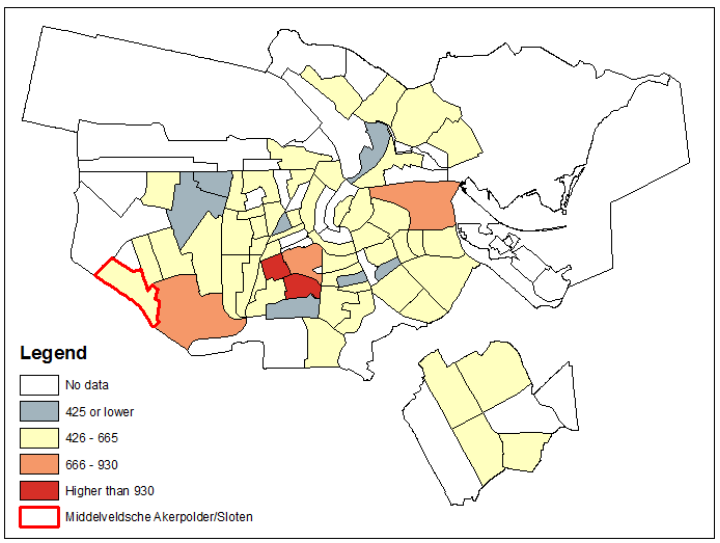
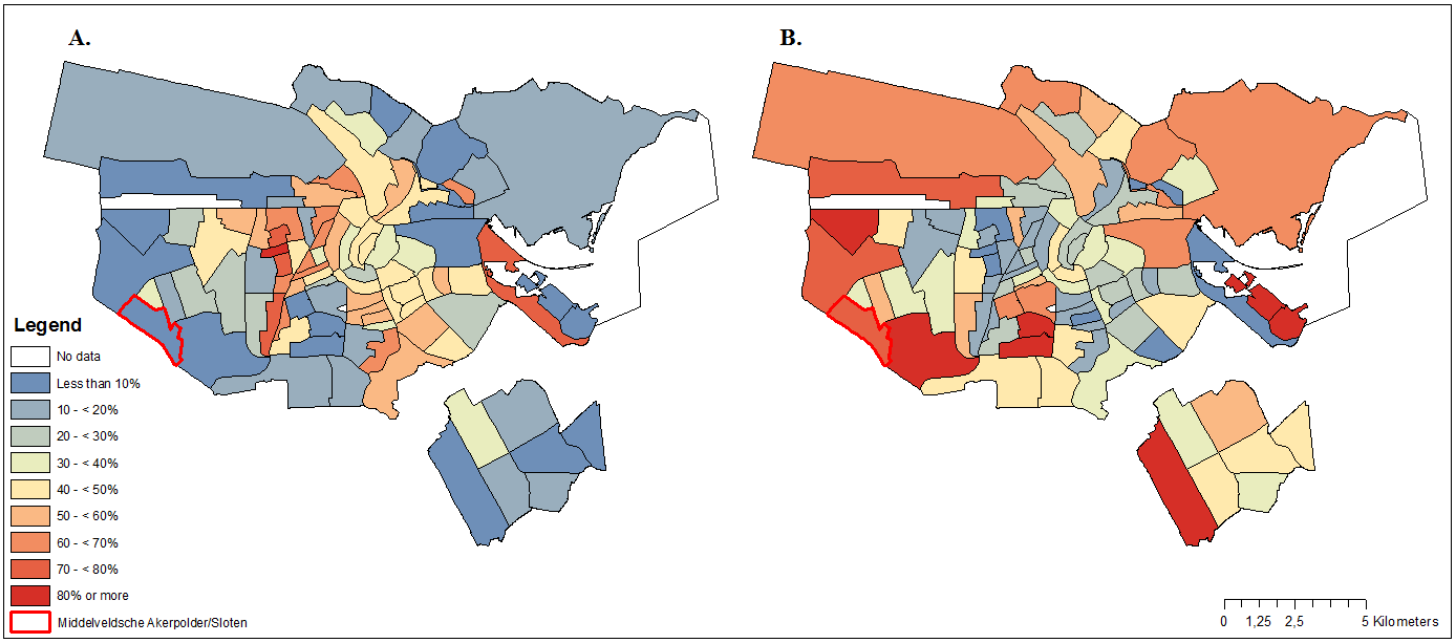



**Figure 58** Mean monthly rent (WiA 2013)




The neighborhood combination Middelveldsche Akerpolder/Sloten, which houses 15 090 inhabitants (CBS 2015), ranks among the lowest with regards to the share of dwellings with a usable surface of less than 60 square meter (less than 10 percent). The bulk of this combination was developed in the 80s and 90s of the 20$^{th}$ century as extension of the city of Amsterdam. In the southeast of this neighborhood combination (see figure 56) the old village Sloten is located. Over the years, this village got enclosed by the extension of the city

(Gemeente Amsterdam 2015k). The mean property valuation of the dwellings in this neighborhood combination falls in the category 200 000 to 300 000. Furthermore, the mean rent is 426 to 665, and 70 to 80 percent of the dwellings have a usable surface of more than 80 square meter.

**Table 15** Descriptive statistics property valuation, rent, and usable surface

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Property valuation | 92 | 123214 | 664514 | 250627 | 108729 | 1.931 | 0.251 |
| Mean monthly rent | 62 | 0 | 1233 | 522.83 | 158.15 | 2.023 | 0.304 |
| Usable surface of less than 60 m² | 94 | 0 | 82.8 | 35.065 | 22.249 | 0.09 | 0.249 |
| Usable surface of more than 80 m² | 94 | 4.6 | 90.90 | 37.543 | 23.116 | 0.633 | 0.249 |

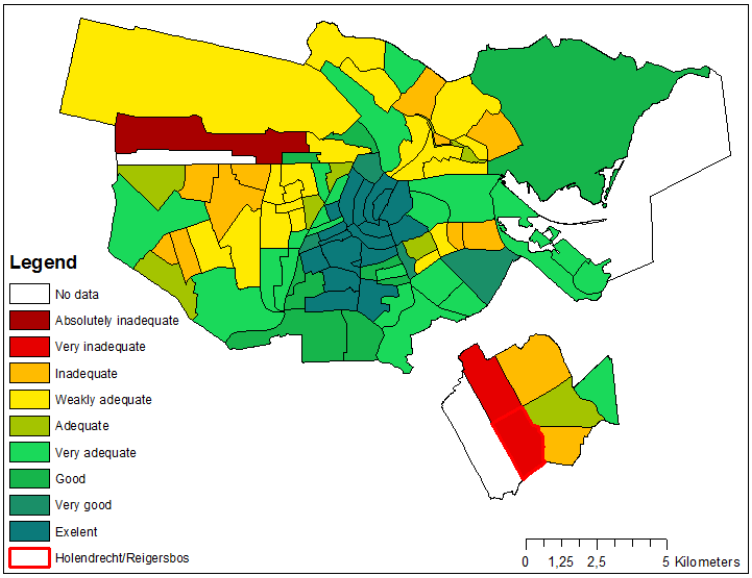
## 4.3 Livability

The livability of a neighborhood combination is determined by the leefbaarometer by a combined score on 100 indicators dispersed over five dimensions (housing stock, physical environment, facilities, inhabitants, and safety). The pattern in figure 44 shows that the neighborhood combinations which have lower than adequate levels of livability, are clustered in areas in the new west, east, southeast, north, and in Westpoort. The city center and neighborhood combinations in the west and south are ranked as having an excellent level of livability, surrounded by combinations which score very adequate to very good. Table 16 denotes the descriptive statistics of this variable.

One of the two neighborhood combinations with a very inadequate level of livability is Holendrecht/Reigersbos (see figure 61). The combination which houses 18 250 inhabitants, is known for its problems. The area is developed in the 80s of the 20$^{th}$ century and is characterized by lower and medium to high buildings (Gemeente Amsterdam 2015l).

**Figure 60** Levels of livability (Leefbaarometer 2014)

**Figure 61** Neighborhood combination Holendrecht/Reigersbos



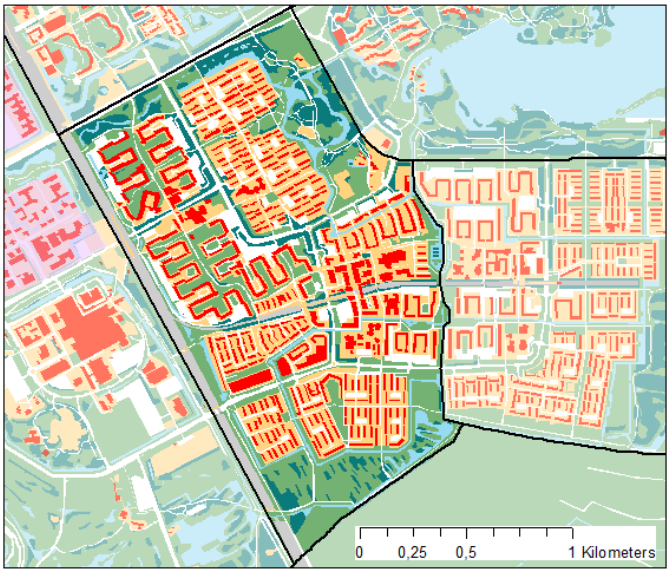




**Table 16** Descriptive statistics livability

| | N | Minimum | Maximum | Mean | Std. Deviation | Skewness | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Level of livability | 94 | 1 | 9 | 5.76 | 2.149 | 0.119 | 0.249 |

# 5 Research results

In this section two regression analyses are discussed in detail which explain the variance in the amount of neighborhood gardens apparent in a neighborhood combination and the amount of reports made to the municipality on situations in public space which need to be sorted (cleaned, fixed, or rearranged) per neighborhood combination. The variables which are discussed in sections 4.1, 4.2, and 4.3 are used as independent variables. In essence, a model is fitted that best describes the data (Field 2009). In this 'best fit' model, the independent variables are used to explain the value of the dependent variable (amount of neighborhood gardens/reports). As it is important to have enough data to be able to perform a reliable regression analysis, the sample size (the neighborhood combinations) dictates the maximum amount of independent variables which can be used in the explanation (Field 2009). To determine this maximum, the rule of thumb '10 cases of data for each independent variable in the model' is used. Amsterdam contains 97 neighborhood combinations (cases). However, as soon as one of the independent variables misses data for a neighborhood combination, this combination is excluded from the regression analysis, lowering the amount of cases. As a result, data sources with extensive amounts of missing data are excluded from the model as an independent variable. Unfortunately, both analyses are based upon around the 70 cases which dictates a maximum of seven independent variables. Consequently, several additional variables cannot be used in the model. A stepwise method is used to mathematically determine which subset of variables is most meaningful in explaining variance in the dependent variables.

In essence "decisions about the order in which predictors are entered into the model are based on a purely mathematical criterion" (Field 2009:212). First, the independent variables which have a sound theoretical base are entered in the model. Then, the independent variable is determined which best explains the outcome of the dependent variable. This is the variable which has the highest simple correlation with the dependent variable. The variable is retained in the model when it significantly improves the explanation. Next, the computer looks for the independent variable which best explains the remaining variance (the semi-partial correlation, the variance which is not explained by the first variable). Again, "if it makes a significant contribution to the predictive power of the model, it is retained and another predictor is considered" (Field 2009:213). Every time a new variable is added, a removal test is done to determine if any of the included variables becomes redundant and can be removed. This process caries on until the model runs out of significantly contributing variables (when the significance level of the t-statistics is bigger than 0.05) (Field 2009). The end result of this approach is a selection of independent variables which best explain the variance in the dependent variable. For both dependent variables, the selected data is presented and analyzed in section 5.1.2 and 5.2.2.

Given the goal of this research, this method is deemed adequate. The goal is not to determine concrete effects and coefficients, but to check if geographic characteristics are to be considered when explaining different forms of neighborhood participation. In addition, the goal is to establish if the new data sources are suitable sources in determining influential independent variables.

## 5.1 Neighborhood gardens

The dependent variable in this regression analysis is the presence of neighborhood (community) gardens per 10 000 inhabitants in the neighborhood combinations of Amsterdam. Neighborhood gardens refer to community gardens in a neighborhood which are initiated by neighborhood inhabitants, and/or in which neighborhood inhabitants are involved in maintaining the garden. By improving their physical environment through creating and

maintaining a garden, the inhabitants take part in a form of horizontal problem oriented neighborhood participation. Inhabitants cooperate in the process of creating and maintaining the garden. The reason behind these (citizen) initiatives is not always driven by a specific problem but motives range from not owning a garden, to refurbishing street corners which formerly were used by substance abusing people, to educating neighborhood kids about growing your own food. Furthermore, the gardens often also function as social gathering space such as communal harvesting or preparing diner made from the harvested vegetables. A participant of a neighborhood garden in north, for example, states that they gather and make salads and flower arrangements with their own crops and flowers in their building on a weekly basis (RODI 2013). These are forms of social neighborhood participation.

**Figure 62** Amount of neighborhood gardens per 10 000 inhabitants

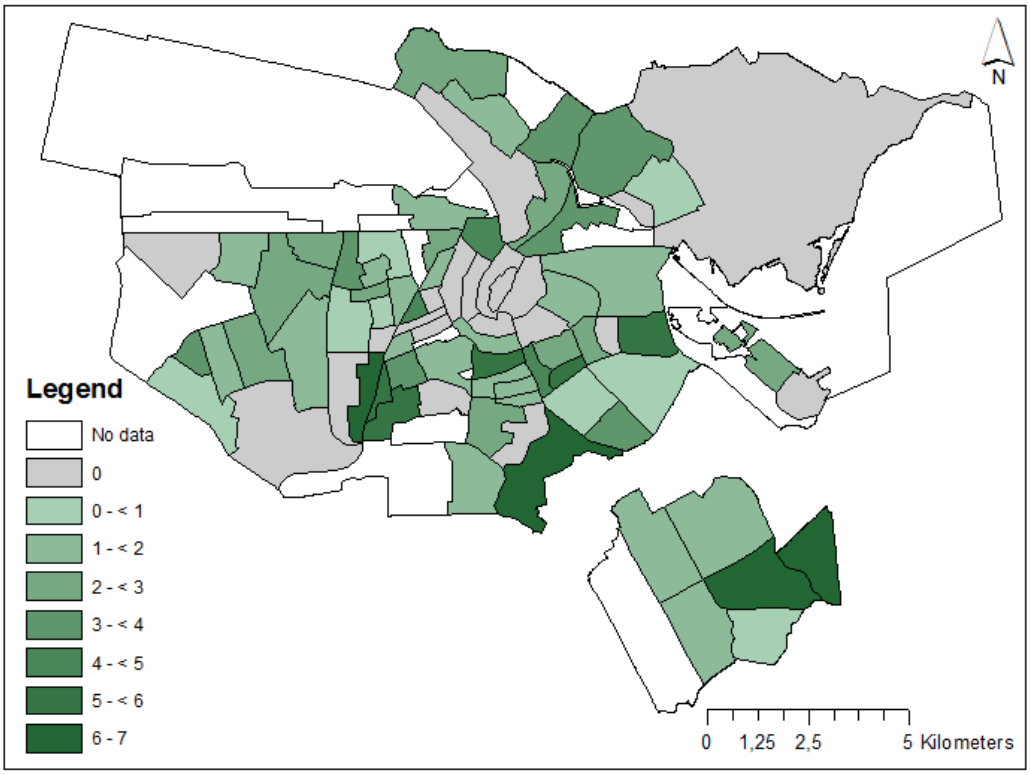



Figure 62 displays the amount of neighborhood gardens per 10 000 inhabitants for the neighborhood combinations. The locations of the neighborhood gardens are mainly collected from the following sources: an urban farming map produced by the municipality, the 'Zuid in beeld' map which depicts nature and environmental projects in the south borough of Amsterdam, and from interactive maps published by 'Groene Ruimte Maken', 'Groen Dichterbij', 'Groen en Doen', and 'Buurtmoestuin.nl'. To review the neighborhood garden projects along with the website which provides information, appendix A can be consulted. The dependent variable is standardized by calculating the amount of gardens per capita. As this results in very small values, the per capita amount is multiplied by 10 000.

The regression model attempts to best explain the outcome of figure 62. The neighborhood combinations which are excluded from the regression analysis as a result of missing data in one or more variables are depicted blank in figure 62. 69 neighborhood combinations are included in the regression analysis.

### 5.1.1 Theoretical expectations

Before turning to the regression analysis, the expectations based on the theory as presented in section 1.2 are addressed.

First of all, it is expected that in neighborhood combinations with a large share of lower educated inhabitants, inhabitants are less likely to get involved in creating and maintaining a neighborhood garden than in neighborhood combinations with a lower share of lower educated inhabitants. Furthermore, in neighborhood combinations with a larger share of families with children, the involvement in the creation and maintenance of gardens is expected to be higher than in combinations with a smaller share of families with children. In addition, neighborhood combinations with a larger share of men are expected to have more involved inhabitants than combinations with a lower share of men. In combinations with a high share of inhabitants with a non-western background, indigenous population is expected to be less involved in social gatherings in and around the garden.

Moving on to socially created neighborhood circumstances, it is expected that in neighborhood combinations with relatively speaking high levels of public familiarity, inhabitants are more likely to be involved in the social aspect of gardening and to a slightly lesser extent in the creation of neighborhood gardens, than in combinations where the public familiarity is low. In addition, neighborhood combinations in which the trust and contact (social capital) between inhabitants is high, it is expected that inhabitants are more inclined to be involved in creating and/or maintaining a neighborhood garden than in combinations in which the trust and contact is low. Lastly, it is expected that inhabitants of neighborhood combinations where the social cohesion is high, are more likely to contribute to the creation and maintenance of neighborhood gardens than in inhabitants of combinations with lower levels of social cohesion.

Next, neighborhood combinations which are inhabited by people with strong emotional, economical, or functional bonds to their neighborhood, are expected to have more inhabitants who are involved in the creation and maintenance of neighborhood gardens than combinations in which these bonds are less/absent.

Lastly, when it comes to problems in the neighborhood, it can be expected that the involvement with the creation and maintenance of neighborhood gardens increases with the increase of problems in neighborhood combinations.

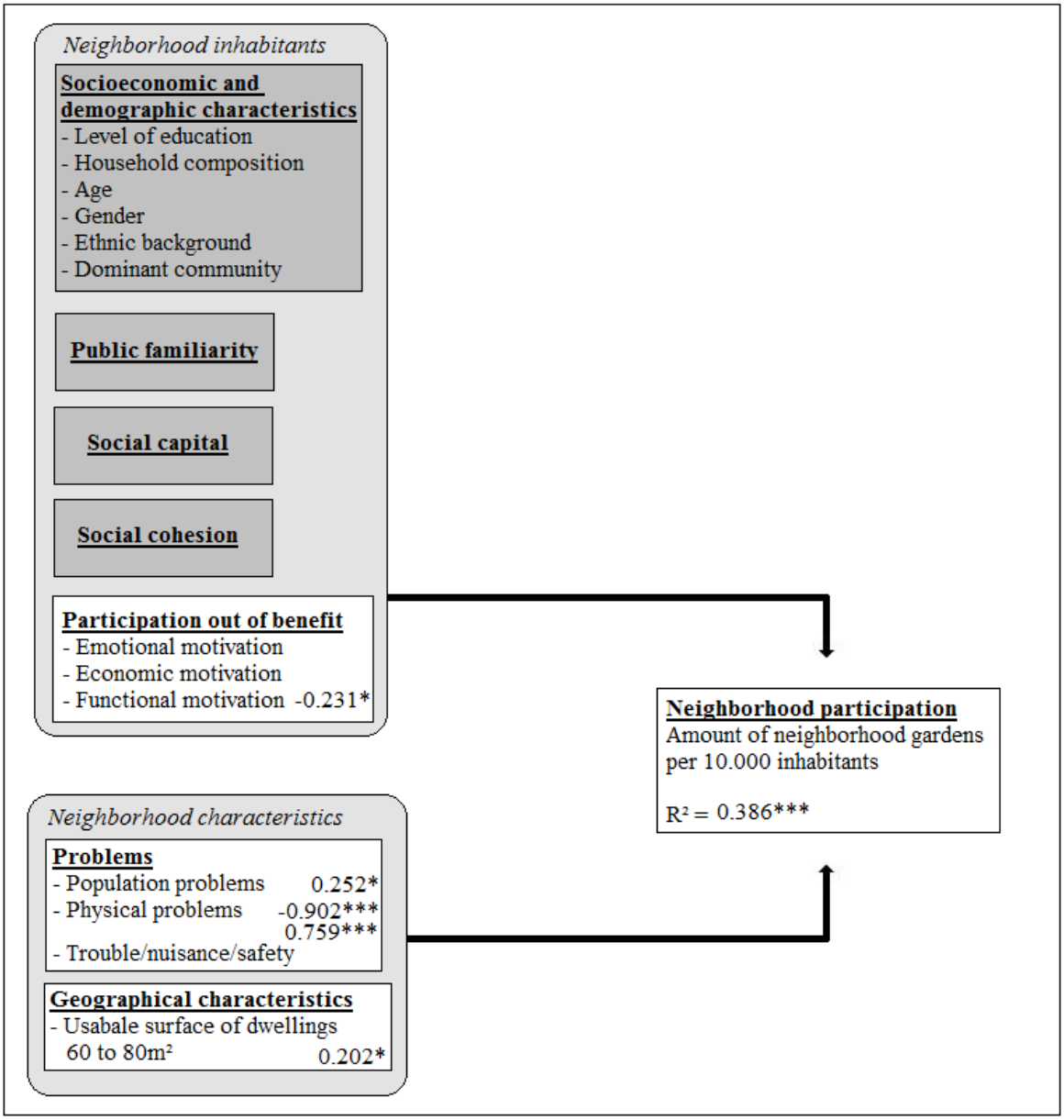
For the pursue of replicating Leidelmeijer's research, a couple of extra variables are produced. In addition to the independent variables discussed in sections 4.1 to 4.3, the variables 'percentage lower educated', 'percentage households with children', 'percentage two person households', and 'percentage non-western immigrants' are included in the regression analysis process.

### 5.1.2 The neighborhood garden regression analysis

The outcome of the regression analysis is summarized in figure 63. This is the conceptual model based on the expectations as derived from Leidelmeijer (2012), extended by the inclusion of geographic components (as were introduced in section 3.2). The white boxes display the independent variables which contribute to the explanation of the dependent variable 'amount of neighborhood gardens per 10 000 inhabitants' (the neighborhood participation variable in the center). The greyed out boxes represent the variables which are deemed statistically redundant or insignificant in their contribution to the ability to explain the outcome values. Data redundancy is described by the United Nations to occur "when the value of data items (fields) can be partially or completely deduced from the values of other data items (fields)" (United Nations 2000:4). In essence, this means that the variable

correlates with another independent variable. As a result, the contribution of the variable is not unique (it can be explained by another variable) and thus deemed redundant. In this particular research, the contribution of the variables socioeconomic and demographic, public familiarity, social capital, and social cohesion do not add to the explanation of the amount of neighborhood gardens in a neighborhood combination.

**Figure 63** Regression analysis outcome




* = significance ≤ .05, ** = significance < .01, and *** = significance < .001

In the white boxes, the standardized Beta coefficient of each independent variable is displayed. The amount of asterisks behind the standardized B value denotes at what significance level the B value holds (with * = significance ≤ .05, ** = significance < .01, and *** = significance < .001). As these standardized values are all measured in standard deviation units, their influence on the explanation can be compared (Field 2009). The R square denoted in the neighborhood participation box indicates that the independent variables explain 38.6 percent (0.386) of the variance in the amount of neighborhood gardens per 10 000 inhabitants. In other words, the participation out of functional benefit, physical and

population neighborhood problems, and geographic neighborhood characteristics account for 38.6 percent of the variation in the amount of neighborhood gardens present in a neighborhood combination. To review the effects of the variables in more detail, the regression model outcomes (summed up in table 17) will now be discussed.

**Table 17** Regression analysis neighborhood gardens ($R^2 = 0.386$ at a 0.000 significance level)

| Variables | B | SE B | β | Sig |
|---|---|---|---|---|
| Constant | 1.140 | 3.500 | | |
| Physical neighborhood problems: cleanness of streets and sidewalks | -3.108 | 0.559 | -0.902 | 0.000 |
| Physical neighborhood problems: maintenance of playgrounds | 3.421 | 0.748 | 0.759 | 0.000 |
| Geographic characteristics: % dwellings with a usable surface of 60 to 80m² | 0.035 | 0.018 | 0.202 | 0.051 |
| Population problems: person hassle index | 1.046 | 0.421 | 0.252 | 0.016 |
| Functional motivation: offer of public transport | -0.446 | 0.196 | -0.231 | 0.026 |

B = Beta coefficient, SE B = standardized error, β = standardized B coefficient, Sig = significance level

The b values in table 17 give insight in the relationship between the independent and the dependent variable(s) (amount of neighborhood gardens per neighborhood combination). According to Field (2009:239) “each of these beta values has an associated standard error (SE B) indicating to what extent these values would vary across different samples.” Furthermore, they are accompanied by the standardized Beta coefficient (β) and the significance level (Sig). When all other independent variables are held constant, table 17 can be interpreted as following:

- If the perceived cleanness of streets and sidewalks increases by one unit, the amount of neighborhood gardens per 10 000 inhabitants decreases by 3.108. In other words, it appears that a neighborhood combination in which streets and sidewalks are perceived to be very clean, less neighborhood gardens per capita are present than in combinations in which they are less clean. This is in accordance with the theory of Leidelmeijer as dirty streets and sidewalks are an indication of physical neighborhood problems. In areas with neighborhood problems, horizontal participation is expected to be high.
- If the level of maintenance of playgrounds as perceived by the inhabitants increases by one unit, the amount of neighborhood gardens per 10 000 inhabitants increases by 3.421. This indicates that neighborhood combinations where the playgrounds are perceived to be well maintained, more neighborhood gardens per capita are expected than in neighborhood combinations where the maintenance is not so good. As bad maintained playgrounds are an indication for physical neighborhood problems, the effect was expected to be reversed.
- If the geographic characteristic ‘percentage dwellings which have a usable floor surface of 60 to 80 square meter’ increases by one unit, the amount of neighborhood gardens per 10 000 inhabitants increases by 0.035. Thus, it appears that more neighborhood gardens are present in neighborhood combinations with a larger share of medium sized dwellings.

- If the population problems measured by the person hassle index increases by one unit, the amount of neighborhood gardens per 10 000 inhabitants increases by 1.046. This suggests that neighborhood combinations in which inhabitants experience irritating behavior against persons, for example by youth grouping together or wantonness behavior, more neighborhood gardens are expected to be created and/or maintained by inhabitants than in neighborhood combinations in which this is not the case. This is in accordance with the expectations as this is an indication of neighborhood problems as well.
- Lastly, if the offer of public transport in a neighborhood combination increases, the amount of neighborhood gardens per 10 000 inhabitants decreases by 0.446. This indicates that more neighborhood gardens are created/maintained by inhabitants when the offer of public transport lessens.

In sum, using a stepwise regression model, five independent variables are mathematically selected out of the bunch. It appears that in neighborhood combinations with cleaner streets and sidewalks, less neighborhood gardens per capita are present. Furthermore, combinations in which inhabitants perceive the playgrounds to be well maintained, more neighborhood gardens per capita are present. Also, in neighborhood combinations with a large share of medium sized houses (60 to 80m²) more neighborhood gardens are likely to be present. Additionally, in combinations with sizable neighborhood problems concerning population, the amount of neighborhood gardens per capita is expected to be larger than in neighborhood combinations with little problems. Furthermore, if the offer of public transport is perceived to be good in a neighborhood combination, less neighborhood gardens are expected to be present.

What strikes is that on the one hand, physical neighborhood problems in form of dirty streets and sidewalks are associated with more neighborhood gardens per capita, on the other hand however, badly maintained playgrounds are associated with the presence of less neighborhood gardens per capita in a neighborhood combination. More research will have to be done to see if dirty streets motivate people to contribute to their neighborhood and if badly maintained playgrounds are experienced as discouraging. The offer of public transport is used as a measure of the focus of inhabitants on the functional usage of the neighborhood. In this particular case, the function is used to leave the neighborhood. A better offer of public transport makes it easier to visit other places. This might indicate that, when the offer of public transport is perceived as bad, inhabitants are more inclined to participate in their own neighborhood.

## 5.2 Reports of hassle in public space

In this second regression analysis, the amount of reports made by inhabitants on situations in public space which need to be sorted (cleaned, fixed, or rearranged), are explained. The reports are a combination of the following subsets:

- Reports on garbage in public space;
- Reports on situations concerning the maintenance and rearrangement of public green and water (e.g. hassle caused by rats or neglected/damaged green space);
- Reports on hassle in public space (e.g. not functioning of sewage, broken sidewalks, or the maintenance state of playgrounds);
- Reports concerning roads, traffic, and street furniture (e.g. hassle caused by parking situations, dog faeces, graffiti, wrongly placed objects, noise pollution, strange odors, or car/bicycle wrecks);

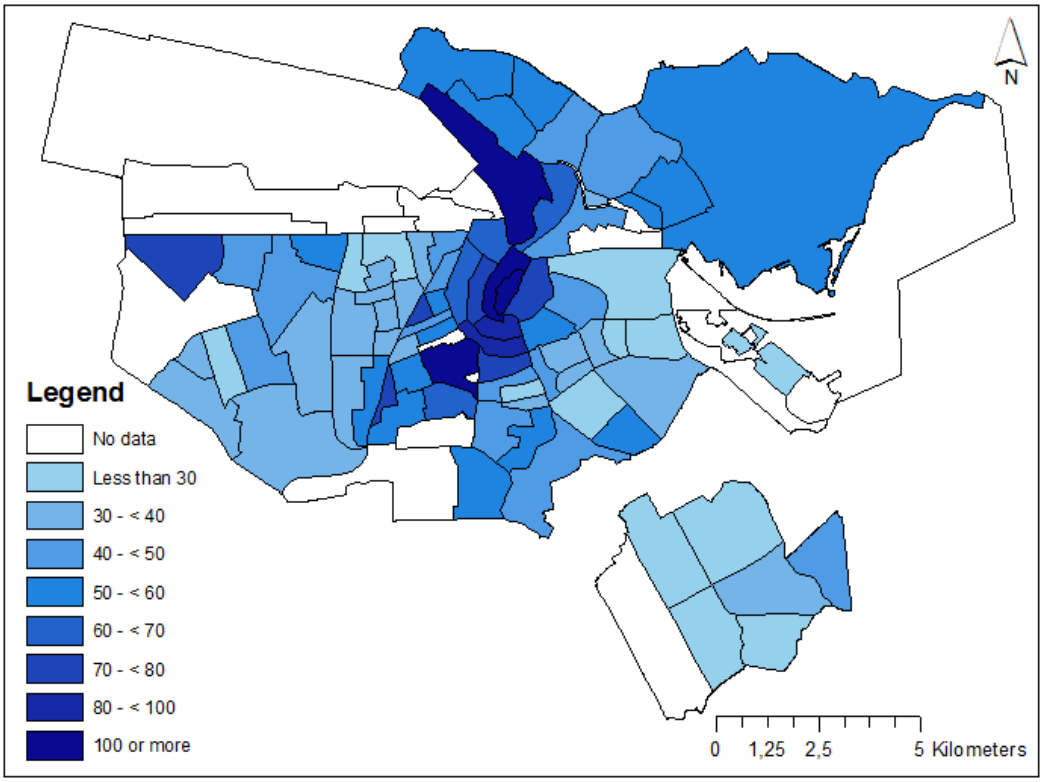
- Reports which cannot be stored in these categories (e.g. floating debris, weed, or maintenance of quay).

These reports are made to the municipality. Each working day morning, the municipality updates a map which displays these reports. They remain mapped for eight days after the problem is solved (Melding Openbare Ruimte n.d.). Therefore, the dataset is harvested every seven days for a period of twelve weeks. This is done by downloading the datasets in GeoJSON and reformatting them into point shape files. After the twelve week period, overlapping data (duplications of the same report) are eliminated after which the reports are clipped to the neighborhood combinations. The Python script which is written to perform this task can be consulted in appendix B.

In practice, the reports of citizens are not limited to their own neighborhood. However, the assumption is made that the majority of reports are made within the neighborhood, as this is an important location at which one spends a large amount of time and which is expected to be a prominent part of ones living environment.

Figure 64 depicts the amount of reports made per 1000 inhabitants which the regression model seeks to explain. Again, the blank neighborhood combinations are excluded from the analysis due to missing data on one or more independent variables. 74 neighborhood combinations are used for this regression analysis.

**Figure 64** Amount of reports made per 1000 inhabitants




### 5.2.1 Theoretical expectations

In similar way as in section 5.1.1, the expectations based on earlier presented theory will now be addressed.

Starting with the level of education, it is expected that in neighborhood combinations with a larger share of lower educated inhabitants, less inhabitants perform vertical problem

oriented neighborhood participation by reporting hassle in public space to the municipality than in combinations with a smaller share of lower educated inhabitants. Furthermore, in neighborhood combinations with a large share of two person households, more reports are expected to be made than in combinations with a smaller share of two person households. In addition, in neighborhood combinations with an older population, more reports are expected to be made than in combinations with a younger population. As opposed to non-western immigrants, indigenous population is expected to participate more in reporting to the municipality in less than good neighborhood combinations (neighborhood combinations with problematic livability to a positive livability). Thus, when livability is less than good, more inhabitants are expected to be involved in making reports when the neighborhood combination has, relatively speaking, a larger share of indigenous population.

Similar to the neighborhood gardens, in neighborhood combinations with a high level of public familiarity, more involvement in reporting hassle in public space is expected than in combinations with a low level of public familiarity. On the contrary, in neighborhood combinations with low levels of trust among the inhabitants (social capital), more participation in the report of hassle is expected. In line, in neighborhood combinations with high levels of social cohesion, more involvement in reporting hassle can be expected than in combinations with low levels of social cohesion.

Furthermore, neighborhood combinations which are inhabited by a large amount of people who feel strongly emotionally bonded to their neighborhood, are expected to have more participation on reporting hassle in public space than combinations which are inhabited by people who feel less bonded. In addition, in neighborhood combinations where a large share of the dwellings are owned by its inhabitants, more involvement in the reporting of hassle can be expected compared to neighborhood combinations where a large amount of the buildings is rented. Also, in neighborhood combinations in which the share of people who loosely functionally use the neighborhood is large, more involvement in reporting hassle is expected than in combination where people are strongly functionally oriented on their neighborhood.

Lastly, the involvement in reporting hassle is expected to be larger in neighborhood combinations which cope with extensive problems.

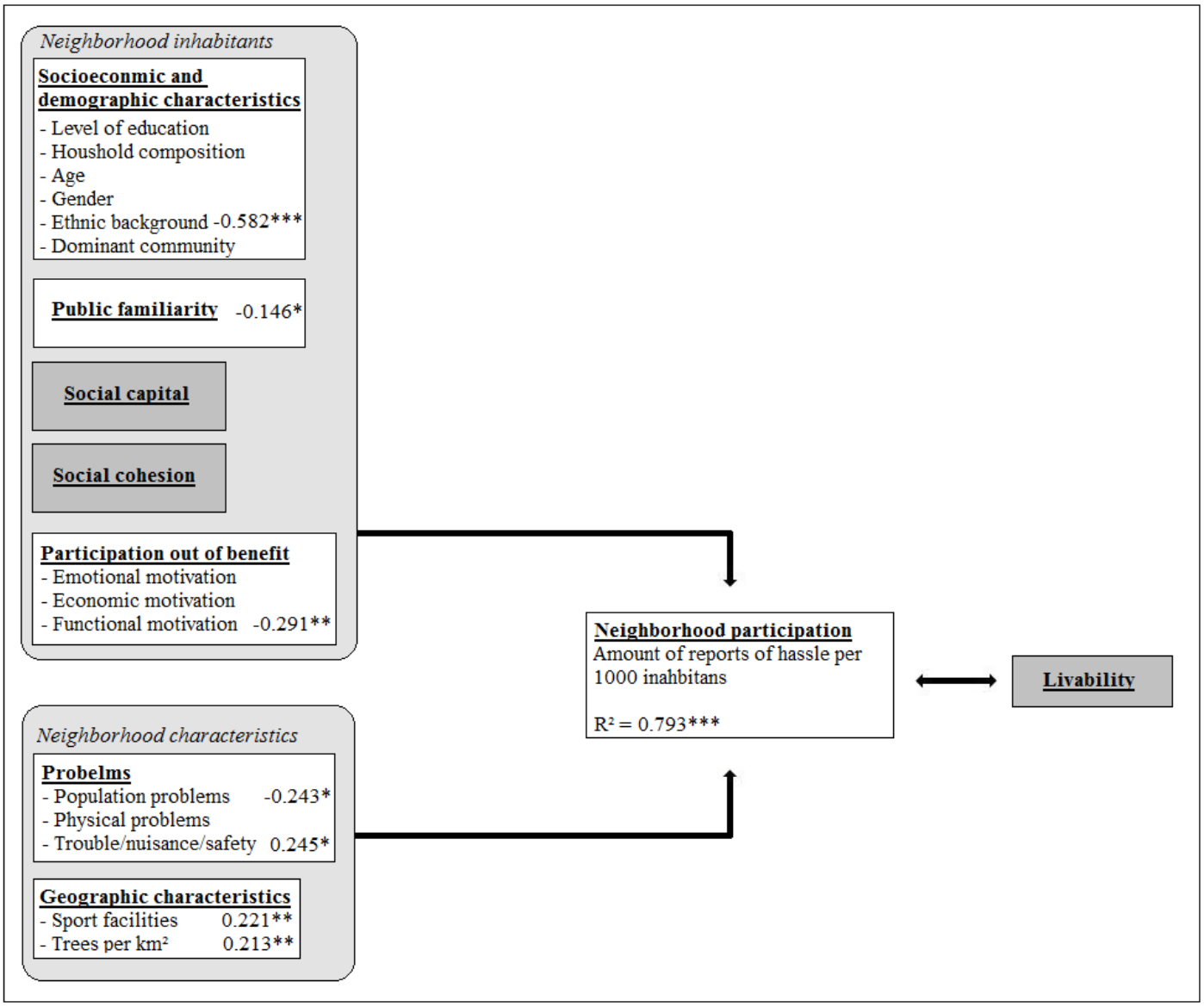
### 5.2.2 The reports on public space regression analysis

Figure 65 summarizes the regression analysis outcome. In similar fashion as before, the variables which are deemed statistically redundant or insignificant in in their ability to explain the outcome values (the amount of reports per 1000 inhabitants for each neighborhood combination) are greyed out. The R square indicates that 79.3 percent (0.793) of the variance in the amount of reports per 1000 inhabitants is explained by the independent variables ethnic background, functional motivation, population and safety problems, and geographic neighborhood characteristics. To review the effects of the variables in more detail, the in table 18 summarized regression model outcome will now be discussed.

When all other independent variables are held constant, table 18 can be interpreted as following:

- If the experience of nuisance caused by bars and restaurants (population problems) increases by one unit, which effectively means the nuisance lessens (with 1 referring to serious nuisance and 10 referring to no nuisance at all), the amount of reports per 1000 inhabitants decreases by 15.218. Thus, it is suggested that neighborhood combination in which the supply of playgrounds are perceived as sufficient, less reports per 1000 inhabitants are made. This finding is in accordance with the

**Figure 65** Regression analysis outcome




* = significance ≤ .05, ** = significance < .01, and *** = significance < .001

**Table 18** Regression analysis hassle reports ( $R^2 = 0.793$ at a 0.000 significance level)

| Variables | B | SE B | β | Sig |
|---|---|---|---|---|
| Constant | 216.654 | 40.350 | | |
| Population problems: experience of nuisance caused by bars and restaurants | -9.202 | 3.500 | -0.243 | 0.011 |
| Functional motivation: supply of playground facilities | -15.218 | 4.237 | -0.291 | 0.001 |
| Socioeconomic and demographic characteristics: % non-western immigrants | -0.786 | 0.118 | -0.582 | 0.000 |
| Neighborhood problems: safety index | 0.263 | 0.104 | 0.245 | 0.014 |
| Geographic characteristics: sport facilities per 1000 inhabitants | 18.685 | 5.308 | 0.221 | 0.001 |
| Geographic characteristics: amount of trees per km² in parks and plantations | 10.820 | 3.469 | 0.213 | 0.003 |
| Public Familiarity | -13.247 | 5.700 | -0.146 | 0.023 |

B = Beta coefficient, SE B = standardized error, β = standardized B coefficient, Sig = significance level

theoretical findings of Leidelmeijer, as less reports of hassle is expected in neighborhood combinations in which the inhabitants are functionally bonded

- If the share of non-western immigrants increases by one unit, the amount of reports per 1000 inhabitants decreases by 0.786. The suggestion that a decrease in the amount of reports per 1000 inhabitants can be expected in a neighborhood combination when the share of non-western immigrants increases is in accordance with earlier theory.
- If the value of the safety index increases by one unit, the amount of reports per 1000 inhabitants increases by 0.263. A higher value refers to more safety issues. Thus, this indicates that it is expected that more reports are made in a areas with more safety issues. This is in line with the theoretical expectations (more neighborhood problems lead to more vertical problem oriented neighborhood participation).
- If the amount of sport facilities per 1000 inhabitants increases by one unit, the amount of reports per 1000 inhabitants increases by 18.685. This indicates that more reports can be expected to be made when a neighborhood combination has larger amounts of sport facilities per 1000 inhabitants available.
- If the mean amount of trees in parks and plantations per square kilometer increases by one unit, the amount of reports per 1000 inhabitants increases by 10.820. This suggests that more reports are made by inhabitants when the neighborhood combination contains more trees in parks and plantations per square kilometer.
- If the amount of public familiarity in an area increases by one unit, the amount of reports per 1000 inhabitants decreases by 13.247. This indicates that less reports can be expected to be made when inhabitants in a neighborhood combination are more familiar with each other. This is not in accordance with the findings of Leidelmeijer.

In sum, the findings which are in accordance with earlier stated expectations concern population problems, functional motivation, and safety problems. On the contrary, the impact of public familiarity on the explanation of the amount of reports differ from the expectations. The geographic variables which make a significant contribution to the explanation of the dependent variable are mean amount of trees in parks and plantations per square kilometer and the amount of sport facilities per 1000 inhabitants. The amount of sport facilities is considered as independent variable as the presence of sport facilities in a neighborhood can lead to more extensive use of the neighborhood which might lead to more hassle being noticed and reported. The difference with functional motivation indicators is that in this case, the amount of physically present sport facilities are determined while functional indicators focus on the experience and perception of inhabitants with neighborhood facilities. In addition, the amount of trees in parks and plantations are taken into consideration because it is expected that greener areas are in need of more maintenance and are easier neglected than open and easy to maintain green.

The inclusion of geographic characteristics in the selection of independent variables which best explains the amount of reports made per 1000 inhabitants indicates that these variables need to be considered in the attempt to explain vertical problem oriented neighborhood participation and in particular when explaining the amount of reports which are made. As is addressed later, the use of the stepwise method results in a focus on the indication of the direction of the contribution as denoted by the B-value and less on the size of the coefficients. Both regression analyses can be consulted in appendix D.

# 6. New data sources: the MOR, subsidy registry, Twitter, and neighborhood gardens in more detail

Within the field of neighborhood participation studies, the data sources which are used in this research to measure the dependent variables are new. In earlier studies, the participation in the neighborhood is mainly determined by asking inhabitants how much they participate in their neighborhood and in what forms. In contrast to what inhabitants state, actual participation outcomes are measured through the sources used in this research. This method eliminates the possibility of inaccurate data due to socially desirable answers given by respondents. In addition to the sources which are used in the regression analyses, the fitness for the purpose of measuring the neighborhood participation of two additional data sources is explored. In this chapter, each of these datasets are discussed in detail.

## 6.1 Advantages of VGI characteristics of the MOR dataset

MOR is short for 'Melding Openbare Ruimte' which translates into 'report public space.' Inhabitants have several options to report situations in public space which need to be sorted (cleaned, fixed, or rearranged). They can fill out a form, make a call, but they can also use an application or online map to, accompanied by a description, locate the situation by clicking on a specific position on the map. When the latter two options are used, citizens produce Volunteered Geographic Information. The term 'Volunteered Geographic Information' (VGI) is introduced by Goodchild (2011:370) and is used to describe "the widespread engagement of large numbers of private citizens, often with little in the way of formal qualifications, in the creation of geographic information, a function that for centuries has been reserved to official agencies." In this particular case, citizens (voluntarily) add a point to the location at which a situation needs to be sorted. Then, they add attribute information to the point. This attribute information contains the description of the situation as well as personal information in case additional information is needed. The advantage of allowing inhabitants to map their reports themselves is that, compared to calling or filling out a form, it is easy to do and the reports are not tied to office hours. As a result, a continues stream of information is created. As every working day morning the dataset is updated, the information is very current. This up-to-date character makes the dataset an interesting source of information. Because reports made by phone and form are mapped by employees of the municipality, the dataset holds all the reports of hassle in public space within the city.

As reporting hassle is seen as a prominent way of performing vertical problem oriented neighbourhood participation, the dataset is a suitable data source to use to determine the amount of participation. research on this matter. The fact that the dataset is published in GeoJSON format, and that each solved report is mapped for an additional eight days makes the dataset easy to harvest. Once every eight days the GeoJSON file has to be downloaded and converted into a point shape file. Adding to this easy use is the fact that each report is documented with a unique code. This allows for the elimination of duplicated reports due to overlap of downloaded datasets.

## 6.2 The subsidy registry

For this research, access was granted to the subsidy registry of Amsterdam by the subsidy bureau. A table was sent which holds information on all (neighborhood) initiatives, located within the municipality of Amsterdam, which receive subsidy in the subsidy years 2015 and 2016. The information which is provided is the name of the (neighborhood) initiatives, the borough in which the project takes place, if the subsidy is a one-off payment or if it is periodic, in which subsidy year it is granted, and the amount which is granted. The project

name combined with the borough it belongs to are used to desktop search 1300 initiatives. If a webpage is found containing information about the project, it is judged on whether the project is aimed at neighborhood inhabitants or on the borough as a whole. Besides noting if the project is aimed at neighborhood inhabitants, the neighborhood combination it belongs to is noted, as well as (when known) the initiators of the project (e.g. neighborhood inhabitants, housing organizations, the municipality etc.). In addition, the information is used to determine which of the four forms of neighborhood participation is practiced (social participation, volunteer work, horizontal, or vertical problem oriented participation). If no information about the project is found, these columns are left blank. This indicates that the table holds 'no data' on the project. However, after thoroughly exploring the data source, it is considered to be insufficient as a representative of neighborhood participation. In this paragraph this decision is justified.

The main problem which appeared while analyzing the data source is that there is a noticeable difference in the preciseness of reporting between boroughs. Table 19 shows the sum of the amount of allocated budget of neighborhood participation projects which were successfully identified. It strikes that the amount of the 'Noord' borough is two and a half times as high as the runner-up and eighteen times as high as 'West'. This could be due to a noticeably more detailed way of registering the initiatives in Noord, mentioning each project separately in detail, while other boroughs group projects together, eliminating the possibility to identify the projects.

**Table 19** Sum of allocated budget received by the identified neighborhood initiatives

| **Borough** | **Amount of allocated budget** |
|---|---|
| Noord | € 2.220.706 |
| Oost | € 859.672 |
| Zuidoost | € 649.940 |
| Nieuw-West | € 559.800 |
| Zuid | € 417.996 |
| Centrum | € 226.777 |
| West | € 121.430 |
| Westpoort | € 0 |

Another possibility is that more money is reserved for neighborhood projects and more promotion is done in the problematic areas of Amsterdam. A lack of information results in the inability to make a clear separation between citizen initiatives and projects which are initiated by the municipality or caring organizations. It certainly strikes that the neighborhood combinations which score insufficiently on livability (figure 60) are located in the boroughs which are topping table 19.

The big differences between the boroughs are expected to produce unrepresentative regression outcomes which are not useful in the knowledge accumulation on neighborhood participation. Therefore the subsidy registry is excluded from further analysis.

## 6.3 The use of Twitter as data source

In the period of February 2013 to December 2015, a database was filled with harvested posts/tweets from twitter. A streaming API is used to collect tweets which are accompanied by a geolocation. Within this database, a list of hashtags and keywords are used to query tweets which are of interest to this study. The full list of keywords can be consulted in appendix C. When the accompanied coordinates are loaded into a geographic information system and projected upon the provinces of the Netherlands, figure 66 is formed. The points represent people using at least one of the query terms in their twitter post. The largest cluster of neighborhood participation tweets (left from the center) contains the tweets which are made in and around Amsterdam. When zooming in on Amsterdam (figure 67), it strikes that only a handful of tweets are made containing words which refer to neighborhood participation within the period of two years. This might be the result of the need of a GPS to determine the geolocation. As a result, figure 50 only displays tweets which are made by using a smartphone. It is assumable that a good deal of tweets about neighborhood participation are made by using a computer (and therefor are not represented in this database).

Another issue shows when the data is analyzed in more detail. The tweets are not necessarily made on the location where the participation takes place. One could tweet about an event from another location. Thus, in these cases, the neighborhood initiative is assigned to another neighborhood combination than where it truly takes place. An example is a tweet which is made from the Burgwallen-Nieuwe Zijde neighborhood combination in the city center about participation in the creation of a neighborhood campsite in a park in the Oosterparkbuurt neighborhood combination in the east of Amsterdam. More examples of tweets about neighborhood participation are given in table 20.

Given the small size of the dataset, together with a possible mismatch between tweet location and actual location, the data source is excluded from further analysis.

**Table 20** Example of tweets made about neighborhood participation in Amsterdam

| |
|---|
| What a great BBQ! From 23:00 onwards, the Amsterdam neighborhood barbecue in your living room. |
| The office has a view of a living painting accompanied by a cozy alternative neighborhood party |
| The first virtual piggy bank. Of course, in the Spaarndammerbuurt. Drive safely and save up for neighborhood projects, for the elderly and youth. |
| Free champagne at the Plankenpad in Swiftbant #beter (better) #klimaatstraatfeest (climate street party). |
| Nature works, neighborhood garden Afrikanerplein experienced hassle caused by snails, a hedgehog was spotted recently. #welcome #Duurzaamoost (sustainable east) |
| On my way to the Pinksterbloemschool. Combination neighborhood square/school yard will become a green neighborhood garden @Stadsdeel_Oost (borough east) #Duurzaamoost (sustainable east). |
| Just received planning for neighborhood garden Weesperzijde. A meeting place ‘eatable garden owned by an produced for the neighborhood’ that’s how it is!@Standsdeel_Oost (borough east) #Duurzaamoost (sustainable east). |
| Nice initiative by neighborhood inhabitants to restore an old building, re-use by giving it a social purpose |

**Figure 66** Geolocation of tweets concerning neighborhood participation

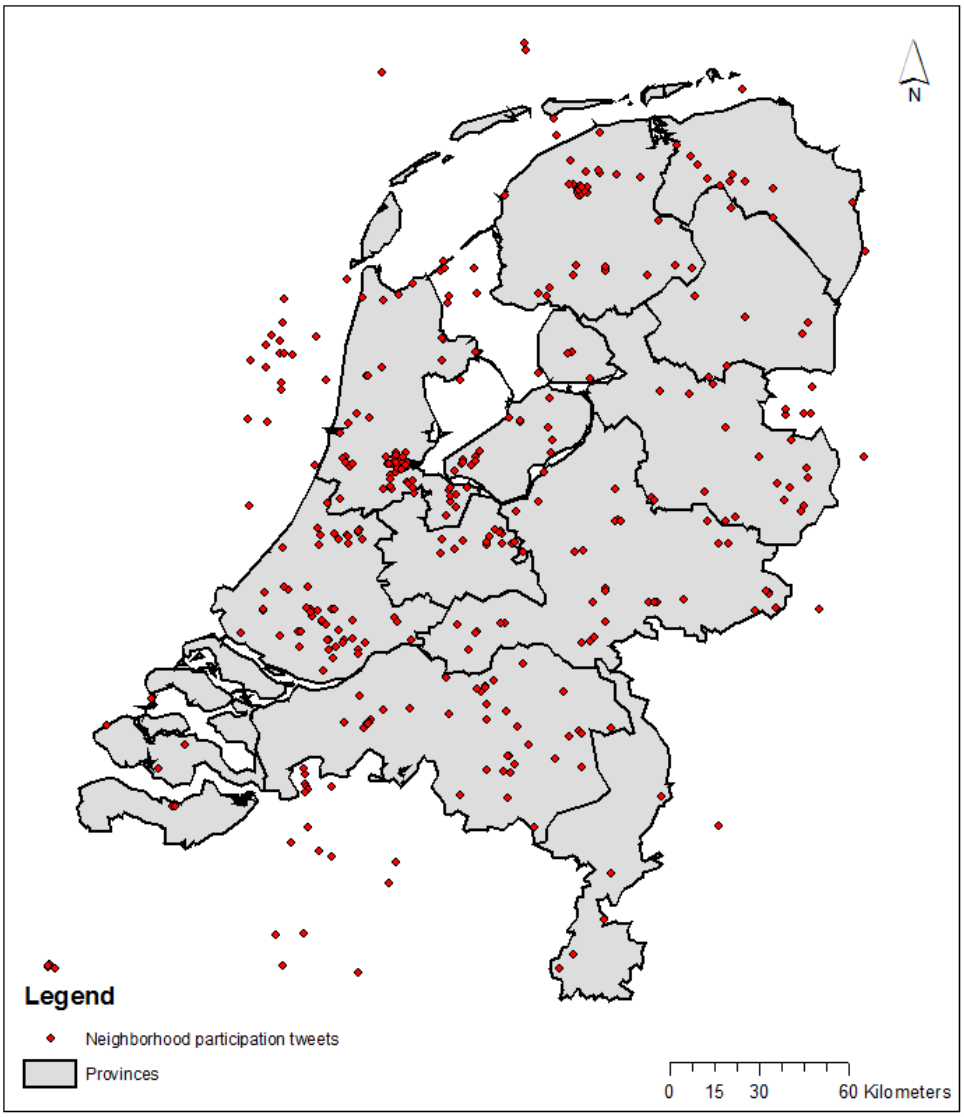
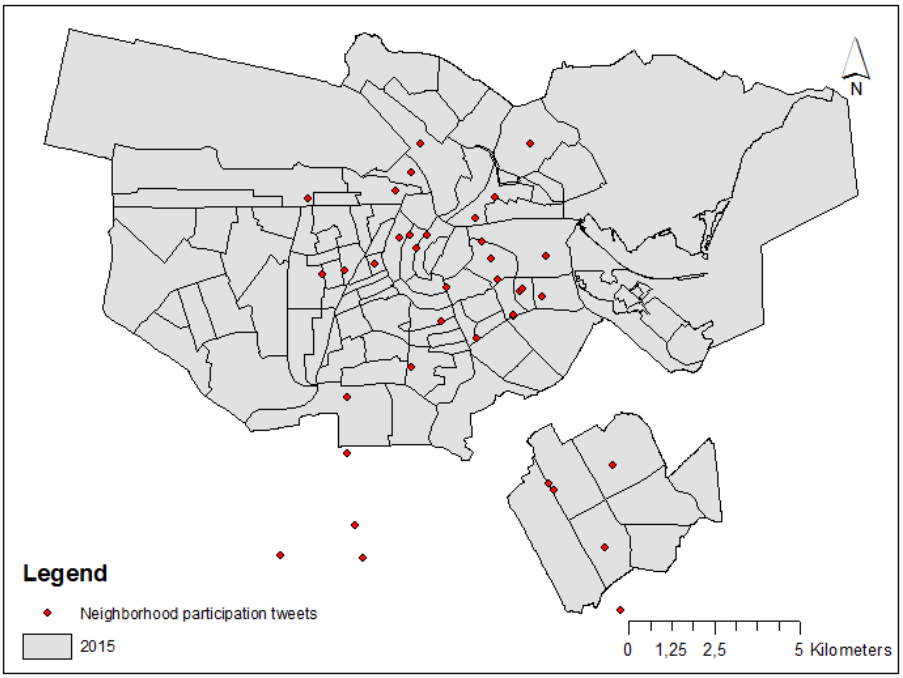



**Figure 67** Geolocation of tweets concerning neighborhood participation in Amsterdam

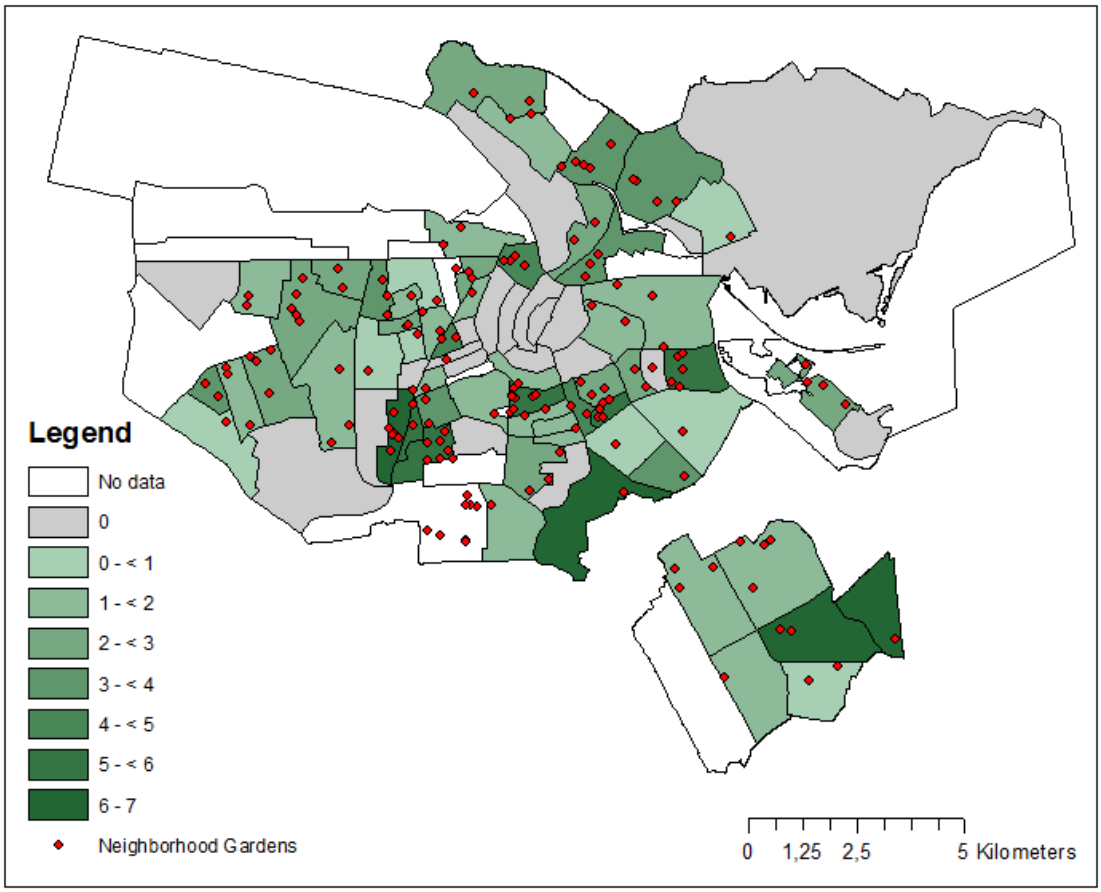


## 6.4 Neighborhood gardens and the modifiable areal unit problem

During the interpretation of the neighborhood garden regression model outcome (section 5.1.2), it is mentioned that one of the discrepancies of the findings in regard to Leidelmeijer's theory, might be explained by the difference between the unit of analysis (the neighborhood combinations) and the area which is involved in creating and maintaining a neighborhood garden. This difference is not limited to neighborhood gardens. Several sources which are used in this model are based on individuals who participated in questionnaires. It is common practice to guarantee confidentiality by aggregating the unique geographic location of the respondent (Longley et al. 2011). In the case of this analysis, the information gathered from individuals is aggregated to the neighborhood combination unit. This aggregation may lead to the modifiable areal unit problem, and in particular to the scale problem. The problem refers to the "variation in results that can often be obtained when data for one set of areal units are progressively aggregated into fewer and larger units for analysis" (Openshaw 1983:8). Thus, the results of the questionnaires may be different with an increasing unit of analysis (e.g. for the neighborhood, neighborhood combination, or borough).

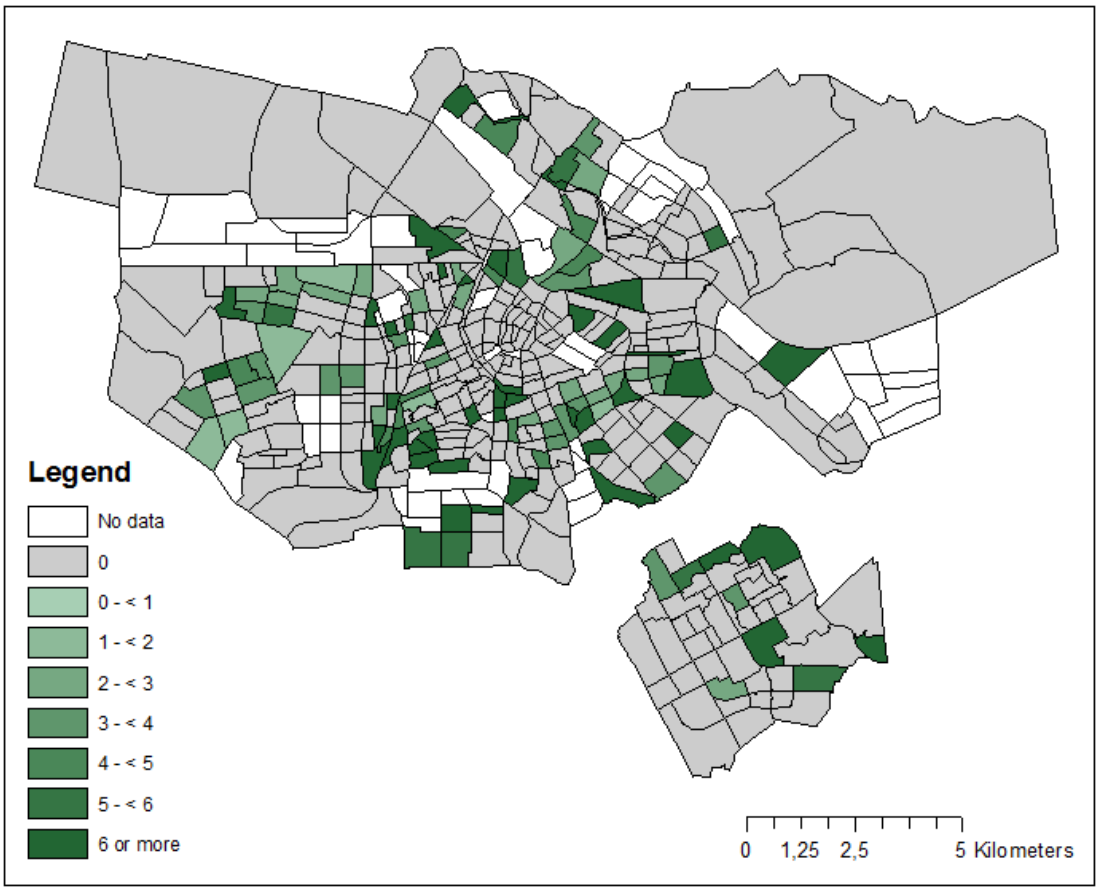
In addition, variation in results may be obtained when alternative aggregation units at equal or similar scale are used. In the case of Amsterdam, the neighborhood combinations are determined by the municipality. When these combinations are made up out of different sets of neighborhoods or the boundaries are changed, variation in the results may be encountered. This is called the aggregation problem (Openshaw 1983).

**Figure 68** Amount of neighborhood gardens per 10 000 inhabitants per neighborhood combination and the locations of the neighborhood gardens in Amsterdam



As the neighborhood gardens are collected as point data and then aggregated, the scale problem can be checked by not only aggregating the gardens to the neighborhood combination unit but also to the single neighborhood unit. Figure 68 displays the point data of the locations of the neighborhood gardens in Amsterdam together with the amount of neighborhood gardens per 10 000 inhabitants which is used in the regression analysis. The amount of points are counted for each neighborhood combination (aggregation), after which the amount is divided by the amount of inhabitants and then multiplied by 10 000. When the neighborhood gardens are aggregated to the smaller 'neighborhood' unit and processed in the same way, figure 69 is formed.

**Figure 69** Amount of neighborhood gardens per 10 000 inhabitants per neighborhood




When comparing both maps, two things strike. First of all, more areas are grey which denotes that no neighborhood gardens are present in these areas. Secondly, more areas rank highly (in the 5 or more range). The latter can be explained by the fact that the amount of gardens is divided by less people than when the neighborhood combinations are used. In this particular case, the influence of using a larger unit of analysis in some cases, is lowering the amount of neighborhood gardens per 10 000 inhabitants by including a larger area which also contains neighborhoods in which no neighborhood gardens are present. In other cases, areas are indicated to have neighborhood gardens, while in reality, no gardens are present. This is due to being included in a larger area which contains gardens.

This problem should be interpreted as a limitation of the level of aggregation of the majority of the sources used for this analysis. The most detailed scale was chosen at which all necessary data is available for the regression models.

# 7. Concluding remarks

## 7.1 The added value of understanding the influence of geographic components

In the first chapter of this thesis, the current situation in the Netherlands with regard to citizens taking initiatives and participating in their environment is explained by reviewing it from historic perspective. While the government tries to lessen her historically grown influence on citizen initiatives by limiting her involvement to a supporting role, Oude Vierlink and Van de Wijdeven (2011) state that in some cases citizen initiatives will not form unless the government is actively involved. They strikingly combine current discourse by interpreting neighborhood policies in the Netherlands as following: “the assumption seems to be that citizens not only specifically know what their neighbourhood needs, they are also capable of producing such initiatives as long as they are given enough space by the government. At the same time, the awareness grows that citizen initiatives do not spontaneously arise” (Oude Vierlink and Van de Wijdeven 2011:439). This suggests that the government is able to pursue her aim of lessening her influence in some areas, while in other areas she should stay involved. Not only is this challenging for her, but the several ways in which neighborhood initiatives can form, ranging from no help at all to support from the government or professionals, makes it particularly challenging to model neighborhood participation for researchers. The involvement of the government seems to reflect in the subsidy registry data source by reserving exceptionally larger amounts of money for neighborhood initiatives in more problematic areas.

Furthermore, another challenge appears when the regression analyses outcomes are analyzed. In the first regression analysis, indicators of the same variable seem to be differently associated with the dependent variable. In the explanation of the variance of the amount of neighborhood gardens per 10 000 inhabitants, two indicators of physical neighborhood problems make different contributions. While dirty streets and sidewalks are indicated to be associated with more neighborhood gardens per capita, poor maintained playgrounds are indicated to be associated with smaller amounts of neighborhood gardens per capita in a neighborhood combination. This underlines the need of delicacy when looking to stimulate neighborhood participation, as it is less straight forward than assuming that all indications of neighborhood problems can be expected to lead to an increase of vertical problem oriented neighborhood participation. Therefore it is important to be able to rely on extensive research of specific forms of neighborhood participation.

Knowledge on the contribution of geographic characteristics to the explanation of neighborhood participation is likely to hand urban planners a useful tool. For example, parks and plantations are relatively easy to create. Some geographic characteristics are harder to adjust, like the share of medium sized homes, but as it concerns objects, adjustments are often more straight forward than adjusting social characteristics of an area. Given the selection of geographic neighborhood characteristics in both sets of independent variables which best explain the variance in the dependent variables, the components appear to make valuable contributions. Therefore researchers are encouraged to include such variables in future research.

The regression models outcome show that most of the variables which are included are associated with similar effects as the stated expectations as derived from Leidelmeijer (2012). However , some of the findings appear to differ. First of all, it is indicated that public familiarity negatively impacts the specific case of vertical problem oriented neighborhood participation: the amount of reports per capita made on hassle. Furthermore, it appears that an increase in neighborhood problems caused by an experience of poorly maintained playgrounds in the neighborhood has a negative impact on the particular case of horizontal

problem oriented neighborhood participation: the amount of neighborhood gardens per capita. Lastly, the level of satisfaction given by the offer of public transport negatively influences the amount of neighborhood gardens per capita. Perhaps, the ease with which one is able to leave the neighborhood effects the level of participation. More research is needed to confirm this suggestion.

## 7.2 Answering the research questions

By first answering the sub-questions which were presented in chapter 3.1, the findings of this research are presented. Hereafter, the main question is answered.

The first set of sub-question answer the first part of the main question: *to what extent do characteristics of neighborhood inhabitants, the livability in the neighborhood, the situational characteristics (…) contribute to the explanation of the amount of neighborhood participation in the neighborhood combinations of Amsterdam?*

**What is the contribution of socioeconomic and demographic characteristics of inhabitants to the explanation of neighborhood participation?**
Except for ethnic background, all of the socioeconomic and demographic characteristics of neighborhood inhabitants are mathematically determined to be statistically redundant. The contribution of the variables to the explanation of the dependent variables are not unique (it can be explained by another variable) and thus, they are excluded from the models. Ethnic background is included as independent variable which contributes to the explanation of the amount of reports made on public hassle per 1000 inhabitants. The regression model outcome suggests that an increase of the share of non-western immigrants in a neighborhood combination is associated with a decrease in the amount of reports per capita.

**What is the contribution of social characteristics to the explanation of neighborhood participation?**
While the variance in public familiarity is excluded from the selection of independent variables which explain the amount of neighborhood gardens per 10 000 inhabitants, it does make a significant contribution to the prediction of the amount of reports made per 1000 inhabitants. The regression model outcome indicates that higher levels of public familiarity are associated with smaller amounts of neighborhood gardens. The remaining social characteristics (social capital and cohesion) are excluded from both regression analyses due to statistical redundancy.

**What is the contribution of beneficial participation to the explanation of neighborhood participation?**
In both regression analyses, the functional motivation of inhabitants appear to contribute to the explanation of the variance in the dependent variables. In case of the amount of neighborhood gardens per capita, an increase in the perceived offer of public transport appears to be associated with lower amounts of gardens. In case of the amount of reports made per capita, an increase in perception of the supply of playgrounds in the neighborhood indicates to be associated with a smaller amount of reports.

**What is the contribution of the amount of problems present to the neighborhood to the explanation of neighborhood participation?**
Furthermore, both regression analyses indicate that variations in specific forms of neighborhood problems significantly contribute to the explanation of the dependent variables.

In both cases, the increase of neighborhood problems which are associated with persons are perceived to contribute to the explanation of the variance in the dependent variables. An increase in the hassle caused by persons (person hassle index) appears to be associated with an increase in the amount of neighborhood gardens per capita. In addition, the increase in nuisance caused by bars and restaurants is associated with the increase in the amount of reports per capita in a neighborhood combination. Furthermore, variation in safety problems (safety index) in a neighborhood combination also significantly contributes in the explanation of the amount of reports made in a combination. Lastly, two indicators of physical neighborhood problems contribute to the explanation of the amount of neighborhood gardens per capita in a contrasting way. On the one hand, an increase of the cleanness of streets and sidewalks appear to be associated with lower amounts of gardens per capita, while an increase in the perceived maintenance state of playground facilities appear to be associated with a larger amount of gardens per capita in a neighborhood combination.

The second set of sub-question answer the second part of the main question: *to what extent do (…) geographic neighborhood characteristics contribute to the explanation of the amount of neighborhood participation in the neighborhood combinations of Amsterdam?*

**What is the contribution of the amount of trees in parks and plantations, the availability of sport facilities, and the residential characteristics in a neighborhood combination to the explanation of neighborhood participation?**
Three geographic characteristics in total are mathematically determined to significantly add to the explanation of the dependent variables (two to the amount of reports and one to the amount of neighborhood gardens). The regression analysis outcome indicates that an increase in the amount of trees in parks and plantations per square kilometer and an increase in the amount of sport facilities per 1000 inhabitants are associated with an increase in the amount of reports made per capita. In addition, an increase in the share of medium sized dwellings is suggested to lead to an increase in the amount of neighborhood gardens per capita.

Now the sub-questions are answered, the answer of the main question can be formulated. The main question is expressed as: To what extent do characteristics of neighborhood inhabitants, the livability in the neighborhood, the situational characteristics, and in particular the geographic neighborhood characteristics contribute to the explanation of the amount of neighborhood participation in the neighborhood combinations of Amsterdam?

Due to a limited amount of cases (neighborhood combinations), a stepwise regression method is used to determine which set of independent variables best explains the variance in the dependent variable. Independent variables which are deemed statistically redundant or which do not significantly contribute to the explanation are excluded from the model. In both regression analyses geographic characteristics are included (one in the explanation of the amount of neighborhood gardens and two in the explanation of the amount of reports). This indicates that geographic characteristics do contribute to the explanation of variance in the amount of neighborhood gardens per capita and in the amount of reports per capita. The share of medium sized dwellings in a neighborhood combination appear to contribute to the explanation of the amount of neighborhood gardens. A larger share of medium sized dwellings is associated with an increase in the amount of gardens. In addition, the amount of sport facilities per 1000 inhabitants and the amount of trees per square kilometer are indicated to contribute to the explanation of the amount of reports on hassle made per 1000 inhabitants.

Eight independent variables in total (which find their base in theoretical expectations determined from Leidelmeijer's (2012) research results) are indicated to contribute to the explanation of the dependent variables. The regression outcome suggests that part of the

variance in the amount of neighborhood gardens per 10 000 inhabitants is explained by population and physical neighborhood problems as well as by functional motivation of inhabitants. The increase of the experience of hassle caused by persons is associated with an increase in the amount of gardens per capita. Furthermore, an increase in the cleanness of streets and sidewalks is associated with less gardens per capita, while an increase in well maintained playgrounds as perceived by the neighborhood inhabitants is associated with an increase in the amount of neighborhood gardens per capita. In addition, an increase in the perception of the offer of public transport is associated with a decrease in the amount of neighborhood gardens per capita.

The regression outcome of the second model suggests that part of the variance in the amount of reports on hassle made per 1000 inhabitants is explained by ethnic background, public familiarity, functional motivation, and by population and safety neighborhood problems. An increase in the amount of non-western immigrants in a neighborhood combination is associated with a decrease in the amount of reports made per capita. Similarly, it is indicated that an increase in public familiarity is associated with a decrease in reports. Furthermore, an increase in the perceived supply of playground facilities is associated with a decrease in the amount of reports made per 1000 inhabitants. Lastly, it is indicated that the increase of nuisance caused by bars and restaurants as well as the decrease in safety in a neighborhood combination are associated with an increase in the amount of reports on hassle made per 1000 inhabitants.

## 7.3 Limitations

The stepwise method which is used to select the set of independent variables post important limitations on the research results. First of all, it is argued that the mathematical way in which the independent variables are selected takes away many important methodological decisions form the researcher (Field 2009). An important example is that the mathematically determined variables which best explain the dependent variable are picked over some of the independent variables which are found to be important by earlier research. It can be argued that knowing the contribution of these important variables is more insightful than explaining a large proportion of the variance. Dallal (2012) states that the method of choosing what looks to be a good variable has influence on the estimates which are associated with the explanation. Statistics like the standard error, P values, the R square, and t-statistics seem to be more suitable than would be found when the research were to be replicated. In addition, the P values are used to select to include and exclude variables from the analysis. Lastly, the method excludes observations (neighborhood combinations) from the analysis when data is missing on any of the entered independent variables, even when the observations do not have missing values in the independent variables which are selected for the final model (Dallal 2012). When this is the case, the model does not use the full potential of the available observations. As this research is a first attempt in including geographic characteristics in the explanation of neighborhood participation, the findings should be understood as a proposal of a method which hopefully will inspire other researchers and practitioners to consider geographic characteristics in their participation studies. Therefore, by focusing on contribution of these variables, less attention is given to concrete effects and coefficients of the model. The stepwise method is suitable for such exploratory research (Field 2009), but to give the findings more body, the model should be tested in other data sets (Dallal 2012).

Besides in the used regression method, several other limitations are encountered when designing a data-driven model and being dependent on external data sources. First of all, some of the data is produced in classes. This leaves little room for manipulation of the data. The classification which is meaningful for the producers is not necessarily meaningful for this

particular research. An example is the categorization of the level of education of neighborhood inhabitants by the OIS in ‘low’, ‘middle’, and ‘high’. Leidelmeijer (2012) found that people who have a primary school education (or lbo) play a role in explaining the form of neighborhood participation. The ‘lower’ category, however, also include inhabitants who graduated from VMBO which is a trajectory in secondary school (OIS 2016). Consequently, the theory cannot be fully replicated.

In addition, the interest of data producers is reflected in the topics which are covered. This occasionally leads to incomplete information on topics which could be interesting for the research. For example, the share of high-rises in a neighborhood combination might contribute to the explanation of the variance in the amount of neighborhood gardens. Although the TOP10NL dataset contains this information on high-rises, the data is not of enough importance to the producer to ensure accuracy and completeness.

Furthermore, data providers like the OIS often use a threshold of at least 50 respondents within a unit of analysis before publishing any statistics. The value of one neighborhood combination might be based on 50 respondents while the value of the next combination is based on 200 respondents. As a result, it is likely the latter value is more representative for the neighborhood combination than the former.

The limited insight in the construction of data is also experienced in the data sources used for the dependent variables. The MOR data source, which is used to determine the amount of reports made in a neighborhood combination, does not provide information on the person who makes the reports due to privacy regulations. As a result, it is unknown how many inhabitants participate in the reporting of hassle. Thus, research results are limited to explaining the amount of reports in an area while it is also desirable to be able to explain how many individuals contribute to these reports. Likewise, limited access plays a role in the explanation of the variance in the amount of neighborhood gardens. It is unknown how many inhabitants participate in the maintenance of gardens. Therefore, the explanation is limited to the amount of neighborhood gardens in a neighborhood combination.

Another limitation of using external sources is that it is not necessarily true that the respondents of for example the WiA research, are the same as the people who made reports on hassle in public space or the people who maintain neighborhood gardens.

Liability on external data sources also showed to be influential when limited access is granted. For privacy reasons access to the full MOR dataset (stretching over a longer period) was not granted and thus, data was collected on a weekly basis for twelve weeks. The effect of outliers in a dataset which covers a longer period is likely to be less influential.

Lastly, Amsterdam contains 97 neighborhood combinations of which several are excluded from the regression analysis due to missing data. The size of the amount of cases (neighborhood combinations) dictates the amount of variables which can be included in the final regression models as independent variables. This posts the need to exclude several independent variables form the analysis.

## 7.4 Recommendations

As argued in this thesis, testing the regression models on other datasets adds to the usefulness of the stepwise regression method which is used. This research should be seen as a first attempt in the exploration of the relevance of including geographic characteristics in the explanation of neighborhood participation. By finding that geographic characteristics of Amsterdam neighborhood combinations are mathematically selected as part of the set of independent variables which best explain the amount of variance in the dependent variables, other researchers and practitioners are hopefully inspired to consider geographic characteristics in their neighborhood participation studies.

Furthermore, this research contains two specific examples of horizontal and vertical problem oriented neighborhood participation in the case study area of Amsterdam. To better understand this phenomenon research in different study areas should be done. Additionally, the explored subsidy registry data source is expected to be a valuable and comprehensive source when full access can be granted. More information gives the researcher the ability to classify the projects on whether they are initiated by neighborhood inhabitants or by external organizations and the specific location of the initiatives.

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# Appendix A.

The neighborhood gardens in the city of Amsterdam
**Neighborhood combination, description, website**

**Stadsdeel Oost:**
Weesperzijde,
De buurttuin wordt beheerd door de werkgroep Wibauttuin, onderdeel van de Vereniging Vrienden van het Wibautplantsoen en is voorjaar 2013 tot stand gekomen in samenwerking met Stadsdeel Amsterdam Oost, Stadgenoot en vijfentwintig enthousiaste buurtbewoners.
http://www.wibauttuin.nl/

Weesperzijde,
Buurtbewoners beplanten en beheren gezamenlijk de tuineilandjes waaruit de tuin bestaat. Deze actieve bewoners zijn hiervoor aangesloten bij de Vereniging Weesperzijdetuin.
http://maps.amsterdam.nl/stadslandbouw/?LANG=nl

Oosterparkbuurt,
We willen het verwilderde stukje binnentuin omzetten tot een groene oase waar buurtbewoners leren omgaan met de mogelijkheden die de grond bied zonder gebruik te maken van onnatuurlijke hulpmiddelen.
http://www.groendichterbij.nl/tuingroepmus

Oosterparkbuurt,
Ze hebben het braakliggende terrein geclaimd voor de buurt.
http://www.oost-online.nl/index.php/natuur/groen-en-natuur/natuur-in-de-buurt/3746-moestuin-in-oost-keb-n-tuintje-in-me-hart

Oosterparkbuurt,
Moestuin Binnenpret is aangelegd voor en door directe omwonenden die toegang hebben tot de binnentuin.
https://sites.google.com/site/moestuinbinnenpret/

Transvaalbuurt,
Vereniging Buurttuinen Transvaal. Buren waren maanden lang bezig zijn om deze plannen uit te voeren en aan het oprichten van een vereniging.
https://buurttuinentransvaal.wordpress.com/about/

Transvaalbuurt,
De tuin is bedacht, ontworpen en gecreëerd door Transvaalbuurtbewoners, het is een levendige, interactieve tuin, gemaakt exclusief voor en geïnspireerd door kinderen.
http://www.groendichterbij.nl/tugelahuiskindertuin

Transvaalbuurt,
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/buurtmoestuinen-oost/

Transvaalbuurt,
De moestuinbakken op de hoek van de Kraaipanstraat en de De la Reystraat.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/buurtmoestuinen-oost/

Transvaalbuurt,
Mobiele moestuin.
http://groendichterbij.nl/motuintransvaal

Dapperbuurt,
De Valreep werkt samen met een enthousiaste groep buurtbewoners die een moestuin gaat aanleggen rondom het oude dierenasiel.
https://valreep.wordpress.com/2012/03/10/buurtmoestuin-op-de-valreep/

Dapperbuurt,
De Dappertuin is een kleine buurtmoestuin in de Pieter Nieuwlandstraat, Amsterdam.
https://www.facebook.com/dappertuin

Indische Buurt Oost,
Oost Indisch Groen wil de buurt nog duurzamer, leuker en gezonder te maken. En dan het liefst met zoveel mogelijk buurtbewoners. Ons credo is samen gewoon te beginnen en te doen.
http://oostindischgroen.nl/

Indische Buurt Oost,
Graag willen we de opening van dit park voor en door de buurt met u vieren!
https://postzegelpark.wordpress.com/

Indische Buurt Oost,
Graag willen we de opening van dit park voor en door de buurt met u vieren!
https://www.facebook.com/pages/Buurttuin-Valentijn/356971717693491?fref=ts

Indische Buurt Oost,
Graag willen we de opening van dit park voor en door de buurt met u vieren!
https://postzegelpark.wordpress.com/

Indische Buurt Oost,
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/buurtmoestuinen-oost/

Indische Buurt Oost,
http://groendichterbij.nl/voorbeeldprojectpostzegelparken

IJburg West,
Tijdelijke buurtmoestuin Op de schop door HotPot en De Gezonde Stad op kavel 1.
https://www.facebook.com/Kavel1opIJburg

IJburg West,
https://www.facebook.com/bloembootjes/info/?entry_point=page_nav_about_item

IJburg West,
Tijdelijke buurtmoestuin op kavel 32a.
https://www.facebook.com/moes32

IJburg West,
Tijdens de financiële crisis bleven veel bouwkavels op IJburg langere tijd onbebouwd, waardoor bewoners initiatieven met moestuintjes en speelplekken startten om de buurt groener, levendiger en gezelliger te maken.
http://debrugkrant.nl/moestuintjes-steigereiland-noord/

Middenmeer,
http://sportparkenamsterdamoost.nl/fruit4sport

Oostelijk Havengebied,

een verdere versterking van de sociale cohesie en participatie van de bewoners door de productie, montage, beheer en onderhoud van de verticale tuinen geheel in eigen beheer uit te voeren.
http://groendichterbij.nl/groenegevelsvanwladiwostok

Oostelijk Havengebied,
nieuwe buurttuin als ontmoetingsplek voor bewoners uit de buurt.
http://www.dichtbij.nl/amsterdam-oost/regionaal-nieuws/artikel/2268242/buurttuin-op-kop-java.aspx

Oostelijk Havengebied,
De Cruquiustuin op De Strook.
http://maps.amsterdam.nl/stadslandbouw/?LANG=nl

Frankendael,
Met ca. 60 bewoners zijn we begonnen na te denken over de vergroening van de buurt en ieders wensen.
http://groendichterbij.nl/julianagroen

De Omval,
De Bajestuin is een moestuin voor en door de buurt – steeds in aanbouw.
http://bajesdorp.nl/activiteiten/bajestuin/

Betondorp,
http://fetedelanature.nl/ik-vier-mee/2016/natuurbeleving/864-opening-buurttuin-zuiveltuin

**Stadsdeel Zuidoost:**
Gein,
Moesuin  Lambertus Rimastraat.
http://maps.amsterdam.nl/stadslandbouw/?LANG=nl

Nellenstein,
Bewoners kunnen tegen een zeer geringe bijdrage gebruik maken van een stukje grond om bloemen te kweken, groenten te verbouwen en te genieten van de oogst daarvan.
http://www.bvnellestein.nl/joomla/index.php?option=com_content&view=section&layout=blog&id=10&Itemid=55&lang=nl

Holendrecht/Reigersbos,
Voor wie? Bewoners van Holendrecht en de rest van Zuidoost, uit verschillende gemeenschappen, van oud tot (piep)jong, voor werkers in het Kantorenpark, voor studenten.
http://ubuntustadstuin.nl/

Holendrecht/Reigersbos,
in beheer van de bewonersvereniging, teruglopend animo.
https://www.publicspaceinfo.nl/media/uploads/files/AMSTERDAM_2012_0010.pdf

Bijlmer-Oost (E, G, K),
http://maps.amsterdam.nl/stadslandbouw/?LANG=nl

Bijlmer-Oost (E, G, K),
nutstuinen in beheer van de bewonersvereniging in gebruik voor de bewoners om hun eigen groente/bloem en te kweken.
https://www.publicspaceinfo.nl/media/uploads/files/AMSTERDAM_2012_0010.pdf

Bijlmer-Oost (E, G, K),

De moestuin is tot stand gekomen door de samenwerking tussen bewoners, de Bewonersvereniging Evergreen, DE Brede school, de buurtregisseur, woningstichting Rochdale, Projectbureau Vernieuwing Bijlmermeer en het stadsdeel Zuidoost.
http://moestuinevergreen.nl/

Bijlmer-Centrum (D, F, H),
Moestuin Groene Vingers is bezig met een bewonersinitiatief voor de focuswijken FD-buurt.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/moestuin-groene/

Bijlmer-Centrum (D, F, H),
nutstuinen in beheer van de bewonersvereniging.
https://www.publicspaceinfo.nl/media/uploads/files/AMSTERDAM_2012_0010.pdf

Bijlmer-Centrum (D, F, H),
De buurtmoestuin heet niet voor niets buurtmoestuin. Het wordt de plek waar iedereen, ongeacht leeftijd of achtergrond, welkom is om te genieten van het weer en mee te doen aan een activiteit.
http://www.dichtbij.nl/amsterdam-oost/regio/artikel/3161425/buurtmoestuin-zorgt-voor-contact-.aspx

Driemond,
Idee is dat buurtbewoners sámen actief zijn in de speeltuin. Er is veel te doen: de tuin en toestellen onderhouden,
http://groendichterbij.nl/samsamtuin

**Stadsdeel Centrum:**
Oostelijke Eilanden/Kadijken,
We verhuren de bakken aan buurtbewoners voor een jaar.
http://www.stadsboeren.org/stadsboeren-naar-oost/

Oostelijke Eilanden/Kadijken,
Tijdelijke buurttuin.
http://www.buurtorganisatie1018.nl/nieuws-uit-1018/2014/11/6/initiatief-buurtmoestuin-kop-dijksgracht

Haarlemmerbuurt,
De tuin wordt al sinds eind jaren negentig beheerd door bewoners.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/mede-zelfbeheer/zelfbeheertuin/voorbeelden/bickeltuin/

Haarlemmerbuurt,
Communal roof garden in the *'t Seepaert* living group on Prinseneiland.
http://cityplot.org/t-seepaert-roof-garden/

Haarlemmerbuurt,
De tuin wordt maandelijks onderhouden door een aantal vrijwilligers van de buurtvereniging.
http://www.groendichterbij.nl/voccour

Haarlemmerbuurt,
Zelfbeheerproject.
http://www.jordaangoudenreael.nl/cms/images/jordaangoudenreael/2014/1._Rosarium.pdf

De Weteringschans,
De kruidenpluktuin in de 1e Weteringplantsoen te Amsterdam is een zelfbeheer project opgezet in 2014 door en voor bewoners van de Weteringbuurt in het stadsdeel Amsterdam Centrum.
http://www.groenendoen.nu/projecten/327

**Stadsdeel Zuid:**
Buitenveldert-Oost,
De tuin rondom het appartementencomplex wordt onderhouden door bewoners.
http://nmtzuid.nl/kaart/

Station-Zuid WTC en omgeving,
Bewoners willen samen een deel van het plantsoen opnieuw inplanten en onderhouden.
http://nmtzuid.nl/kaart/

Diamantbuurt/Ijselbuurt,
Prachtige bakken van Stadshout gevuld met wilde bloemen en onderhouden door een bewonersgroep.
http://nmtzuid.nl/kaart/

Hoofddorppleinbuurt,
https://issuu.com/movement1537/docs/special_schoon_zuid_internet

Hoofddorppleinbuurt,
Een groepje bewoners heeft het initiatief genomen om een buurtmoestuin op te zetten in de omgeving van de Generaal Vetterstraat. Het plan is nog in ontwikkeling.
http://nmtzuid.nl/kaart/

Hoofddorppleinbuurt,
http://nmtzuid.nl/kaart/

Scheldebuurt,
Samen met de kinderen en buren de zaden in de grond stoppen en enkele weken later heerlijke verse groente en fruit op het bord, uit eigen tuin.
http://www.buurtmoestuin.nl/index.php?option=com_content&view=article&id=30&Itemid=33

Scheldebuurt,
ZuiderKruid (voorheen Gershwintuin en daarvoor als Groene Fred) is een buurtmoestuin op de Zuidas.
http://nmtzuid.nl/kaart/

Scheldebuurt,
20 moestuinbakken, die aangelegd en onderhouden worden door een bewonersgroep.
http://nmtzuid.nl/kaart/

Museumkwartier,
http://nmtzuid.nl/kaart/

Museumkwartier,
Beheer en onderhoud van groenperk voor Huis van de Wijk Coenen-Lydia door bewoners.
http://nmtzuid.nl/kaart/

Willemspark,
Beheer en onderhoud van Koeienweide en het daarop gelegen natuureducatieve Jan Haakpad door bewoners.
http://nmtzuid.nl/kaart/

Willemspark,
Bewoners beheren de binnentuin van het voormalige schoolgebouw, nu atelierruimte.
http://nmtzuid.nl/kaart/

Stadionbuurt,

Beheer en onderhoud van openbaar groen door bewoners.
http://nmtzuid.nl/kaart/

Stadionbuurt,
Beheer en onderhoud van kruidentuin door bewoners. Ook voor en door kinderen.
http://nmtzuid.nl/kaart/

Stadionbuurt,
Beheer en onderhoud van moestuin door clienten en bezoekers van Odensehuis en buurtbewoners.
http://nmtzuid.nl/kaart/

Stadionbuurt,
De Groene Fred is een groep bewoners uit Amsterdam Zuid, die met groen als middel de sociale samenhang willen vergroten.
https://degroenefred.wordpress.com/

Stadionbuurt,
Kinderen uit de buurt hebben een tuintje aangelegd. Er is momenteel plek voor nieuwe kinderen uit de Sportstraat, of directe omgeving. Beheer en onderhoud door kinderen en bewoners.
http://nmtzuid.nl/kaart/

Stadionbuurt,
Beheer en onderhoud van lange groenstrook door bewoners.
http://nmtzuid.nl/kaart/

Nieuwe Pijp,
Grote grijze bakken op stoep zijn opgeknapt en worden nu onderhouden door een groep bewoners uit de straat. Gezellig dat het daardoor geworden is!
http://nmtzuid.nl/kaart/

Nieuwe Pijp,
Bewonersinitiatief om de straat op te knappen en vergroenen, o.a. via het aanleggen van de eerste 6 buurtboomtuinen van De Pijp.
http://nmtzuid.nl/kaart/

Hoofddorppleinbuurt,
Een groepje bewoners heeft het initiatief genomen om het speeltuintje in de Woestduinstraat een fraaier aangezicht te geven. Het plan is nog in ontwikkeling.
http://nmtzuid.nl/kaart/

Hoofddorppleinbuurt,
De binnentuin aan de Sloterkade is opgezet en wordt onderhouden door een tweetal buurtbewoonsters. Het gaat hier om een klein medebeheerproject dat door NMTzuid ondersteund wordt met klein gereedschap en donatie van planten die over zijn na de jaarlijkse Natuur&Milieumarkt.
http://nmtzuid.nl/kaart/

Hoofddorppleinbuurt,
Buurttuin aan de Westlandgracht.
http://nmtzuid.nl/kaart/

Hoofddorppleinbuurt,
Bewoners van de Rijnsburgstraat hadden al jaren het idee dat er meer mogelijk was met het enigszins verwaarloosde plantsoentje voor hun deur.
http://www.buurtmoestuin.nl/index.php?option=com_content&view=article&id=38&Itemid=42

Buitenveldert-West,
Herinrichting van de speeltuin die fungeert als gemeenschappelijke tuin en ontmoetingsplek voor de buren in het hofje.
http://nmtzuid.nl/kaart/

Buitenveldert-West,
Bewoners van de VVE Rupelmonde willen gezamenlijk hun binnenhof aanpakken om er een groene ontmoetingsplaats van te maken.
http://nmtzuid.nl/kaart/

Buitenveldert-West,
De Groene Fred is een groep bewoners uit Amsterdam Zuid, die met groen als middel de sociale samenhang willen vergroten.
https://degroenefred.wordpress.com/

Buitenveldert-West,
VVE en bewoners zijn samen de straat steeds groener aan het maken met geveltuinen.
http://nmtzuid.nl/kaart/

Buitenveldert-West,
Twee buurtmoestuinen in medebeheer bij een groep bewoners.
http://nmtzuid.nl/kaart/

Buitenveldert-West,
Gemeenschappelijke buurttuin aanleggen en een grote geveltuin op de kop van de flat.
http://nmtzuid.nl/kaart/

Buitenveldert-West,
Buurtmoestuin met fruitbomen, moestuinbakken en bessenstruiken.
http://nmtzuid.nl/kaart/

Buitenveldert-West,
Initiatief om een gezamenlijke buurtmoestuin te starten in de binnentuin.
http://nmtzuid.nl/kaart/

Schinkelbuurt,
waarvan aanleg en onderhoud door cliënten van Heliomare en buurtgenoten gezamenlijk gedaan wordt.
http://nmtzuid.nl/kaart/

Schinkelbuurt,
Beheer en onderhoud van buurttuin door bewoners.
http://nmtzuid.nl/kaart/

Oude Pijp,
Door de inzet van deze werkgroep is het mogelijk geworden om de grond rondom een straatboom te adopteren en er een boomtuin van te maken.
http://www.buurtboomtuin.nl/

Oude Pijp,
Dankzij de jarenlange inspanningen van deze betrokken wijkbewoners, met ondersteuning van Natuur&Milieuteam Zuid, is De Pijp door deze drijvende tuinen een stuk groener geworden.
http://nmtzuid.nl/project/watertuinen/

Oude Pijp,

Een bewonersvereniging beheert een binnenterrein met 22 tuintjes, midden in De Pijp.
http://nmtzuid.nl/kaart/

Oude Pijp,
Plantsoentje ontworpen en onderhouden door bewoners.
http://nmtzuid.nl/kaart/

Oude Pijp,
Gezamenlijke binnentuin onderhouden en vogelvriendelijker maken.
http://wijkcentrumceintuur.nl/fileadmin/documenten/geveltuinen/NMTkrantZuid2013.pdf

Oude Pijp,
Tetje Falentijn richtte met haar buren in de Quellijnstraat, (in het stuk tussen de Frans Halsstraat en Ruysdaelkade), een buurtinitiatief op om de straat groener te maken en de cohesie in het straatje te verbeteren.
http://wijkcentrumceintuur.nl/fileadmin/documenten/geveltuinen/NMTkrantZuid2013.pdf

Oude Pijp,
Bewoners onderhouden een aantal buurtboomtuinen in de Frans Halsstraat.
http://nmtzuid.nl/kaart/

Oude Pijp,
Bewonersinitiatief om de straat op te knappen en vergroenen samen met alle buren.
http://nmtzuid.nl/kaart/

**Stadsdeel West:**
Kinkerbuurt,
Er worden workshops tuinieren gehouden voor buurtbewoners en zullen er verschillende festivals worden georganiseerd met een creatieve invalshoek.
http://www.stadsboeren.org/over-ons/

Kinkerbuurt,
Buurtbewoners rond stadsboerderij Zimmerhoeve hebben de gereedschappen ter hand genomen om de moestuintjes, borders en bijentuin op het terrein zoveel mogelijk te vergroenen.
http://groendichterbij.nl/permacultuuropstadsboerderijzimmerhoeve

Kinkerbuurt,
https://www.facebook.com/events/1235876736436011/

Van Galenbuurt,
Tuin van Jan onderhouden door bewoners.
http://maps.amsterdam.nl/stadslandbouw/?LANG=nl

Van Galenbuurt,
Gonzende eetbare tuin te maken met - en voor de buurt.
http://libarynth.org/jeruzalemgarden

De Krommert,
Bewoners rondom Pieter van der Doesstraat.
http://maps.amsterdam.nl/stadslandbouw/?LANG=nl

De Krommert,
In 1991 namen buurtbewoners zelf het initiatief om het braakliggende stuk rond een nieuwe bestemming te geven. Na uitgebreid overleg tussen alle betrokkenen werd besloten er een natuurtuin

van te maken met een sociale en educatieve functie. Het stadsdeel stemde in met de plannen en verleende een jaarlijks tegemoetkoming in het beheer van de tuin.
http://natuurtuinslatuinen.wix.com/slatuinen2#!historie/c228a

De Kolenkit,
Buurtbewoners verbouwden er hun groenten in de kas en op kleine lapjes grond. Inmiddels wordt het gebouw omgebouwd tot een Brede School.
http://maps.amsterdam.nl/stadslandbouw/?LANG=nl

De Kolenkit,
Stadstuin voor en door de buurt.
http://www.stadstuinbosenlommer.nl/stadstuin/

De Kolenkit,
idee om buurtmoestuinen aan te gaan leggen in binnentuinen in de Kolenkit.
http://www.cascoland.com/2009/index2_dt.php?id=1799&cat=50&artist=Fiona+de+Bell%2CBas+Feenstra%2CJair+Straschnow%2CWouter+Nieuwendijk%2CRoel+Schoenmakers&casco_cat=projects

Landlust,
In een stadsmoestuin van 1200 vierkante meter werkt kunstenaar Natascha Hagenbeek met bewoners uit de Landlustbuurt aan een voedsel-afval kringloop.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/change-the-world/

Erasmuspark,
Buurtmoestuin voor kinderen in de Erasmusbuurt (Bos en Lommer) in Amsterdam West en hieraan gekoppeld workshops Natuurbeleving (vanuit wijkinitiatief 2013).
https://www.facebook.com/moeskimus

Staatsliedenbuurt,
Op Soeptuin Bredius kweken Amsterdammers met groene vingers groenten en kruiden voor en met omwonenden van het Westerpark.
http://www.soeptuinen.nl/

Staatsliedenbuurt,
Omdat het nu een kil en leeg aanzicht geeft hebben een aantal omwonende een verschillende plannen aangereikt.
http://groendichterbij.nl/watertuinenwittenkade

Staatsliedenbuurt,
We hebben al een bijvriendelijke/eetbare binnentuin gerealiseerd met buurtkinderen en bewoners.
http://groendichterbij.nl/beecareamsterdam

Centrale Markt,
We hebben een hele actieve groep bewoners, vanaf het begin zorgen die voor de 70 fruitbomen en de 80 nutsttuintjes. Ook hebben een paar woonblokken een deel van hun omliggende maaiveld in eigen beheer genomen middels een convenant met het Stadsdeel.
http://groendichterbij.nl/eco20vergroeninggwlterreinamsterdam

Spaarndammer- en Zeeheldenbuurt,
Op Soeptuin Bredius kweken Amsterdammers met groene vingers groenten en kruiden voor en met omwonenden van het Westerpark.
http://www.soeptuinen.nl/

Spaarndammer- en Zeeheldenbuurt,

https://www.facebook.com/AbcWesterpark/posts/390026251089013

Hoofdweg en omgeving,
Dennis van Beek, een actieve buurtvrijwilliger heeft het initiatief genomen voor deze transformatie met de aanleg van de Baarsjes Buurtmoestuin.
http://groendichterbij.nl/baarsjesbuurtmoestuin

Frederik Hendrikbuurt,
Samen met de buren van de bovenste woonlaag gaan we zorgen voor onze eigen eieren.
http://groendichterbij.nl/wesharechicken

Overtoomse Sluis,
De Frederikstuin is een initiatief van buurtbewoners om gezamenlijk een binnentuin te realiseren tussen de Frederiksstraat, de Zocherstraat en de Overtoom.
http://www.overfred-enzo.nl/frederikstuin/

**Stadsdeel Nieuw-West:**
Slotervaart,
ACTA Tuin is aangelegd door bewoners en huurders vh ACTA gebouw, in samenwerking met buurtbewoners. Hier wordt gewerkt aan een voedselbos: eetbare natuur.
https://www.facebook.com/ActaTuin?ref=ts&fref=ts

Slotervaart,
Bewoners willen binnentuinen en openbare ruimte gebruiken voor moestuinprojecten. Stadsdeel en corporaties geven ruimte en ondersteuning.
https://www.amsterdam.nl/.../o88_gebiedsplan_slotervaart_sloterplas_en_park.pdf

Slotervaart,
In december 2011 werd het buurtinitiatief van Clea Conijnenberg aangenomen, voor een tijdelijke buurt(moes)tuin in de Jacob Geelbuurt voor 2 jaar.
http://groeneruimtemaken.nl/index.php/tuinen/buurtmoestuin-jan-theuniszhof/

Overtoomseveld,
Nieuwe en oude bewoners kunnen elkaar alvast leren kennen .
https://www.amsterdam.nl/publish/pages/354785/kaart_buurtmoestuinen.pdf

Slotermeer-Noordoost,
Bewoners beheren en onderhouden tuin.
http://groeneruimtemaken.nl/index.php/tuinen/buurtmoestuin-the-rose-speelmanstraat/

Slotermeer-Noordoost,
Bewoners aan het roer.
https://www.nieuwwestexpress.nl/nl/page/3614/hanno-klein-tuin

Slotermeer-Zuidwest,
De Buurtboomgaard is een initiatief van bewoners die graag een mooie, groene ontmoetingsplek willen.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/moestuinen-nieuw/

Slotermeer-Zuidwest,
Bewoners van Buurt 5 kunnen voor een symbolisch bedrageen tuintje huren.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/moestuinen-nieuw/

Slotermeer-Zuidwest,
Samen met bewoners is vervolgens een moestuin aangelegd.
http://www.buitenruimtevoorcontact.nl/projecten/moestuin-in-wijsgerenbuurt-amsterdam/

Slotermeer-Zuidwest,
Bewoners gaan de plantenbakken vullen en onderhouden.
https://www.amsterdam.nl/publish/pages/354785/buurtmoestuinen_kansen_voor_sociale_cohesie_en_leefbaarheid_in_amsterdam_nieuw-west.pdf

Slotermeer-Zuidwest,
Bewoners hebben gekozen voor deze tijdelijke invulling van het terrein dat door vertraging van de nieuwbouw tijdelijk braakligt.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/moestuinen-nieuw/

Geuzenveld,
OntKIEM West combineert tuinieren, koken en kunst en kweekt samen met bewoners ontmoetingen.
http://ontkiemwest.nl/?page_id=39

Geuzenveld,
Het beheer werd aan de bewoners/tuiniers toevertrouwd.
https://www.amsterdam.nl/publish/pages/354785/buurtmoestuinen_kansen_voor_sociale_cohesie_en_leefbaarheid_in_amsterdam_nieuw-west.pdf

Osdorp-Oost,
Vrouwen met verschillende culturele achtergronden uit de buurt onderhouden de tuin en leren tuinieren volgens het principe van permacultuur.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/moestuinen-nieuw/

Osdorp-Oost,
Twintig bewoners hebben een tuintje. Twee tuintjes zijn voor de kinderen uit de buurt, ze krijgen hier les van een tuinman en verbouwen groenten.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/moestuinen-nieuw/

Osdorp-Oost,
ISM the Beach, Amsterdams Steunpunt Wonen, de Lucas Community en vele buurtbewoners, begon URBANIAHOEVE in lente 2013 met de aanleg van *Foodscape Wildeman*, een eetbaar landschap gesitueerd tussen twee verschillende groengebieden.
http://www.urbaniahoeve.nl/project-locaties/

Osdorp-Oost,
Moestuin Sonderbuur.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/moestuinen-nieuw/

Osdorp-Midden,
Leefbaarheidsinitiatief van bewoners uit de buurt.
http://www.nieuwreimerswaal.nl/nieuws-voor-bewoners/moestuinen-in-de-buurt

Osdorp-Midden,
Na het succes van de eerste moestuin in de buurt heeft een tweede bewoner uit de Reimerswaalbuurt het initiatief ingediend voor een volgende moestuin.
http://www.nieuwreimerswaal.nl/nieuws-voor-bewoners/moestuinen-in-de-buurt

Osdorp-Midden,
In samenwerking met leerlingen van de agrarische school in onze buurt hebben wij, met behulp van een klein bedrag van E 1000,- uit een potje voor wijkiniatief, deze grote oppervlakte nu voorzien van mooie vaste planten, die door ons worden onderhouden.
http://groendichterbij.nl/spiegeltuintjes
De Punt,
Bij bewoners is belangstelling voor de tuin gepeild d.m.v. huis aan huis brieven. Deze bleek er te zijn.
https://www.amsterdam.nl/toerisme-vrije-tijd/groen-amsterdam/stadslandbouw/initiatieven/moestuinen-nieuw/

De Punt,
Buurtmoestuin.
https://www.facebook.com/Buurtmoestuin-Dijkgraafplein-143261055843422/

Middelveldsche Akerpolder en Sloten,
https://www.westersite.nl/zoeken/?term=buurtmoestuin&x=0&y=0

**Stadsdeel Noord:**
Ijplein/Vogelbuurt,
Voedseltuin IJplein is een gezamenlijke moestuin voor en door buurtbewoners.
http://voedseltuinijplein.nl/

Ijplein/Vogelbuurt,
We zoeken samenwerking met bewoners en tal van organisaties om het leefklimaat in de buurt te optimaliseren en ondersteunen initiatieven daartoe.
http://www.stichting-spin.nl/algemeneinformatie#mijnanker

Ijplein/Vogelbuurt,
Ook in de Vogelbuurt hadden bewoners een dergelijk groen idee voor de buurt.
https://www.rochdale.nl/uploads/tx_dddownload/ROCHDALE_jvrslg2009_def_lv__online.pdf

Volenwijck,
Samen met buurtbewoners, ouders en speeltuinleiders kweken en verzorgen kinderen plantjes, veelal in een vierkantemeterbak.
http://docplayer.nl/14435128-Management-rapportage-jaar-2014.html

Volenwijck,
In samenwerking met buurtbewoners, lokale organisaties en kunstenaars/designers van de IJsbrand, legt URBANIAHOEVE sinds 2011 een demonstratietuin aan: een eetbaar landschap bestaand uit een pluk- en theetuin, fruitheggen, een gemeenschappelijke en collectief beheerde buurtmoestuin, een permacultuur food forest en een ecologische kwekerij.
http://www.urbaniahoeve.nl/project-locaties/

Buikslotermeer,
Bakken voor bewoners.
http://breednieuws.nl/Breednieuws_files/2014%20Breednieuws%20nr%204_20%20pag_web.pdf

Buikslotermeer,
Buurtgenoten, door gezamenlijk te tuinieren, elkaar beter leren kennen op een informele manier en zich daardoor meer met elkaar en de buurt verbonden gaan voelen.
https://worteleninjebuurt.wordpress.com/about/

Buikslotermeer,

Het gaat om initiatieven voor buurtmoestuinen en stadslandbouw waar de betrokkenheid van burgers centraal staat: zelf doen, samen leren.
https://eetbaaramsterdam.wordpress.com/agenda/

Buikslotermeer,
Samen met buren en hun families, (ROC) studenten, WOOFers en iedere groen geïnteresseerde verbouwen we een experimentele mix van groente, fruit, kruiden, eetbare onkruiden, medicinale en onthaastende voeding.
http://proeftuindeluwte.nl/?page_id=257

Banne Buiksloot,
Koopvaarders Buurt Moestuin.
https://www.facebook.com/profile.php?id=100008277256804&sk=about

Banne Buiksloot,
Buurttuin.
http://maps.amsterdam.nl/stadslandbouw/?LANG=nl

Banne Buiksloot,
Wij willen graag in ons eigen kanaal drijvende riettuinen maken. Daarom is een groep van 10 enthousiaste kanaalbewoners dit initiatief gestart.
http://www.groendichterbij.nl/drijvendetuinenzijkanaali

Banne Buiksloot,
In de Banne is een aantal buurtbewoners begonnen, met medeweten van het stadsdeel, om buurtmoestuinen in te richten.
http://www.buurtmoestuin.nl/index.php?option=com_content&view=article&id=33&Itemid=36

Banne Buiksloot,
Bewoners samen met kunstenaar.
http://www.rodi.nl/widgets/1697-amsterdam-noord/nieuws/916448-creatieve-boost-voor-de-bannedrie-kunstprojecten-van-de-kleurenstraat-bij-box-71

Tuindorp Oostzaan,
De Puur Natuur Tuin is ontstaan vanuit het project ‘Op de Schop’: een initiatief van De Gezonde Stad om braakliggende terreinen om te vormen tot tijdelijke speel-, leer- en ontmoetingsplekken voor de buurt. Vooral door bewoners.
http://www.puurnatuurtuin.nl/ontwikkelingen-in-de-puur-natuur-tuin/

Tuindorp Oostzaan,
Aan begin van dit jaar is het grasveld naast Huis van de Wijk de Evenaar door de buurt geadopteerd.
https://www.huisvandewijknoord.nl/nieuws/wie-helpt-er-mee-met-de-buurttuin/

Oostzanerwerf,
We zoeken samenwerking met bewoners en tal van organisaties om het leefklimaat in de buurt te optimaliseren en ondersteunen initiatieven daartoe.
http://www.stichting-spin.nl/algemeneinformatie#mijnanker

Oostzanerwerf,
In samenwerking met ondernemers, vrijwilligers, buurtbewoners en overige enthousiaste mensen die mee willen doen.
http://www.noordoogst.org/

Nieuwendam-Noord,

De Tuin is een buurtmoestuin waar achtien gezinnen een eigen tuintje hebben waar ze groente en fruit verbouwen.
http://www.groendichterbij.nl/tuin

# Appendix B.

**TOP10NL Script**

**# Name: Clip_TOP10NLTerrein.py**
**# Description: Clip TOP10NLTerreinlAdam objects that fall within the bc area.**

**# Import system modules**
import arcpy
from arcpy import env

**# Set workspace**
env.workspace = "D:\UNIGIS\Master Thesis\GIS"

**# Set local variables**
in_features = "TOP10NLTerreinAdam.shp"
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xy_tolerance = ""

# Set list
bc_list = [bc0, bc1, bc2, bc3, bc4, bc5, bc6, bc7, bc8, bc9, bc110, bc111, bc212, \
        bc213, bc214, bc215, bc216, bc217, bc218, bc219, bc220, bc221, bc222, \
        bc236, bc237, bc238, bc239, bc240, bc241, bc242, bc243, bc375, bc376, \
        bc377, bc378, bc379, bc380, bc381, bc382, bc383, bc384, bc385, bc386, \
        bc387, bc388, bc424, bc425, bc426, bc444, bc445, bc446, bc447, bc448, \
        bc449, bc450, bc452, bc453, bc454, bc459, bc490, bc491, bc527, bc528, \
        bc529, bc530, bc531, bc532, bc533, bc534, bc535, bc551, bc555, bc556, \
        bc557, bc558, bc574, bc660, bc661, bc662, bc663, bc664, bc665, bc666, \
        bc667, bc668, bc669, bc670, bc671, bc672, bc673, bc792, bc793, bc794, \
        bc795, bc796, bc797, bc798]

# Set loop to execute clip
for bc in bc_list:
   arcpy.Clip_analysis(in_features, bc, "TOP10NLTerrein" + bc, xy_tolerance)

print "Script completed"
```

**MOR Script**

```
# Name: Clip_MOR_garbage.py
# Description: Clip MOR_garbage points that fall within the bc area.

# Import system modules
import arcpy
from arcpy import env

# Set workspace
env.workspace = "D:\UNIGIS\Master Thesis\GIS\MOR"

# Set local variables
```

```
in_features = "MORafvalMERGE2.shp"
bc0 = "BU03630000.shp"
bc1 = "BU03630001.shp"
bc2 = "BU03630002.shp"
bc3 = "BU03630003.shp"
bc4 = "BU03630004.shp"
bc5 = "BU03630005.shp"
bc6 = "BU03630006.shp"
bc7 = "BU03630007.shp"
bc8 = "BU03630008.shp"
bc9 = "BU03630009.shp"
bc110 = "BU03630110.shp"
bc111 = "BU03630111.shp"
bc212 = "BU03630212.shp"
bc213 = "BU03630213.shp"
bc214 = "BU03630214.shp"
bc215 = "BU03630215.shp"
bc216 = "BU03630216.shp"
bc217 = "BU03630217.shp"
bc218 = "BU03630218.shp"
bc219 = "BU03630219.shp"
bc220 = "BU03630220.shp"
bc221 = "BU03630221.shp"
bc222 = "BU03630222.shp"
bc236 = "BU03630236.shp"
bc237 = "BU03630237.shp"
bc238 = "BU03630238.shp"
bc239 = "BU03630239.shp"
bc240 = "BU03630240.shp"
bc241 = "BU03630241.shp"
bc242 = "BU03630242.shp"
bc243 = "BU03630243.shp"
bc375 = "BU03630375.shp"
bc376 = "BU03630376.shp"
bc377 = "BU03630377.shp"
bc378 = "BU03630378.shp"
bc379 = "BU03630379.shp"
bc380 = "BU03630380.shp"
bc381 = "BU03630381.shp"
bc382 = "BU03630382.shp"
bc383 = "BU03630383.shp"
bc384 = "BU03630384.shp"
bc385 = "BU03630385.shp"
bc386 = "BU03630386.shp"
bc387 = "BU03630387.shp"
bc388 = "BU03630388.shp"
bc424 = "BU03630424.shp"
bc425 = "BU03630425.shp"
bc426 = "BU03630426.shp"
bc444 = "BU03630444.shp"
```

bc445 = "BU03630445.shp"
bc446 = "BU03630446.shp"
bc447 = "BU03630447.shp"
bc448 = "BU03630448.shp"
bc449 = "BU03630449.shp"
bc450 = "BU03630450.shp"
bc452 = "BU03630452.shp"
bc453 = "BU03630453.shp"
bc454 = "BU03630454.shp"
bc459 = "BU03630459.shp"
bc490 = "BU03630490.shp"
bc491 = "BU03630491.shp"
bc527 = "BU03630527.shp"
bc528 = "BU03630528.shp"
bc529 = "BU03630529.shp"
bc530 = "BU03630530.shp"
bc531 = "BU03630531.shp"
bc532 = "BU03630532.shp"
bc533 = "BU03630533.shp"
bc534 = "BU03630534.shp"
bc535 = "BU03630535.shp"
bc551 = "BU03630551.shp"
bc555 = "BU03630555.shp"
bc556 = "BU03630556.shp"
bc557 = "BU03630557.shp"
bc558 = "BU03630558.shp"
bc574 = "BU03630574.shp"
bc660 = "BU03630660.shp"
bc661 = "BU03630661.shp"
bc662 = "BU03630662.shp"
bc663 = "BU03630663.shp"
bc664 = "BU03630664.shp"
bc665 = "BU03630665.shp"
bc666 = "BU03630666.shp"
bc667 = "BU03630667.shp"
bc668 = "BU03630668.shp"
bc669 = "BU03630669.shp"
bc670 = "BU03630670.shp"
bc671 = "BU03630671.shp"
bc672 = "BU03630672.shp"
bc673 = "BU03630673.shp"
bc792 = "BU03630792.shp"
bc793 = "BU03630793.shp"
bc794 = "BU03630794.shp"
bc795 = "BU03630795.shp"
bc796 = "BU03630796.shp"
bc797 = "BU03630797.shp"
bc798 = "BU03630798.shp"
xy_tolerance = ""

```
# Set list
bc_list = [bc0, bc1, bc2, bc3, bc4, bc5, bc6, bc7, bc8, bc9, bc110, bc111, bc212, \
        bc213, bc214, bc215, bc216, bc217, bc218, bc219, bc220, bc221, bc222, \
        bc236, bc237, bc238, bc239, bc240, bc241, bc242, bc243, bc375, bc376, \
        bc377, bc378, bc379, bc380, bc381, bc382, bc383, bc384, bc385, bc386, \
        bc387, bc388, bc424, bc425, bc426, bc444, bc445, bc446, bc447, bc448, \
        bc449, bc450, bc452, bc453, bc454, bc459, bc490, bc491, bc527, bc528, \
        bc529, bc530, bc531, bc532, bc533, bc534, bc535, bc551, bc555, bc556, \
        bc557, bc558, bc574, bc660, bc661, bc662, bc663, bc664, bc665, bc666, \
        bc667, bc668, bc669, bc670, bc671, bc672, bc673, bc792, bc793, bc794, \
        bc795, bc796, bc797, bc798]

# Set loop to execute clip
for bc in bc_list:
   arcpy.Clip_analysis(in_features, bc, "MOR_Garbage2" + bc, xy_tolerance)

print "Script completed"
```

# Appendix C.

## Twitter hashtags

#buurtbbq
#buurtbarbecue
#buurtfeest
#buurtdiner
#buurtinitiatief
#schonebuurt
#buurtschoonmaak
#burendag
#dorpsbelang
#stadsdorp
#buurtproject
#ikkenmijnburen
#kenjeburen
#veiligebuurt
#trotsopmijnbuurt
#topbuurt
#buurtproblemen
#gezelligebuurt
#goeiebuurt
#bestebuurt
#buurtpreventie
#burenzorg
#burenhulp
#participatiesamenleving
#zelfredzaamheid
#nabuurschap
#actiefburgerschap
#buurtparticipatie
#bewonersinitiatief
#burgerinitiatief
#volksinitiatief
#lokaledemocratie
#doedemocratie
#buurtdorp
#wijkbbq
#dorpbbq
#dorpsbbq
#straatbbq
#wijkbarbecue
#dorpbarbecue
#dorpsbarbecue
#straatbarbecue
#dorpsfeest
#wijkfeest
#straatfeest
#wijkinitiatief
#dorpsinitiatief
#dorpinitiatief
#straatinitiatief
#schonewijk
#schoondorp
#schonestraat
#wijkschoonmaak
#dorpschoonmaak
#dorpsschoonmaak
#straatschoonmaak
#wijkproject
#straatproject
#dorpproject
#buurtzorg
#wijkzorg
#buurtmoestuin
#buurttuin
#straatmoestuin
#straattuin
#wijkmoestuin
#wijktuin
#buurtcompostproject
#straatcompostproject
#buurtcompost
#straatcompost
#buurtactiviteiten
#straatactiviteiten
#buurtmiddag
#buurtavond
#buurtochtend
#buurtbewoners
#buurtkamer
#buurtmooimaken
#straatmooimaken
#wijkmooimaken
#dorpmooimaken
#buurthuis
#buurtcentrum
#buurtrestaurant
#buurtkoor
#buurtwerkkamer
#buurtontbijt
#straatontbijt
#dorpontbijt
#wijkontbijt
#buurtmaaltijd
#straatmaaltijd
#dorpmaaltijd
#dorpsmaaltijd
#wijkmaaltijd
#buurtkoffie
#straatkoffie
#dorpkoffie
#dorpskoffie
#wijkkoffie
#buurtevent
#straatevent
#wijkevent
#dorpsevent
#buurtcamping

# Appendix D

**Regression Neighborhood Gardens**

**Variables Entered/Removed[a]**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015 | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 2 | Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015 | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 3 | Percentage of dwellings with a usable surface between 60 and 80m². OIS 2015 | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 4 | Person hassle index: lower than 120 vs higher than 120 | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 5 | Mean score: "How do you rate the offer of public transport in your neighborhood? WIA 2015 | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |

a. Dependent Variable: Amount of neighborhood gardens per 10.000 inhabitants

**Model Summary**[f]

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| 1 | ,330[a] | ,109 | ,096 | 1,6696412408666 | |
| 2 | ,491[b] | ,241 | ,218 | 1,5525822910804 | |
| 3 | ,541[c] | ,293 | ,261 | 1,5093388376631 | |
| 4 | ,580[d] | ,336 | ,295 | 1,4739660644283 | |
| 5 | ,621[e] | ,386 | ,338 | 1,4287555455918 | 2,062 |

a. Predictors: (Constant), Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015

b. Predictors: (Constant), Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015, Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015

c. Predictors: (Constant), Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015, Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015, Percentage of dwellings with a usable surface between 60 and 80m². OIS 2015

d. Predictors: (Constant), Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015, Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015, Percentage of dwellings with a usable surface between 60 and 80m². OIS 2015, Person hassle index: lower than 120 vs higher than 120

e. Predictors: (Constant), Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015, Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015, Percentage of dwellings with a usable surface between 60 and 80m². OIS 2015, Person hassle index: lower than 120 vs higher than 120, Mean score: "How do you rate the offer of public transport in your neighborhood? WIA 2015

f. Dependent Variable: Amount of neighborhood gardens per 10.000 inhabitants

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 23,148 | 1 | 23,148 | 8,304 | ,005[b] |
| | Residual | 189,564 | 68 | 2,788 | | |
| | Total | 212,712 | 69 | | | |
| 2 | Regression | 51,207 | 2 | 25,604 | 10,622 | ,000[c] |
| | Residual | 161,504 | 67 | 2,411 | | |
| | Total | 212,712 | 69 | | | |
| 3 | Regression | 62,357 | 3 | 20,786 | 9,124 | ,000[d] |
| | Residual | 150,355 | 66 | 2,278 | | |
| | Total | 212,712 | 69 | | | |
| 4 | Regression | 71,494 | 4 | 17,874 | 8,227 | ,000[e] |
| | Residual | 141,217 | 65 | 2,173 | | |
| | Total | 212,712 | 69 | | | |
| 5 | Regression | 82,066 | 5 | 16,413 | 8,040 | ,000[f] |
| | Residual | 130,646 | 64 | 2,041 | | |
| | Total | 212,712 | 69 | | | |

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95,0% Confidence Interval for B | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 | (Constant) | 9,210 | 2,524 | | 3,648 | ,001 | 4,172 | 14,247 | | |
| | Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015 | -1,137 | ,394 | -,330 | -2,882 | ,005 | -1,924 | -,350 | 1,000 | 1,000 |
| 2 | (Constant) | 1,693 | 3,219 | | ,526 | ,601 | -4,733 | 8,119 | | |
| | Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015 | -2,750 | ,598 | -,798 | -4,595 | ,000 | -3,945 | -1,555 | ,376 | 2,662 |
| | Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015 | 2,671 | ,783 | ,593 | 3,412 | ,001 | 1,108 | 4,234 | ,376 | 2,662 |
| 3 | (Constant) | -,774 | 3,322 | | -,233 | ,817 | -7,408 | 5,860 | | |
| | Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015 | -2,836 | ,583 | -,823 | -4,864 | ,000 | -4,000 | -1,672 | ,374 | 2,674 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015 | 2,953 | ,772 | ,655 | 3,826 | ,000 | 1,412 | 4,493 | ,365 | 2,737 |
| | Percentage of dwellings with a usable surface between 60 and 80m². OIS 2015 | ,041 | ,018 | ,233 | 2,212 | ,030 | ,004 | ,078 | ,962 | 1,039 |
| 4 | (Constant) | -2,067 | 3,305 | | -,625 | ,534 | -8,669 | 4,534 | | |
| | Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015 | -2,990 | ,574 | -,868 | -5,206 | ,000 | -4,138 | -1,843 | ,368 | 2,721 |
| | Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015 | 3,259 | ,768 | ,723 | 4,242 | ,000 | 1,725 | 4,793 | ,352 | 2,844 |
| | Percentage of dwellings with a usable surface between 60 and 80m². OIS 2015 | ,042 | ,018 | ,240 | 2,331 | ,023 | ,006 | ,078 | ,961 | 1,040 |
| | Person hassle index: lower than 120 vs higher than 120 | ,878 | ,428 | ,211 | 2,051 | ,044 | ,023 | 1,733 | ,961 | 1,041 |
| 5 | (Constant) | 1,140 | 3,500 | | ,326 | ,746 | -5,853 | 8,133 | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mean score "How do you rate the cleanness of streets and sidewalks in your neighborhood?" WIA 2015 | -3,108 | ,559 | -,902 | -5,559 | ,000 | -4,225 | -1,991 | ,364 | 2,744 |
| Mean score "How do you rate the maintenance of playgrounds in your neighborhood?" WIA 2015 | 3,421 | ,748 | ,759 | 4,573 | ,000 | 1,927 | 4,915 | ,348 | 2,870 |
| Percentage of dwellings with a usable surface between 60 and 80m². OIS 2015 | ,035 | ,018 | ,202 | 1,992 | ,051 | ,000 | ,071 | ,934 | 1,070 |
| Person hassle index: lower than 120 vs higher than 120 | 1,046 | ,421 | ,252 | 2,482 | ,016 | ,204 | 1,888 | ,931 | 1,074 |
| Mean score: "How do you rate the offer of public transport in your neighborhood? WIA 2015 | -,446 | ,196 | -,231 | -2,276 | ,026 | -,838 | -,054 | ,934 | 1,071 |

a. Dependent Variable: Amount of neighborhood gardens per 10.000 inhabitants

**Regression Reports of hassle (MOR)**

**Variables Entered/Removed[a]**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015 | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 2 | Mean score: how do you rate the supply of playground facilities. WIA 2015 | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 3 | Percentage non-western immigrant | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 4 | Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014 | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 5 | Sport facilities per 1000 inhabitants: Less than 1 vs 1 or more | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 6 | Trees per km²: Less than 50 vs 50 or more | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |
| 7 | Public Familiarity: lower than 50 vs 50 or more | . | Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100). |

a. Dependent Variable: Reports of total hassle by citizens per capita (*1000)

**Model Summary[h]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|---|---|---|---|---|---|
| 1 | ,697[a] | ,485 | ,478 | 17,8810754 | |
| 2 | ,763[b] | ,583 | ,571 | 16,2121209 | |
| 3 | ,838[c] | ,703 | ,690 | 13,7792264 | |
| 4 | ,854[d] | ,729 | ,714 | 13,2429073 | |
| 5 | ,865[e] | ,748 | ,730 | 12,8580492 | |
| 6 | ,881[f] | ,776 | ,756 | 12,2220667 | |
| 7 | ,890[g] | ,793 | ,771 | 11,8448134 | 2,164 |

a. Predictors: (Constant), Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015

b. Predictors: (Constant), Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015, Mean score: how do you rate the supply of playground facilities. WIA 2015

c. Predictors: (Constant), Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015, Mean score: how do you rate the supply of playground facilities. WIA 2015, Percentage non-western immigrant

d. Predictors: (Constant), Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015, Mean score: how do you rate the supply of playground facilities. WIA 2015, Percentage non-western immigrant, Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014

e. Predictors: (Constant), Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015, Mean score: how do you rate the supply of playground facilities. WIA 2015, Percentage non-western immigrant, Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014, Sport facilities per 1000 inhabitants: Less than 1 vs 1 or more

f. Predictors: (Constant), Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015, Mean score: how do you rate the supply of playground facilities. WIA 2015, Percentage non-western immigrant, Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014, Sport facilities per 1000 inhabitants: Less than 1 vs 1 or more, Trees per km²: Less than 50 vs 50 or more

g. Predictors: (Constant), Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015, Mean score: how do you rate the supply of playground facilities. WIA 2015, Percentage non-western immigrant, Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014, Sport facilities per 1000 inhabitants: Less than 1 vs 1 or more, Trees per km²: Less than 50 vs 50 or more, Public Familiarity: lower than 50 vs 50 or more

h. Dependent Variable: Reports of total hassle by citizens per capita (*1000)

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 21999,326 | 1 | 21999,326 | 68,805 | ,000[b] |
| | Residual | 23340,499 | 73 | 319,733 | | |
| | Total | 45339,825 | 74 | | | |
| 2 | Regression | 26415,858 | 2 | 13207,929 | 50,252 | ,000[c] |
| | Residual | 18923,966 | 72 | 262,833 | | |
| | Total | 45339,825 | 74 | | | |
| 3 | Regression | 31859,262 | 3 | 10619,754 | 55,933 | ,000[d] |
| | Residual | 13480,563 | 71 | 189,867 | | |
| | Total | 45339,825 | 74 | | | |
| 4 | Regression | 33063,603 | 4 | 8265,901 | 47,133 | ,000[e] |
| | Residual | 12276,222 | 70 | 175,375 | | |
| | Total | 45339,825 | 74 | | | |
| 5 | Regression | 33932,094 | 5 | 6786,419 | 41,048 | ,000[f] |
| | Residual | 11407,731 | 69 | 165,329 | | |
| | Total | 45339,825 | 74 | | | |
| 6 | Regression | 35182,059 | 6 | 5863,676 | 39,254 | ,000[g] |
| | Residual | 10157,766 | 68 | 149,379 | | |
| | Total | 45339,825 | 74 | | | |
| 7 | Regression | 35939,751 | 7 | 5134,250 | 36,595 | ,000[h] |
| | Residual | 9400,073 | 67 | 140,300 | | |
| | Total | 45339,825 | 74 | | | |

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95,0% Confidence Interval for B | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 | (Constant) | 254,829 | 24,774 | | 10,286 | ,000 | 205,454 | 304,204 | | |
| | Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015 | -26,415 | 3,184 | -,697 | -8,295 | ,000 | -32,761 | -20,068 | 1,000 | 1,000 |
| 2 | (Constant) | 325,896 | 28,374 | | 11,486 | ,000 | 269,333 | 382,459 | | |
| | Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015 | -18,215 | 3,512 | -,480 | -5,186 | ,000 | -25,217 | -11,214 | ,676 | 1,480 |
| | Mean score: how do you rate the supply of playground facilities. WIA 2015 | -19,885 | 4,851 | -,380 | -4,099 | ,000 | -29,555 | -10,215 | ,676 | 1,480 |
| 3 | (Constant) | 326,025 | 24,116 | | 13,519 | ,000 | 277,939 | 374,112 | | |
| | Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015 | -11,303 | 3,252 | -,298 | -3,475 | ,001 | -17,788 | -4,818 | ,569 | 1,757 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean score: how do you rate the supply of playground facilities. WIA 2015 | -25,481 | 4,253 | -,487 | -5,991 | ,000 | -33,962 | -17,000 | ,635 | 1,575 |
| | Percentage non-western immigrant | -,510 | ,095 | -,378 | -5,354 | ,000 | -,700 | -,320 | ,842 | 1,187 |
| 4 | (Constant) | 230,831 | 43,090 | | 5,357 | ,000 | 144,890 | 316,772 | | |
| | Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015 | -6,892 | 3,550 | -,182 | -1,941 | ,056 | -13,973 | ,189 | ,441 | 2,266 |
| | Mean score: how do you rate the supply of playground facilities. WIA 2015 | -20,102 | 4,574 | -,384 | -4,395 | ,000 | -29,225 | -10,979 | ,507 | 1,972 |
| | Percentage non-western immigrant | -,722 | ,122 | -,535 | -5,909 | ,000 | -,965 | -,478 | ,473 | 2,116 |
| | Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014 | ,299 | ,114 | ,278 | 2,621 | ,011 | ,071 | ,526 | ,343 | 2,915 |
| 5 | (Constant) | 220,853 | 42,064 | | 5,250 | ,000 | 136,938 | 304,769 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015 | -7,467 | 3,456 | -,197 | -2,161 | ,034 | -14,362 | -,572 | ,439 | 2,278 |
| | Mean score: how do you rate the supply of playground facilities. WIA 2015 | -18,171 | 4,520 | -,347 | -4,020 | ,000 | -27,189 | -9,153 | ,489 | 2,043 |
| | Percentage non-western immigrant | -,659 | ,122 | -,488 | -5,409 | ,000 | -,901 | -,416 | ,448 | 2,230 |
| | Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014 | ,282 | ,111 | ,262 | 2,540 | ,013 | ,061 | ,503 | ,342 | 2,928 |
| | Sport facilities per 1000 inhabitants: Less than 1 vs 1 or more | 12,514 | 5,460 | ,148 | 2,292 | ,025 | 1,622 | 23,406 | ,874 | 1,144 |
| 6 | (Constant) | 238,768 | 40,460 | | 5,901 | ,000 | 158,030 | 319,505 | | |
| | Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015 | -11,077 | 3,514 | -,292 | -3,152 | ,002 | -18,090 | -4,065 | ,384 | 2,607 |

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|---|---|---|---|---|---|---|---|---|---|---|
| | Mean score: how do you rate the supply of playground facilities. WIA 2015 | -16,387 | 4,341 | -,313 | -3,775 | ,000 | -25,049 | -7,725 | ,480 | 2,085 |
| | Percentage non-western immigrant | -,709 | ,117 | -,525 | -6,059 | ,000 | -,943 | -,476 | ,438 | 2,281 |
| | Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014 | ,238 | ,107 | ,222 | 2,234 | ,029 | ,025 | ,451 | ,335 | 2,988 |
| | Sport facilities per 1000 inhabitants: Less than 1 vs 1 or more | 15,500 | 5,292 | ,183 | 2,929 | ,005 | 4,941 | 26,059 | ,841 | 1,190 |
| | Trees per km²: Less than 50 vs 50 or more | 10,337 | 3,573 | ,203 | 2,893 | ,005 | 3,206 | 17,467 | ,667 | 1,500 |
| 7 | (Constant) | 216,654 | 40,350 | | 5,369 | ,000 | 136,116 | 297,192 | | |
| | Mean score "Can you rate to what extent you experience nuisance caused by bars and restaurants? WIA 2015 | -9,202 | 3,500 | -,243 | -2,629 | ,011 | -16,189 | -2,216 | ,363 | 2,753 |
| | Mean score: how do you rate the supply of playground facilities. WIA 2015 | -15,218 | 4,237 | -,291 | -3,592 | ,001 | -23,675 | -6,762 | ,473 | 2,115 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Percentage non-western immigrant | -,786 | ,118 | -,582 | -6,653 | ,000 | -1,022 | -,550 | ,404 | 2,476 |
| Safetyindex. The lower, the safer. (100 is the mean safety in the police region Amsterdam-Amstelland 2014). OOV / OIS 2014 | ,263 | ,104 | ,245 | 2,536 | ,014 | ,056 | ,471 | ,331 | 3,021 |
| Sport facilities per 1000 inhabitants: Less than 1 vs 1 or more | 18,685 | 5,308 | ,221 | 3,520 | ,001 | 8,090 | 29,280 | ,785 | 1,275 |
| Trees per km²: Less than 50 vs 50 or more | 10,820 | 3,469 | ,213 | 3,119 | ,003 | 3,895 | 17,744 | ,664 | 1,505 |
| Public Familiarity: lower than 50 vs 50 or more | -13,247 | 5,700 | -,146 | -2,324 | ,023 | -24,624 | -1,869 | ,782 | 1,278 |

a. Dependent Variable: Reports of total hassle by citizens per capita (*1000)