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SUSTAINABLE RENOVATION LEWENBORG

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Sustainable renovation in Lewenborg, commissioned by Lefier Groningen

A quantitative research in the experience of residents in social housing involving a sustainable renovation

Bachelor thesis for the University of Groningen for the Bachelor of Science in Human Geography and Planning

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ABSTRACT

Sustainable development is an important concept in today's society. As a consequence sustainable renovation is getting more attention. In the Netherland many houses are owned by housing corporations. After a few decades these houses need to be renovated and sustainable renovation is being more implemented because of climatological and sustainability issues. In the neighbourhood of Lewenborg, Groningen, 387 houses were renovated sustainably in 2010. This thesis is trying to gain insight in such projects, especially the experience of the residents, with the help of a case study. The main research question was: *"To what extent does the participation of the residents influence the renovation process"*.

By means of questionnaires residents who were involved in the renovation gave their opinion about the process and result of the renovation. After conducting the questionnaires, the results are analysed in SPSS. After the analyses it was clear that there was a positive association between active participation of the residents and the smoothness of the process. A positive association was found between active participation of the residents, and the rate of inconvenience. Another positive association was found between Lefiers' (the housing corporation) involvements with its residents and the rate of inconvenience. Eighty-five percent of the participants agreed with the statement that sustainable renovation was desirable for their homes. However this did not have an association with the end result of the renovation. Residents who thought it was desirable to renovate sustainably were not by definition happy with the end result.

Involving the people in the renovation process result in a smoother process and less inconvenience during the renovation. It is important that people are being heard before and during the process, otherwise they are reluctant to everything they get offered, no matter how good this may be.

Key words: Sustainable renovation, residents, renovation process, social housing

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1. INTRODUCTION

1.1 Motivation

The concept of sustainable development is a significant part of developmental guidelines since the 1990s. It has been around in city planning, architecture and construction. In line with this renovation, reconstructions and renewal of existing buildings was and is becoming more important. The concept of sustainable renovation was being implemented in a few countries in Europe, including the Netherlands. The renewal of housing structures is an important element in today's renovation projects (Kaklauskas et al., 2007).

Many rented residential housing in the Netherlands are owned by housing corporations. After a few decades these houses need to be renovated and with the climatological/sustainability issues of today, sustainable renovation will be increasingly implemented. Such renovations are commissioned by the housing corporations who are the owner of the dwellings. But how are these renovation experienced by the residents.

In the scientific literature sustainability is a popular topic, as is sustainable renovation. The definition of sustainable renovation includes cultural, social, economic and institutional aspects of the renovation project (Botta, 2005). Concerning policy sustainable development is likewise an important topic of discussion already for a few decades (Brundtland commission, 1987). Scientific literature is available in terms of EU policy and Dutch policy (Botta, 2005, Klunder, 1999), but little is written about the influence on housing corporations. The general opinion of residents of renovated houses is not an important research question in the scientific literature. The Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer (1996a) in Klunder (1999) did some research about the opinion of the residents in the Netherlands, but this is dated data. As a result new research is needed to acquire more insight in this topic as a whole.

In the neighbourhood of Lewenborg 387 houses are renovated sustainably commissioned by Lefier Groningen, a housing corporation in the Netherlands, which was completed in 2010. After the renovation, Lefier Groningen never did research in the opinion of the residents, since they never asked or conducting questionnaires for feedback. In this thesis I will research the relationship between the covering policy, housing corporation and residents. What are the main reasons for the housing corporations initiate sustainable renovations and how do the residents react to the renovation process before, during and after the renovation?

1.2 Problem posing

Housing corporations are working together with architects and other advisers. The target group, one would say, are the residents who are living in the houses. One might expect that the residents have a say in the plans before the renovation and during the renovation process. The main research question is as follows: *"To what extent does the participation of the residents influence the renovation process"*. This has been investigated by means of a questionnaire in the neighbourhood of Lewenborg and a literature study, where the main question is divided in numerous sub questions:

1: What is sustainability?

1a: What is sustainability and sustainable development?

1b: What is sustainable renovation?

- 2: How can one involve the residents?
- 3: What are the policies regarding sustainable development and renovation
 - 3a: Dutch strategy regarding sustainable development/renovation
 - 3b: EU policy regarding sustainable development/renovation
 - 3c: Problems regarding the policies
- 4: Are housing corporations willing to renovate sustainably and how do they manage this?
 - 4a: What project is realized in Lewenborg?
 - 4b: Did the residents participate in the renovation process?
 - 4c: How was the interaction between residents and Lefier?

The goal of this thesis is to gain insight in the sustainable renovation commissioned by housing corporations and if participation of the residents has influence on the renovation process.

1.3 Structure of the thesis

The first section of the thesis will discuss theoretical information about the topic. Some concepts will be explained on the basis of existing literature and a conceptual model of the thesis will be presented. The second section consists of the methodology. The data collection, data quality and ethical issues will be discussed. In the third section results will be discussed by means of statistical analyses of the collected data. The last section consists of a summary of the thesis and conclusions will be drawn.

2. THEORETICAL FRAMEWORK

2.1 Sustainability & sustainable development

The concept of sustainability means the need to look at the consequences of industrialisation on the environment. The way to do this is to bring natural, economic and social sciences together. The Brundtland report (1987) resulted in an intertwine in terms of political issues and sustainability (Botta, 2005).

Choguill (2007) argues that the term sustainable development was initially most relevant to macro-economic development, but more recently has shifted towards the quality of development in sustainable settlements and especially housing. Choguill (2007) defines sustainability of human settlements as follows: "staying within the absorptive capacity of local and global waste limits". The goal of sustainable development is to bring balance between human society and the natural environment. This needs to lead in a decrease of consumption especially in underdeveloped countries (Botta 2005).

Priemus (2005) argues that the life cycle-model of buildings is necessary to measure sustainability. The environmental impact will depend on the life-cycle phase of the building. The life-cycle costs can be derived from certain flows during the life-cycle and the different stages of the life-cycle model. This has been simplified in the ecodevice model which is shown in figure 2.1. The incoming flow consists of construction materials, furnishing, replacement materials and energy and water consumed during everyday use (Priemus, 2005). He states that there are two 'protective' functions, resistance and retention, which determine the environmental efficiency of the system.

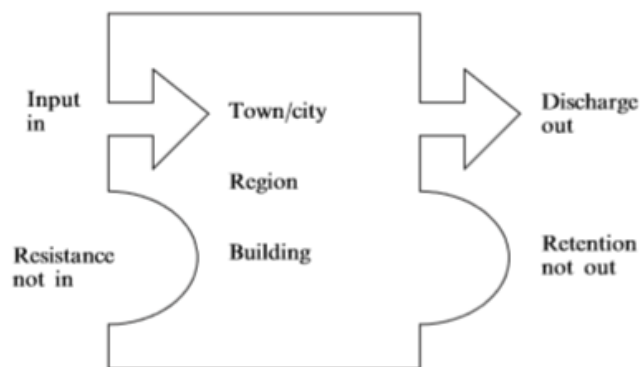


Figure 2.1: the ecodevice model (Priemus, 2005)

Priemus (2005) argues it would be more logical to use a multivariate yardstick that would offer a sustainable profile. This is called SPLASH; sustainable planning of land-use activity, subdivision, and housing. The profile is a combined measurement, containing consumption of fossil-fuel energy, non-renewable materials and water, and soil (Priemus, 2005).

Quality of environment is closely attached to sustainability. It is a precondition for the health and wellbeing of people, animals and vegetation and therefore a necessity for sustainable development. Hence it is important that the housing stock takes notice of the quality of environment before they can contribute to sustainable development (Van den Broeke & Quist, 1994). Van den Broeke and Quist (1994) argue that the quality of environment within housing stock at the moment is called 'static quality of environment. Dynamic quality of environment is the improvement that is necessary for the housing stock. Quality of environment in this context is related to the characteristics of the residence.

According to Van den Broeke and Quist (1994) sustainable development was firstly introduced by the Commission Brundtland: "Humanity has the ability to make development sustainable to ensure that it meets the needs of the present, without compromising the ability of future generations to meet their own needs" (Brundtland commission, 1987). It is important that human activity in terms of technology and social organization gets limited, and by doing so both aspects can be managed and improved for a new era of economic growth (Brundtland commission, 1987).

2.1.1 Sustainable renovation

In the first part of the theoretical framework, sustainable development and sustainability are explained. In this part sustainable renovation is explained since this is one of the central topics in this thesis.

According to Botta (2005) sustainable renovation includes cultural, social, economic and institutional aspects of the renovation project. This means that sustainable renovation contributes to sustainable development in a broader context, thinking of the needs of the future generations.

She argues that the concept of renovation refers to the conservation and maintenance of existing buildings. She also states renovation means functional and technical modernisation and adaptation to new needs and functions. In the end this results in upgrading the use of existing buildings, but it also has an effect in the physical and social context in which the building is located. Sustainable development has a multidisciplinary character, which means that projects of sustainable renovation should include environmental, cultural, economic, social and institutional arguments (Botta, 2005)

Ástmarsson et.al. (2013) states that an alternative for sustainable renovation are the so called green leases. These are voluntary agreements between landlord and resident to decrease the consumption of heating, cooling, water and electricity. As a result, residents accept a higher rent for a period of time, but get the benefits of the energy savings. Green leases can be part of a Responsible Property Investment which encourages property owners to think about the economic, environmental and social sustainability during the decision making process about purchase, management and the sale of the properties (Ástmarsson et.al. 2013). This is partly done in Lewenborg. After the renovation people were able to buy their homes through the "Te Woon" concept. This way the houses stayed available in the public housing sector (Lefier Groningen et al., (2011).

Kaklauskas et al. (2007) concludes that at present the only benefits of building renovations were the reduce in energy costs, but that these energy savings measures does not only improve the condition of the building, but also results in a value increase of the building. One must note that sustainable renovation is being implemented in each country differently. Main reasons for different implementations are government policy, existing housing stock, social needs, economic potential and so on.

According to Kaklauskas et al. (2007) knowledge management is another element of sustainable renovation. In these kind of projects many stakeholders are involved. Two kinds of knowledge can be distinguished; explicit- and implicit knowledge. Kaklauskas defines explicit knowledge as knowledge that covers measure units, criteria system and information about project alternatives. He defines implicit knowledge as the knowledge about the building renovation, such as skills, qualification, experience, social needs etcetera. All these types of knowledge comes together in Lewenborg, where the explicit knowledge is delivered by Lefier. Implicit knowledge is a knowledge combination between Lefier, the construction workers and the residents.

In summary, sustainable renovation consists of numerous aspects, but also alternatives regarding sustainable renovation exists. In this thesis sustainable renovation and the exchange of knowledge (implicit and explicit) between Lefier and the residents.

2.2 Involving the residents

It is essential that projects, whether they have failed or not, are being evaluated. What went wrong or right can be communicated to all parties (Van Hal, 2014). Residents do have an opinion on the process so it would be prudent to involve them as well. Van Hal (2014) created a 3-step theory called "the merger of interest" for sustainable construction and renovation.

The first step is making an inventory of the interests of each party, as each party will have different interests in a renovation. It is just as important to know from each other what they do not want. By ignoring needs of parties, it is likely for projects to fail. If residents were not heard in the preparation of a project, they are likely to reject everything that is offered to them. If residents were taken seriously, project professionals are getting more possibilities (Van Hal, 2014).

The second step is to promote the interests in a way that current and future residents are happy, through sustainable measures. If this is done in a creative way, social cohesion in a neighbourhood can be higher (for example a communal energy system). This is done through a collaboration process which also consists of people with an unorthodox way of thinking, so that plans are not made through one way of thinking (Van Hal, 2014)

In the third step of the Merger of Interests Van Hal (2014) states in sustainable entrepreneurship there is a social responsibility, but only the first two steps are relevant for this thesis. All actors in projects as Lewenborg need to know each other's interests to make the renovation a successful project.

2.3 Dutch strategy regarding sustainable development/renovation

Dutch and European policy and legislation had an indirect effect on the policies followed or created by housing corporations. Therefore a brief description of the policies is presented in the following two chapters. Furthermore problems regarding the policies are discussed in the third chapter.

The Dutch government has a significant influence considering the policy for housing corporations. Since cabinet Kok-I State Secretary Tommel of public housing stimulated green housing. He introduced a standard for a more "green" construction world. This standard is not only applicable for new buildings, but also for existing housing-stock. As a result housing corporations need to take environmental contribution into account (Klunder, 1999).

Since the seventies, the development of sustainable building was slowly being started. In the eighties this approach was getting popular, since building materials became more important. This growing interest resulted in large-scale housing projects. In the nineties sustainable measures were being used in large housing projects. This careful approach resulted in a slow increase of sustainability in housing projects (Boon & Sunikka, 2002). Because of the high population density in the Netherlands efficient land use is extremely important. A major aspect to achieve this is through sustainable building. According to Boon and Sunikka (2002) a new trend has emerged. The focus of sustainable building has shifted to an urban-level and more developments are underway. They argue that "in the future, sustainable building policy will focus on urban development, the climate in the built environment and materials, including in relation to recycling and health issues". Some professionals in sustainable building argue that progress in

this approach depends not exclusively on regulation, but also on (environmental) education and knowledge and experience exchange (Boon & Sunikka, 2002).

2.3.1 EU policy regarding sustainable development/renovation

The European Union emphasises that housing and urban planning needs to take environmental and health impact of buildings into consideration. In line with this the social needs of its inhabitants during production, use and maintenance is being emphasised (Botta, 2005). According to Botta (2005) there is a great need to improve the urban environment and quality of life, since almost eighty percent of the European population lives in urban areas. Revitalising towns and cities is an important element in achieving sustainable development.

On September 16th 2002, the European Parliament wrote a guideline regarding energy performance of buildings. This guideline contains four elements. One of the elements is about minimum standards of energy performance of new buildings, or, when they are being renovated, existing buildings. The guideline is applicable for the housing sector, but also the third sector (office buildings, public buildings). Every element that determine the energy-efficiency calculation must be integrated. The method was limited just to isolation of the building but with this integrated approach cooling/heating installations, position of the building among other will be taken into account. Every member of the European Union is obliged to determine a minimum standard (Europees Parlement, 2003).

Policies are thus being developed in the EU countries, as are regulations and legislation for sustainable housing. Most countries are relying on "environmental consciousness" of the market. Hence they assume the market is taking sustainability into account during their construction/renovation process. This way countries do not have to formulate strict regulations or methods in their policy. For the new Member States sustainable housing is a new phenomenon, but they are adapting housing policies regarding renovation and energy efficiency. The economic conditions however are limited, so policy instruments such as subsidies are tricky to implement (Sunnika, 2003).

Since the Kyoto protocol many measures such as regulations for indoor air quality, waste and emissions are being established by means of environmental legislation. But there are some differences between the Member States concerning the legislation. For example, some regulations in the Netherlands are at the level of Finnish regulations of 1971 and sometimes even of 1951. In the new Member States the regulation norm is lower than in the old Member States. As mentioned before, the new Member States are willing to adapt regarding sustainable housing policies. The problem, however, is that these countries have little legislation for sustainable housing (Sunnika, 2003).

2.3.2 Problems regarding the policy

If we take a look at the followed policy concerning sustainable renovation a few barriers need to be overcome (Priemus, 2005). According to Priemus (2005) institutional obstacles are in the way to make sustainable-housing development successful. There are two problems; inadequate ecological stimulation in the taxations, and the difference of responsibility in real-estate sector. When developing real-estate, many actors are involved including the architect, urban planner, civil engineer and so on. Each of the actors is acting in their own individual framework and rules without adjusting to each other.

Some objectives of sustainable development are to empower poor people (especially in the developing world). Half of the urban population is economically and politically marginalized.

It is important that they have influence on policy making. The lower segment of the population is also given some self-worth when they have a proper house (Choguill 2007).

Another problem is the lack of motivating factors, high estimated costs and low demand. This results in a slow progress in the policy of sustainable housing since 1996, although governments did subsidize this kind of policies and developments (Sunnika, 2003).

2.4 Are housing corporations willing to renovate sustainably and how do they manage this?

Housing corporations in the Netherlands usually have a positive opinion about sustainable construction (MVRM, 1996a, in Klunder, 1999). The main reason to participate in sustainable construction, is social responsibility. The possibilities for sustainable renovation depends on multiple factors. Firstly, the government has a great influence on the relevant policy, as mentioned before. Secondly, the post-war neighbourhoods need a specific approach regarding sustainable renovation, which results in both opportunities and barriers. Finally, the policy regarding the stock of housing corporations plays a role (Klunder, 1999).

Boon and Sunikka (2002) did a case study regarding environmental measures by housing corporations. They were curious if housing corporations did have sustainable plans for the long term and how committed they were to those plans in the end. They defined this as "environmental policy as a statement of housing corporations environmental policy". The results revealed 66% of the respondents (the respective housing corporations) did not have an environmental policy in the year 2000. However 75% of the respondents did adopt environmental measures on a regular basis and another 15% adopt environmental measures in an experimental manner. In short, adopting environmental measures are not depending on an environmental policy. The case-study also shows that the size of the housing corporation is relevant for the use of environmental policy. One fifth of associations with less than 600 houses have an environmental policy, while nearly half of the associations with over 10.000 dwellings have an environmental policy (Boon & Sunikka, 2002).

Lefier Groningen is a housing corporation with over 10.000 dwellings, 24.968 houses to be specific (Lefier Groningen, 2013). In line with Boon and Sunikka (2002) it is not surprising that Lefier renovates houses sustainably since big corporations are more likely to have an environmental policy of some sort.

2.5 Conceptual model

Figure 2.5 represents the conceptual model that visualizes the coming research. EU and Dutch policy are the guidelines for housing corporations. They created a framework for sustainable development (and eventually sustainable renovation) in which housing corporations can operate. The process followed by the housing corporations have direct influence on the residents, whereas the covering policy has an indirect influence on the residents.

Both housing corporations and residents have interests in the project. Housing corporation are likely to renovate as fast and as cheap as possible, but with a positive end result, while residents are also likely to renovate as fast as possible, but with little inconvenience. To have a smooth process it is easy to say that interaction between the housing corporation and residents is essential. It is rational to say that they also do not want to pay a much higher rent, while the housing corporation expect higher profit after the renovation. Society as a whole has an interest in sustainable development since climatological and environmental issues are becoming more

important. The interaction between residents, housing corporations and sustainable renovation is being researched.

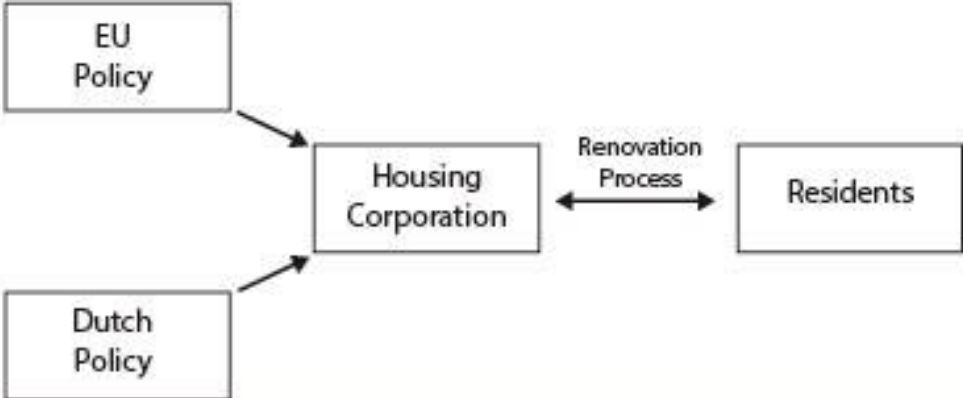


Figure 2.5; Conceptual research model

3. METHODOLOGY

3.1 Study area

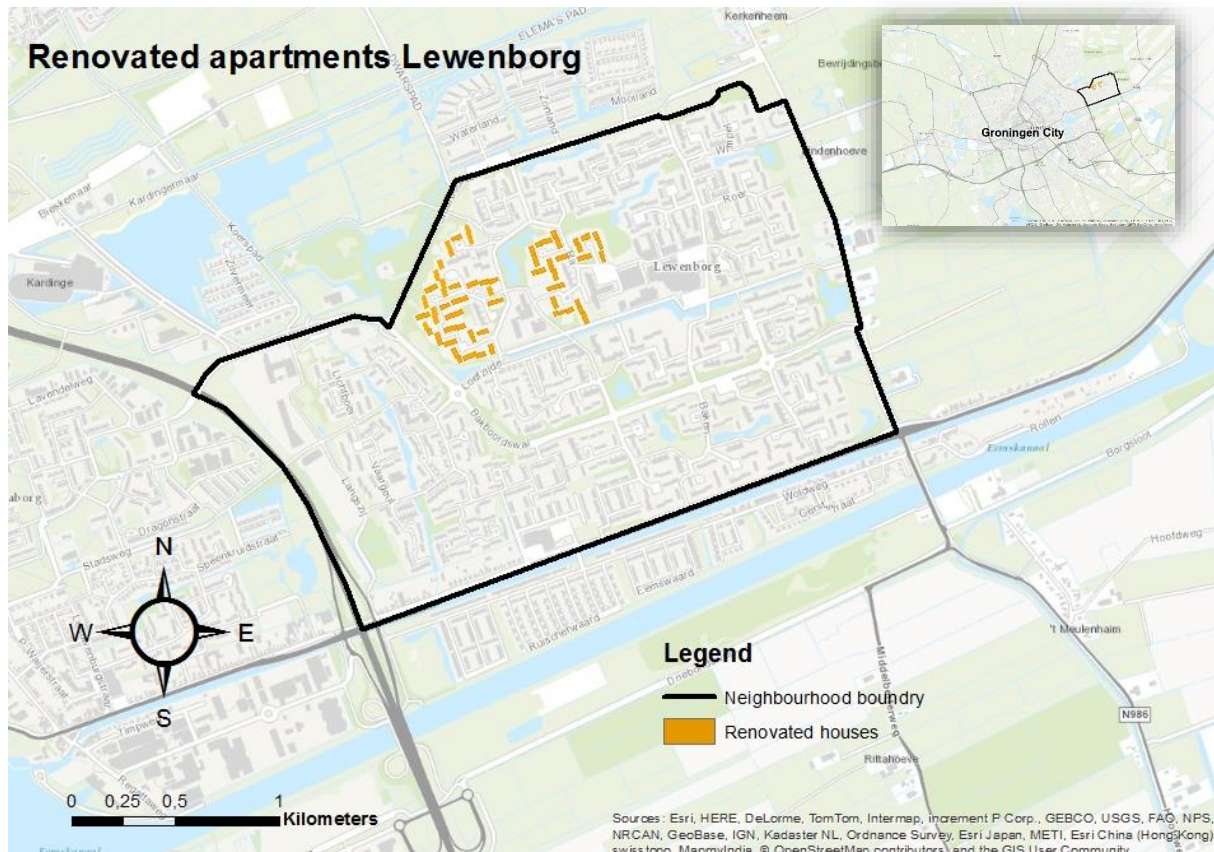
In the next chapter the study area is being presented. To get a clear picture of the neighbourhood the realisation process is explained whereupon the neighbourhood and renovated houses are visualised. In the following chapter the sustainable renovation is described on the basis of Lefier Groningen itself.

Lewenborg has been built in the 70's as a suburb of Groningen-city, typically in the Dutch 70's style. Reason for the new neighbourhood was the municipality format in 1969. The municipality of Noorddijk was dissolved and added to the municipality of Groningen. In the Structuurplan 1969 of the municipality, Noorddijk will contain three neighbourhoods including Lewenborg. This neighbourhood was realised as first, with residential area (woonerfgedachte) and a green character as fundamental ideas. Traffic was guided away from the residential areas. The green character is being realised by blending in the private gardens in the green space (Gemeente Groningen, 2012).

The quality of Lewenborg is the rural 'atmosphere' while living close to the city centre. There is not much traffic in the neighbourhood and the gardens are relatively big compared by other neighbourhoods in Groningen (Gemeente Groningen, 2012). These are the characteristics of a garden city invented by Ebenezer Howard. The core of Howard's idea was to combine labour and capital by building new 'cities'. In these cities residents have the benefits of the city, combined with the benefits of the rural. Ideal places were those that were 30 to 50 kilometers away from a big city, but these standards were especially developed for England (van der Cammen & de Klerk, 2003).

The several residential areas are surrounded by a ring road. These neighbourhoods are known as 'Bloemkoolwijken' in Holland. The characteristic houses of the Bloemkoolwijken are the terraced houses (rijtjeshuizen). These are the houses that have been renovated sustainably in order of Lefier Groningen (Gemeente Groningen, 2012) . It was important that residents of Lewenborg were able to do everything within the neighbourhood, which is why schools, a mall, sporting facilities and green-space was realised. Lewenborg has the appearance of a small village with around 10.000 residents and is moreover the most green neighbourhood of Groningen-city (Gemeente Groningen, 2015). The study area is visualized on map 3.1 as are the houses that are renovated sustainably.

The houses in the residential areas are oriented on the twisting road structure. Most of the housing blocks are at right angles to each other. As a result of this orientation, the rear of the houses are towards the public space and the back gardens are facing the street. All this results in cosy, peaceful residential areas in the middle of public green spaces (Gemeente Groningen, 2012).



Map 3.1: Study area and renovated houses (Esri, 2015, own illustration)

3.2 Project Lewenborg

In the neighbourhood of Lewenborg, Lefier Groningen renovated 387 houses sustainably. This was done in partnership with KAW architecten. These houses were built in 1972 and therefore did not have many sustainable measures. Architecturally, the buildings were outdated and they did not have any future value. The neighbourhood renewal was the starting point to renovate these houses.

The residents were allowed to stay in their houses during the renovation. This meant that the planning and process had to be discussed with the residents so they were rightly informed. Within three weeks, a house was being renovated completely. The body of every house was being renovated (basis of the project), without a raise in rent. Residents were also able to choose improved showers, toilets or kitchen, which resulted in a raise of rent up to thirty euros a month.

According to Lefier StadGroningen et al. (2011) the sustainable renovation was a success because of the simplicity. They chose to do the so called trias energetica, which means that the houses first were being isolated to reduce the energy costs. The project was finished in two years and was ready in December 2009. The target group for the houses did not change overtime: social housing. The residents are able to buy their house by means of the so called "Te Woon" concept. The fundamental idea of this concept is that housing corporation offers a part of their housing stock. This consists of three types of contracts (Opmaat, 2015):

1. Normal rent
2. A market conform purchase opportunity
3. A form of sale under requirements

The projects resulted in a reduce of 596.771 m³ of gas, 15.255.540 liters of water, 1.216.149 kg CO₂ and 10.000.000 m³ clean air on yearly bases. This means a reduction for a 3-person house hold of 1542 m³ of gas and 39.420 liters of water on yearly bases. Before the renovation the energy label of the houses was E, and after the renovation the label is B, where label B is a better label concerning environmental issues (Lefier StadGroningen et al., 2011).

3.3 Data collection

To gain more insight in the opinion of the residents, information was collected by means of questionnaires. According to McLafferty (2010) the goal of questionnaires is to acquire information about behavioural and attitudes of a population by conducting a questionnaire, to a sample of individuals. She argues that conducting questionnaires is useful to find out about people's attitudes and opinions about social, political and environmental issues (McLafferty 2010). As an example McLafferty (2010) mentions among others neighbourhood quality of life and environmental problems. These two issues are intertwined in the thesis.

At first, the questionnaires were conducted by going door to door. This, however, was too time consuming and with little result. A week later the questionnaires were put online, and by means of flyering people were notified to fill them in. It is possible that the sample is biased because only residents with computers and internet (maybe more young adults) were able to fill them in. The results told otherwise, since most participants were sixty years or older. The questionnaires consists of eighteen multiple choice questions, where the answers are ranked from "1 to 5", a Likert scale, where 1 means "totally disagree" and 5 means "totally agree" and one open question where people can write remarks regarding the renovation.

I did not choose for interviews because it is too time consuming and just a few people can be reached by doing interviews. The renovation was completed four and a half years ago, so many changes in residents has occurred. This makes it hard to find people who can be interviewed. Therefore it is hard to get a group of residents that is big enough for using in this thesis. By conducting questionnaires, it is easy to reach the relevant residents and the chance of response is higher. The information provided in interviews could have been helpful, but with the questionnaires enough information is gathered to answer the research questions.

3.4 Data analyses

After conducting the questionnaires, the data will be analysed by means of SPSS (Norušis, 2012). The answers of the questionnaires are given on a scale from 1 to 5, where 1 means "totally disagree" and 5 means "totally agree". This results in a database with ordinal variables. The sample itself consists of 29 participants, which is in the 'grey area' concerning the central limit theorem, and there was not a normal distribution. Therefore a non-parametric test is more appropriate. Since the variables are ordinal only the Chi-Square of Spearman Correlation are applicable. After rescaling, Chi-Square still did not met the condition so only the Spearman Correlation was applicable.

3.5 Ethics

Hay (2010) states ethical research is being performed by geographers who act fairly, because it is the right thing to do. But why do we need to behave ethically? First, it protects the effects the actors involved in the research. Second, ethically behaviour results in an optimal climate to do research in. It is also an interaction about trust between the researcher and the actors (Hay 2010).

The questionnaires were filled in completely anonymous and the results were only used for this thesis.

4. RESULTS

4.1 General opinion about sustainable renovation.

In general, people have a positive opinion about living in sustainable houses as long as it does not have great consequences (MVRM, 1996a, in Klunder, 1999). Residents are not willing to make sacrifices in terms of residential quality to enable sustainable renovation. This is even more the case for houses which are renovated sustainably since housing corporations take initiative for such projects (Klunder, 1999). Residents are willing to pay more for a sustainable home or a sustainable renovated home. As a result they expect a lower energy-bill or a higher quality of live (Klunder, 1999).

4.2 Participation of the residents

To gain more insight in the residents involvement in the renovation and what influence this had on the process of the renovation, a Spearman Correlation is executed with the variables "I had active participation in the decision making" and "The process of the renovation was smoothly". The corresponding hypotheses is "there is no association between active participation in the decision making and the smoothness of the renovation". The result in table 1 below shows that there is a strong positive association between both variables, since the Correlation Coefficient is 0,706, so the process of the renovation was more smoothly when the residents had active participation. Kaklauskas et al. (2007) states that knowledge management is an element in sustainable renovation. One of the components of knowledge management is implicit knowledge which contains skills, qualification and experience, but also social needs. It is important that the knowledge can be exchanged between experts and the target group.

"There is no association between the active participation in decision making and the inconvenience during the renovation". As shown in table 4.2.1 the correlation coefficient is rather positive. Also the p-value is smaller than 0,01 so the hypotheses is being rejected. This means that there is an association between active participation in decision making and little inconvenience during the process. This is in line with Van Hal (2014) that it is important to know each other's interests and this way the process will be more easy-going. People are reluctant to accept everything when they are being ignored.

| | | | <i>"I had active participation in the decision making"</i> |
|-----------------------|--|--------------------------------------|--|
| Spearman's rho | <i>"The process of the renovation was smoothly"</i> | Corr. Coefficient Sig. (2-tailed) | 0,706** 0,000 |
| | <i>"During the renovation, there was little inconvenience"</i> | Corr. Coefficient Sig. (2-tailed) | 0,505** 0,005 |

** Correlation is significant at the 0,01 level (2-tailed)

Table 4.2.1: Result of the Spearman Correlation with the variables participation of residents and the smoothness of the renovation process

The null hypotheses for this Spearman Correlation is “there is no association between the inconvenience during the renovation and the attention Lefier paid for its residents wellbeing”. As shown in table 4.2.2 there is a strong positive association between both variables. The p-value is less than 0,01 so the null hypotheses is being rejected. This means that if Lefiers’ involvements is higher for its residents, the inconvenience during the renovation is less. There is also an association between “Lefier was involved with its residents” and “The process of the renovation was smoothly” since the correlation coefficient is 0,561 and the p-value is less than 0,01. The process went smoother when Lefier was involved with the residents. This is in line with Van Hal (2014), who states that when residents are taken seriously, they are more willing to cooperate. It is important to know from one another what they want, but also what they do not want. By knowing what resident want and do not want, it is more likely that the inconvenience is being limited to a minimum.

| | | | <i>“Lefier paid attention to the wellbeing of the residents”</i> |
|-----------------------|--|--------------------------------------|--|
| Spearman’s rho | <i>“During the renovation, there was little inconvenience”</i> | Corr. Coefficient Sig. (2-tailed) | 0,726** 0,000 |
| | <i>“The process of the renovation was smoothly”</i> | Corr. Coefficient Sig. (2-tailed) | 0,561** 0,002 |

** Correlation is significant at the 0,01 level (2-tailed)

Table 4.2.2: Results of the Spearman Correlation with the variables “Lefier was involved with its residents” and “During the renovation there was little inconvenience.”

4.3 Rate of desirability and satisfaction

Figure 4.3.1 represents the importance of sustainable renovation in the housing market and the desirability of the Lewenborg project according to the participants. It is easy to see that the greater part of the participants “agreed” or “totally agreed” with both statements. The rate of satisfaction can be seen in figure 4.3.2. It is instantly clear that the participant are rather positive about the outcome of the renovation. 68,9 percent of the participants noted that they “agree” or “totally agree” with the question “did the renovation meet the expectations?”

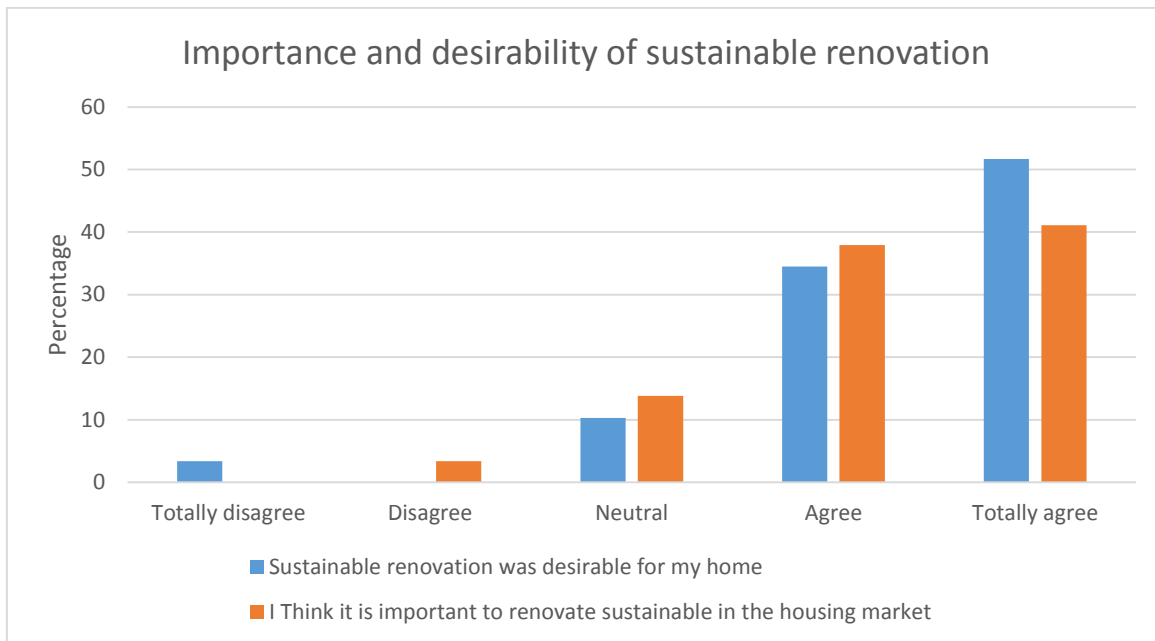


Figure 4.3.1: Importance and desirability of sustainable renovation (N=29)

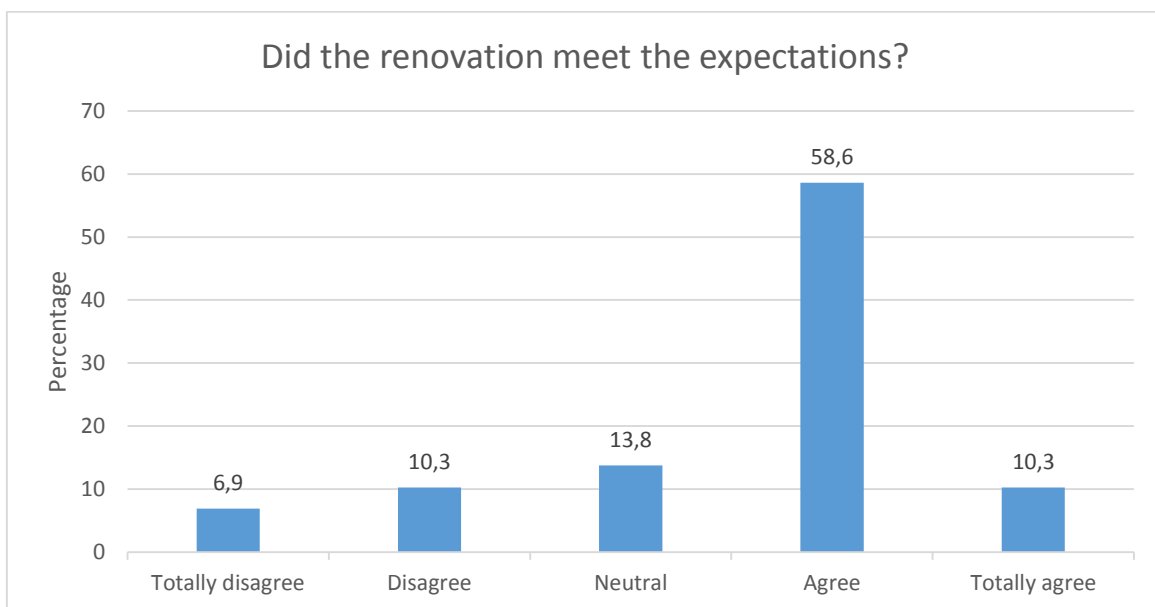


Figure 4.3.2: End result of the renovation (N=29)

The null hypotheses is "there is no association between desirability and the end result of the renovation". Table 4.3.1 shows that the P value is bigger than 0,05 so H0 is being accepted. This means there is no association between the two variables. This is in line with Klundert (1999) who stated that residents are willing to live in sustainable houses as long as they do not have to make big sacrifices. As said before the housing corporation renovated one house within a time frame of three weeks and the residents were able to stay in their house during the process (Lefier StadGroningen et al., 2011). Apparently this is a relative short, but big sacrifice for the residents. This can be the reason why residents thought the renovation did not meet the expectations.

| | | | <i>"The renovation did meet the expectations"</i> |
|-----------------------|---|-------------------|---|
| Spearman's rho | <i>"Desirability of sustainable renovation"</i> | Corr. Coefficient | 0,284 |
| | | Sig. (2-tailed) | 0,143 |

Table 4.3.1: Result of the spearman correlation between desirability and expectations of the renovation

5. DISCUSSION AND CONCLUSIONS

5.1 Discussion

In the discussion the results of the data analyses will be discussed and interpreted. The first result has been presented in table 4.2.1. If residents were more heard during the decision making, the process of the renovation was more smooth. There was also less inconvenience for the more the residents were heard by Lefier.

The second result has been presented in table 4.2.2. It appears that if Lefier took care of the residents wellbeing, the convenience during the renovation is less than when Lefier is not or less involved. Also the process is smoother if Lefier is paying attention to the wellbeing for the residents.

The third result has been presented in table 4.3.1. People who thought the sustainable renovation was desirable, did not necessarily thought that the renovation meet their expectations. Residents were able to stay in their homes during the renovation. Since this was a big sacrifice, people could have been disappointed with the end result. Further conclusions will be drawn in the next chapter.

5.2 Conclusions

The goal of this thesis was to gain insight in a sustainable renovation project of public housing. The main question that needed to be answered was; *“To what extent does the participation of the residents influence the renovation process”*. By means of questionnaires residents were asked for their opinion about the renovation in this particular case.

With the help of a bar chart, the statements “desirability of sustainable renovation for their houses” and “the importance of sustainable development/renovation in the housing market as a whole” were presented. The greater part of the participants “agrees” or “totally agrees” with these two statements.

The core-question of this thesis is how residents experienced the renovation. Therefore statistical analyses was being done through Spearman Correlation tests (Norušis, 2012). A (strong) positive association was found between “I had active participation in the decision making” and “The process of the renovation was smoothly”. If active participation in the decision making goes up, so is the smoothness of the renovation. There was also a positive association between “I had active participation in the decision making” and “During the renovation, there was little inconvenience”. It appears that when people has more say in the project and process, not only the smoothness of the process and project is better, but also they experience less inconvenience. Kaklauskas et al. (2007) states that knowledge management is an element in sustainable renovation projects. By means of knowledge exchange, actors are more aware of the interests of the parties.

Also a strong positive association was found between “Lefier paid attention to the wellbeing of its residents” and “During the renovation there was little inconvenience.” The more Lefier was involved with the residents, the better the inconvenience was handled. Van Hal (2014) states that when people are not being heard during a renovation project, they are reluctant to everything they get offered, which makes the project more complicated and inconvenient.

In the end, there was no association between “Desirability of sustainable renovation” and “the renovation did meet the expectations”. People are willing to live in sustainable houses, but they do not want to make big sacrifices to do so. The residents had to make sacrifices. They were

able to stay in their homes during the renovation, but this meant that they had to live in inconvenient conditions during three weeks (Klundert, 1999)(Lefier Stadgroning et al., 2011).

Finally, it appears that the more residents have a say in the decision making process the better the process is going to be. There is not only less inconvenience, but also a smoother process. Same can be said about the involvement of the housing corporation, in this particular case Lefier Groningen. The more they are involved with the residents, the less inconvenience the residents experience and the better the process will be. If residents are taken seriously, they are less reluctant to what the housing corporation has to offer them (Van Hal, 2014).

5.3 Recommendations

In the scientific literature there are many articles about sustainability, sustainable development and sustainable renovation. Little is written about sustainable renovation and the experiences of the residents, who are the target group. Research about the experience of residents before, during and after such projects, can help to improve following projects. Lefier Groningen never asked the residents for any feedback, which is strange since this is their target group and many people had remarks on the process. Some of these remarks are mentioned in appendix B.

5.4 Reflection

This research consists merely of one specific case. It is too time consuming to do research of more than one project such as Lewenborg during this thesis, moreover other project just give an overview of the project itself, without the opinion of the residents. Since this topic is becoming more integrated in society more research is necessary to understand the procedures and the interest of all actors. More data and results can be helpful to create a more specific overview of such projects realized by housing corporations.

The use of ordinal variables are limited. The Chi-Square and the Spearman correlation test are suitable for these variables. Chi-Square has certain requirements which could not be fulfilled even after resizing the scale. This means that the Spearman correlation is the only suitable test that was left. Also the sample was small (N=29) due to the small population and the years that has passed since the renovation was being completed. Certain questions were not used during the analyses and in the conclusions, because they were less relevant to the main question of the thesis. The questionnaire had to be better adjusted to SPSS before handing them out to the participants.

Through questionnaires, the researcher is asking participant for their opinions. Therefore answers given by them are subjective. For example participant 1 can say that he/she was involved during the renovation, while participant 2, who was as involved as participant 1, can feel he/she was not involved at all. This in combination with a small sample and one case makes it difficult draw hard conclusions

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Appendix A

Questionnaire bachelor research sustainable renovation in Lewenborg

Beste respondent,

Mijn naam is Mark Reij. Op dit moment ben ik bezig met een afstudeer scriptie voor mijn Bachelor Sociale Geografie & Planologie aan de Rijksuniversiteit Groningen.

Voor u ligt het enquête, bestaande uit 20 gesloten vragen en 1 open vraag, over de duurzame renovatie van de 387 woningen in Lewenborg, gerealiseerd in opdracht van Lefier Groningen. Er wordt in de enquête naar uw mening gevraagd over de desbetreffende renovatie opgeleverd in 2010. De enquête is opgedeeld in drie delen namelijk, voor- tijdens en na de renovatie. Het is hierbij essentieel dat u goed nadenkt wat uw mening was ten tijde van elk tijdsdeel. Elke vraag heeft vijf antwoordmogelijkheden, namelijk van 1 tot en met 5, waarbij 1 “helemaal niet mee eens” en 5 “helemaal mee eens” beslaan. Daarnaast wil ik u erop wijzen dat de enquête geheel anoniem wordt afgenomen en dat u ten alle tijden kunt stoppen met het invullen van de enquête. Het invullen van de enquête zal hooguit 5 minuten in beslag nemen. De resultaten zullen uitsluitend worden gebruikt voor dit onderzoek.

Ik wil u alvast hartelijk bedanken voor het invullen van de enquête en daarmee het helpen met mijn afstudeer onderzoek. Mocht u geïnteresseerd zijn in de resultaten, kunt u uw e-mailadres aan het eind van de enquête noteren.

ENQUÊTE DUURZAME RENOVATIE LEWENBORG

| |
|---------------------------|
| Geslacht: M/V |
| Leeftijd: |
| Hoogst genoten opleiding: |

| Voor de renovatie | | | | | |
|--|------------------------|---------------|----------|----------|-------------------|
| | Helemaal niet mee eens | Niet mee eens | Neutraal | Mee eens | Helemaal mee eens |
| 1. Ik vind duurzame ontwikkeling, renovatie in woningbouw erg belangrijk | 1 | 2 | 3 | 4 | 5 |
| 2. Ik was op tijd op de hoogte gebracht van de renovatie | 1 | 2 | 3 | 4 | 5 |
| 3. Renovatie was nodig voor mijn woning | 1 | 2 | 3 | 4 | 5 |
| 4. Ik vond het wenselijk dat mijn woning duurzaam werd gerenoveerd | 1 | 2 | 3 | 4 | 5 |
| 5. Ik was goed geïnformeerd over de geplande werkzaamheden | 1 | 2 | 3 | 4 | 5 |
| 6. Ik heb overwogen om te gaan verhuizen nadat bekend werd dat er zou worden gerenoveerd | 1 | 2 | 3 | 4 | 5 |

| Tijdens de renovatie | | | | | |
|---|------------------------|---------------|----------|----------|-------------------|
| | Helemaal niet mee eens | Niet mee eens | Neutraal | Mee eens | Helemaal mee eens |
| 7. Het proces tijdens de renovatie is goed verlopen | 1 | 2 | 3 | 4 | 5 |
| 8. Ik vind dat ik voldoende inspraak heb gehad tijdens de renovatie | 1 | 2 | 3 | 4 | 5 |
| 9. Er was weinig overlast tijdens de renovatie | 1 | 2 | 3 | 4 | 5 |
| 10. Lefier Groningen (en andere betrokken partijen) hebben voldoende aandacht besteed aan het welzijn van de bewoners | 1 | 2 | 3 | 4 | 5 |
| 11. Ondanks dat ik in mijn woning kon blijven, heb ik overwogen om tijdelijk ergens anders te verblijven | 1 | 2 | 3 | 4 | 5 |

| Na de renovatie | | | | | |
|--|------------------------|---------------|----------|----------|-------------------|
| | Helemaal niet mee eens | Niet mee eens | Neutraal | Mee eens | Helemaal mee eens |
| 12. De renovatie is snel en soepel verlopen | 1 | 2 | 3 | 4 | 5 |
| 13. De daling van energiekosten zijn het waard ten opzichte huur verhoging | 1 | 2 | 3 | 4 | 5 |
| 14. Ik heb mijn mening in positieve zin moeten bijstellen ten opzichte van voor de renovatie | 1 | 2 | 3 | 4 | 5 |
| 15. Ik vind dat de architectuur van mijn huis erop vooruit is gegaan | 1 | 2 | 3 | 4 | 5 |
| 16. Na de renovatie ben ik ook in andere opzichten duurzamer gaan leven (auto ↔ fiets, voedsel etc.) | 1 | 2 | 3 | 4 | 5 |
| 17. De renovatie heeft ervoor gezorgd dat ik overweeg mijn huis te kopen/gekocht heb | 1 | 2 | 3 | 4 | 5 |
| 18. De renovatie heeft aan de verwachtingen voldaan | 1 | 2 | 3 | 4 | 5 |

Wat had u achteraf graag anders willen zien en waarom?

Emailadres (als u geïnteresseerd bent naar de resultaten)

Appendix B

Remarks of the residents.

Negative:

"Lefier Groningen called the project a residential improvement instead of a renovation. This way they didn't have to pay big compensation to its residents"

"It was impossible to live in the house during the renovation. Lefier had to take care of people with children and pets through alternative homes. It was a stressful time for many people, including me"

"I'd rather lived somewhere else during the renovation. It was not livable during the renovation"

"The director of Lefier told us that the reduce in energy costs will be €100 per month. Now, we don't even save half of it"

"This renovation was primarily for Lefier itself, so the maintenance is less work and expensive"

positive:

"I am very happy with the new toilet/kitchen and shower. However there is too much glass in the façade, which makes it slightly less cozy"

"No complaints, the co-operation was fine"
