

# Research Report

## The future of the Utrechtse Heuvelrug through the eyes of residents



*Regional Integration Project  
Utrecht University, Global Sustainability  
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*Group number*  
6C

*Group members*  
Hela Azib (7062826)  
Cors Gardeniers (6934218)  
Romane Isoard (1173576)  
Lucca Polders (0537924)  
Daphne Rasser (7765184)

*Supervisor*  
Tom peek

# Reader's Guide

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0.0 Introduction.....	3
1.0 Literature Review.....	4
1.1 Pathways for the future .....	4
1.2 Tourism.....	4
1.3 Sustainable living.....	4
1.4 Climate adaptation.....	5
1.5 Conceptual framework.....	5
2.0 Methodology.....	7
2.1 Research design.....	7
2.2 Fieldwork.....	7
2.3 Data analysis .....	8
3.0 Results.....	9
3.1 Data.....	9
3.2 Narratives.....	15
4.0 Discussion.....	17
4.1 Alternative narratives.....	17
4.2 Link to research aim.....	17
4.3 Comparison to other research.....	18
4.4 Strengths and weaknesses.....	18
5.0 Conclusion.....	19
6.0 Relevance & Integration.....	20
7.0. Reference List.....	21
Appendix 1 (Questionnaire).....	23

## 0.0 Introduction

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This past year, many restrictions have been imposed by the government because of the corona pandemic. Because activities were not allowed to take place, and many places could no longer be visited, nature reserves were one of the few opportunities where people could still move around freely. One place that got, and still gets, visited often is the well-known Utrechtse Heuvelrug.

The Utrechtse Heuvelrug is the second-largest forest area in the Netherlands. In total, the area covers about 40,000 ha with alternating deciduous and coniferous forests, heaths, extensive meadows, over 100 estates and country houses, hereby creating a landscape of cultural heritage (Utrechtse Heuvelrug, n.d.). Because the Utrechtse Heuvelrug is so varied in possibilities, it attracts a diverse public. Think about hikers, horse riding, mountain bikers etc. Because it attracts such a grand public, the question remains whether the Heuvelrug can be sustained in the light of future challenges such as climate change.

The residents will be affected by any changes made in the policy of the municipality to battle these challenges (van Unen, 2019). Therefore, it is important to look at the future prospects of this area together with the residents when implementing policies. (Utrechtse Heuvelrug, n.d.).

The number of inhabitants in this municipality is around 48.000 people. To identify their future perspectives for the Utrechtse Heuvelrug, we have conducted research based on the topics of climate adaptation, tourism and sustainable living. The research includes a literature review to gain knowledge about the Utrechtse Heuvelrug and its current policies. After this, the research design will be stated, and results will be analysed. Lastly, a conclusion is provided containing a summary of the research. Potential bias encounters and other discussion points will be mentioned as well.

The aim of this research is to understand what residents of the Utrechtse Heuvelrug prefer for their future. In doing so, it is important that we also look at how residents identify different scenarios which can influence policy making regarding the three topics. To answer the main research question, we have explored key variables that shape the possible narratives for the future of the Utrechtse Heuvelrug. Hereby, we have investigated whether the current development plans of the government differ from the future perspectives of the residents.

In order to achieve these goals, we have formulated the following research question: *what possible narratives fit the future visions of residents of the Utrechtse Heuvelrug concerning sustainable living, climate adaptation and tourism?*

# 1.0 Literature Review

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An analytical framework consisting of key variables for data collection needs to be established first. Analysing existing literature provides room for exploratory research about the Utrechtse Heuvelrug and which variables are important considering future challenges. This analysis supports the aim to identify current and possible future developments in the municipality of Utrecht. Hereby, an opportunity arises to connect existing knowledge about current policy plans with a theoretical approach for narrative construction considering the resident-group point of view for future plans.

## 1.1 Pathways for the future

Bohensky et al. (2006) define scenarios as "a set of plausible narratives that depict alternative pathways to the future". Subsequently, narratives qualitatively explain and project change in aspects of society that are difficult to map out quantitatively. Social developments, environmental awareness, and public perception of institutions can be described with narratives (O'Neill et al., 2017; Van Vuuren et al., 2012).

Van Vuuren et al. (2012) summarizes different ways of creating and studying scenarios. Alcamo (2008) does this as well, but more extensively. As narratives are inherently qualitative, our research scenarios will inherently have advantages and disadvantages as Alcamo (2008) notes. Narratives can include many different stakeholder perspectives simultaneously and thereby describe a complex system that is not hard to understand. However, they always rest on assumptions that are extremely hard to test and they cannot be numerical.

## 1.2 Tourism

Research shows that National Parks are acknowledged for their representation of ecosystems within a country, leading to their appeal for nature-based tourism. Residents and visitors can connect with nature through recreation and educational practices (Eagles & McCool, 2002). The Utrechtse Heuvelrug counts around 1 million tourists per year which generates an added value of 131 million euros, accounting for almost 1390 jobs in the recreation sector (Utrechtse Heuvelrug, n.d. a).

To deal with increasing tourism, the municipality plans to increase public transport for long distance use and make biking more attractive amongst citizens for short distance use (Utrechtse Heuvelrug, 2010). This decreases traffic, which increases the residents' quality of life. However, it is not elaborated how feasible and costly these plans are. Also, substantial research considering the opinions of residents on tourism and its impact on landscape in the Heuvelrug is not provided.

Additionally, the programme for economic development shows the municipality's plans to increase tourism by improving shopping malls and subsidize tourist projects. However, the report fails to take sustainability, nature-based recreation or the sports sector into account. Furthermore, details about the feasibility concerning the ideas are not mentioned (Utrechtse Heuvelrug, 2018).

## 1.3 Sustainable living

Furthermore, literature describes a transition to a circular economy, together with the desire to become a CO<sub>2</sub>-neutral municipality in 2035 (Putman & de Wit, 2017). This is desired to deal with future challenges considering climate change.

To incorporate sustainability for the future, Utrecht is part of the Regional Energy Strategies campaign. They try to generate sustainable energy with wind turbines and solar panels, while taking the possible negative impacts for residents into account (Provincie Utrecht, n.d.). Furthermore, they state rules for the placement of wind and solar parks considering natural and urban habitats.

Another goal is to move past natural gas heating systems in residential housing and other buildings by 2050, through citizen participation, and to invest in renewable energy forms. Research shows that heating-related CO<sub>2</sub> emissions can be diminished by 90% when sustainable technology is used (Verhagen, der Voet & Sprecher, 2020). This study also found that policy measures such as a tax increase on the usage of natural gas can help to reduce the emissions. The Transition Vision heat report notes that residents of Utrecht will be informed about the implementation of new residential forms of energy, yet it is unclear whether they will get subsidies to make this change and which energy form will be used (Utrechtse Heuvelrug, 2021).

## 1.4 Climate adaptation

Pielke (1998) defines climate adaptation as "adjustments in individual, group, and institutional behavior in order to reduce society's vulnerabilities to climate". This definition is broad in many aspects. Climate adaptation measures could be taken by everyone and can address different vulnerabilities. These can vary from social and economical to environmental and biological (Smit & Wandel, 2006). Therefore, climate adaptation measures are and should be different for every location and context (Huggel et al., 2015). Municipalities and local communities play a central role in the debate about what measures need to be taken (Biagini et al., 2014; Huggel et al., 2015).

The municipality of the Utrechtse Heuvelrug has mapped out their vulnerabilities to a changing climate along with measures that should be taken. The municipality is vulnerable to both droughts and extreme precipitation due to climate change (Bodegom et al., 2011; Verkaik et al., 2009). The Heuvelrug itself is a moraine with elevated sandy soil, which will be drier than normal during droughts (Verkaik et al., 2009). Because the groundwater levels are already low in this area, increasing droughts can affect the growth of vegetation (Bodegom et al., 2011).

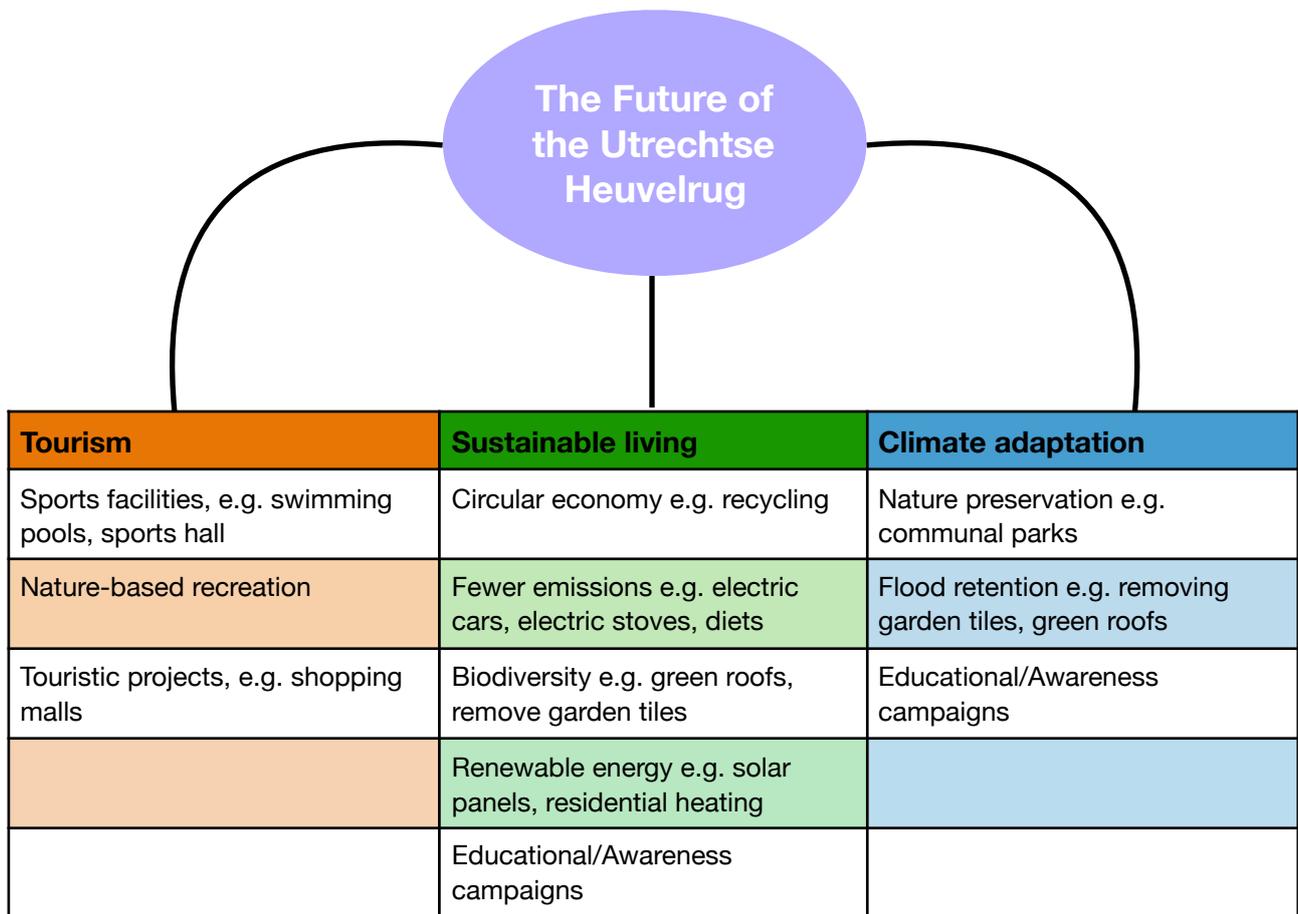
On the other hand, extreme amounts of precipitation are also concerning. The Utrechtse Heuvelrug is an elevated area and heavy rainfall flows off to nearby villages, flooding the sewage system (Gemeente Utrechtse Heuvelrug, n.d. b). A local strategy to adapt to such vulnerabilities is the current "Huisje Boompje Beter" campaign which encourages residents to remove tiles from their garden and plant flora to contribute to a biodiverse neighbourhood. This is an example of a climate adaptation measure at the local level, since the soil can take up excess rainwater or hold onto water in drought. The campaign includes a simple guide on how to make the transition. This guide is concise and clear, yet generalised without detail (Stichting RIONED, n.d.).

Similar is the installation of green roofs which has already been accomplished in Rotterdam through subsidies. Hereby residents contribute to local biodiversity whilst incorporating climate adaptation as green roofs retain water, decrease the urban heat island effect and reduce building energy consumption of cities (Berardi, GhaffarianHoseini & GhaffarianHoseini, 2014). Literature shows that enforcement by a government body, together with subsidy possibilities is the best method. However, opinions of residents are not always taken into account and research in Utrecht about this subject is not yet available (Mees, 2014).

## 1.5 Conceptual framework

An overarching research gap is discovered when considering the residents of Utrecht. Reports exploring the opinions of residents, or the trade-offs between different measures (for residents) are missing. Often, collaborations with residents are mentioned, yet it remains unclear in what way this collaboration was conducted. Clear and substantial research considering the opinion of residents regarding climate adaptation, sustainable living and tourism is necessary. An analytical framework considering key variables for data collection has been established based on the literature review (figure 1).

This conceptual framework encompasses the building blocks through which we will view the future of the Utrechtse Heuvelrug, retrieved from information gathered from the literature review. The most important municipality plans have been incorporated into the framework. We have based our survey questions on these building blocks to understand the opinions of residents on plans for the future structured into these topics of sustainable living, climate adaptation and tourism. In making narratives for the future, the variables in this framework will be used again to construct a vision for the residents, to see how these building blocks might develop in the coming years. However, this will be elaborated further in the following sections.



**Figure 1** Analytical framework outlining variables in future plan development of the Utrechtse Heuvelrug on tourism, sustainable living and climate adaptation.

## 2.0 Methodology

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### 2.1 Research Design

First of all, literature has been read and reviewed to gain a better understanding of the Utrechtse Heuvelrug together with key concepts and variables that have been explored. Learning about the past developments from the municipalities has provided us with the tools to see how the park is the way it is today and develop relevant and interesting questions for our project. Furthermore, delving into similar research in other parks has been useful to develop our own method. Literature has also been analysed concerning narratives and their construction in order to analyse the results of the fieldwork at a later stage in the project.

After having identified the current knowledge gap, the focus was placed on developing a survey aimed at the residents of the Utrechtse Heuvelrug. Surveys are a proper tool to conduct this research as they are an effective way to gain insights about people's opinions. They are less time consuming than interviews and the sampling size of the population of interest is larger when using a survey than with interviews (Peek, 2021). The larger sample size helps to reduce potential bias in sample choice, decreases uncertainty and increases the validity for making representative conclusions concerning the population of interest. We have used a purposive sampling technique, with the contingent criteria that the people have to be residents of the municipality. This qualitative method of sampling is useful as it is a good way to get information about a specific group that corresponds to our research question (Acevedo Guerrero, 2021). Moreover, using surveys ensures that the necessary information is provided as guiding questions will be designed.

Residents are key stakeholders when considering the future of the Utrechtse Heuvelrug. Indeed, they have local knowledge and experience (most of them have been living there for generations and have seen the park evolving for example) which is essential for designing effective policies and facing current and future challenges such as climate change. (van den Ende et al, 2021) The municipality as a whole cannot adapt to climate change if the residents do not participate in adaptation measures. In order to make concrete and well-researched narratives, it was desirable that the survey got at least a hundred responses. To achieve this, multiple ways of data collection have been combined for the survey to reach the largest audience possible. Unfortunately, in the end, there were only 84 respondents.

### 2.2 Fieldwork

The goal of the survey was to collect information about the opinions of residents about the current and future developments for the Utrechtse Heuvelrug, as well as what these residents envision for its future. Combining the literature gap with our research aim, we knew what questions were relevant to ask in the survey and we have designed them accordingly. These questions cover a wide range of topics and issues concerning the current and future challenges for the Utrechtse Heuvelrug. Questions encompass the themes of tourism, climate adaptation and sustainable living, as we view these themes as most relevant and challenging. Questions about *what residents think about distinct climate adaptation measures* or *what their relationship with the Utrechtse Heuvelrug is* give insights about the different wishes of the residents.

After having constructed the survey on the website Survey123, it has been distributed during our fieldwork. The first step was to make a QR code which provides residents with easy access to the survey through the website. Then, we approached people who were walking around the Utrechtse Heuvelrug (Driebergen-Rijsenburg, Leersum, Amerongen, Maarn, and Doorn) and asked if they had a few minutes to fill in the survey. They could either scan the QR code and fill in the survey on their own, or we asked them the questions and filled it in for them. For our research, we thus used convenience sampling (Bryman, 2015). Furthermore, a flyer which contained information about the project and the QR code was put in the mailboxes of residents. This way, they could fill it in individually and more people were reached. Moreover, there is a facebook group called 'Gemeente Utrechtse Heuvelrug' which we have messaged to ask if they wanted to share our survey. We hoped to reach a larger group this way. Sadly though, they did not accept our proposal and the survey could not be distributed online.

After the surveys were filled in over the three days of fieldwork by as many residents as possible, the data was interpreted. To analyse the findings we looked at the graphs made by Survey123, identifying patterns regarding the key variables of our analytical framework, which made clear what the residents value most. Furthermore, by putting the data set into SPSS it could be determined, by making bar graphs, if there were any correlations concerning for example age,

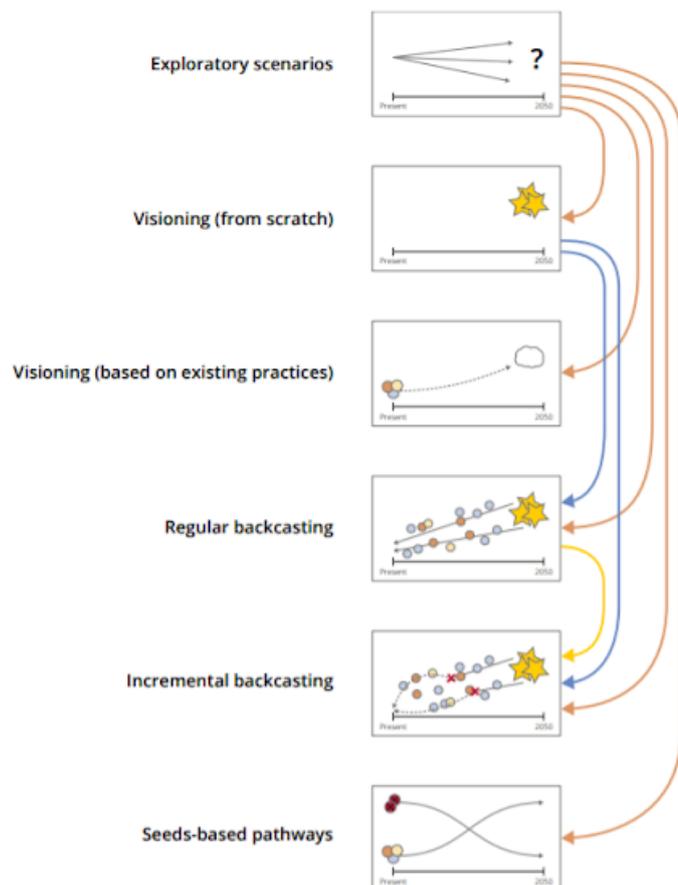
municipality, income or family situation with future perspectives. In SPSS there was also made use of descriptive statistics and statistical tests which will be elaborated on in the next section.

Moreover, combining the data analysis and interpretations with the literature review and the conceptual framework, was the base of our narratives. Indeed, we developed the narratives by 'visualizing from existing practices' such as the current developments of the municipality, and by looking at the different components of the topics from the framework. The framework provides the building blocks for the narratives, as the data gives information on the opinions of residents considering these key variables. With the opinions of residents on these key variables, a future narrative can be constructed.

### 2.3 Data analysis

According to an article of Van den Ende et al. (2021), there are multiple ways to construct a narrative, many of which can be combined (figure 2). For this research, a combination of exploratory scenarios and visioning from existing practises has been used.

Firstly, the exploratory scenarios have been used to see which future storylines are plausible. The residents were asked numerous questions related to different outcomes for the future; they explored what their vision is. The analytical framework has helped to analyse the data considering resident acceptance, participation and possible actions of the municipality. To build on the current developments in the municipality, we have designed narratives from the visions based on existing practises. The difference between exploratory scenarios and visioning is that it moves the focus from a plausible future to a desirable one, making it more concrete. For this report the aim is to construct plausible narratives that encompass the opinions of residents, whilst it is deemed less important to research practicalities considering the achievability of these future visions. Using the two mentioned components, narratives that accurately reflect the residents' imagined futures for the Utrechtse Heuvelrug have been constructed.



**Figure 2** Overview of possible combinations of foresighting methods  
<https://www.uu.nl/sites/default/files/geo-sd-reports-foresight-methods-toolbox.pdf>

## 3.0 Results

First of all, the survey received 84 responses in total from towns of the Utrechtse Heuvelrug. The collected data has been put in an Excel file and analysed using SPSS. The results are provided in the following sections.

### 3.1 Data

Before constructing the narratives, we tried to look for possible linkages between age, salary and other demographics that would portray differences for future perspectives. By making bar graphs and using statistical tests we found that there is no correlation between demographics and preferences for future developments between residents.

An example of this can be seen in figure 3, where we used a Spearman's rho test to identify a correlation between age group and preference for future investment in the three topics. The null hypothesis for this test is that there is no significant relationship between age group and topic choice. The regular hypothesis would be that there is a significant relationship between age group and topic choice. The correlation would be significant with a p-value below 0.01. The Sig. (2-tailed) in figure 3 is 0.339, which is higher than 0.01, so we have to accept the null hypothesis. Therefore, we can state that there is no significant relationship between age group and topic choice. As we got similar results when testing other demographics, these findings did not yield useful results to include in the narratives.

## Nonparametric Correlations

		Correlations		
			Top 3 of sustainable living, climate adaptation and tourism	leeftijdgroep
Spearman's rho	Top 3 of sustainable living, climate adaptation and tourism	Correlation Coefficient	1,000	-,107
		Sig. (2-tailed)	.	,339
		N	84	82
	leeftijdgroep	Correlation Coefficient	-,107	1,000
		Sig. (2-tailed)	,339	.
		N	82	82

**Figure 3** Table showing the results of the Spearman's rho test for topic top 3 (sustainable living, climate adaptation, tourism) and different age groups retrieved from SPSS

Next, the most obvious finding was the top three about the priority of the different topics, as is visualized in the pie chart of figure 4. Sustainable living was mostly chosen (n=52) as the first priority for the municipality. Less people chose to put climate adaptation (n=25) as first and only a few chose tourism (n=7).

Top priority for the municipality according to residents

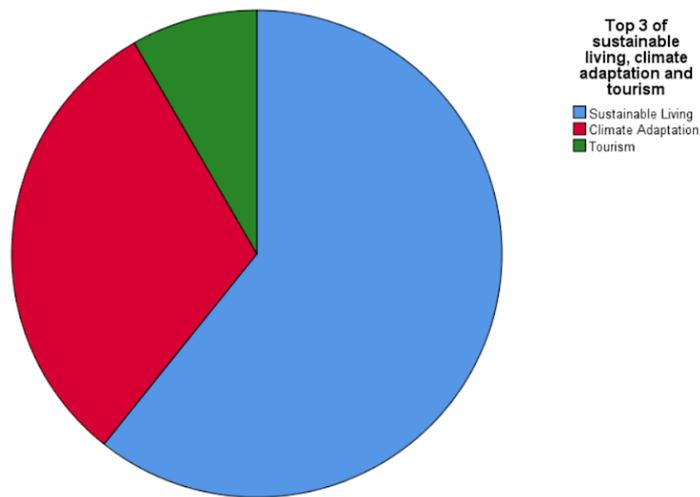


Figure 4 Pie chart showing the top priority topic for the municipality to invest in, according to residents retrieved from SPSS

Furthermore, apart from voting, the majority (67.9%) of the residents feel that they are not very involved in the decision-making processes of the municipality (figure 5). Next, we will go more into depth about residents' opinions on the three main topics.

Feeling of involvement in the municipality

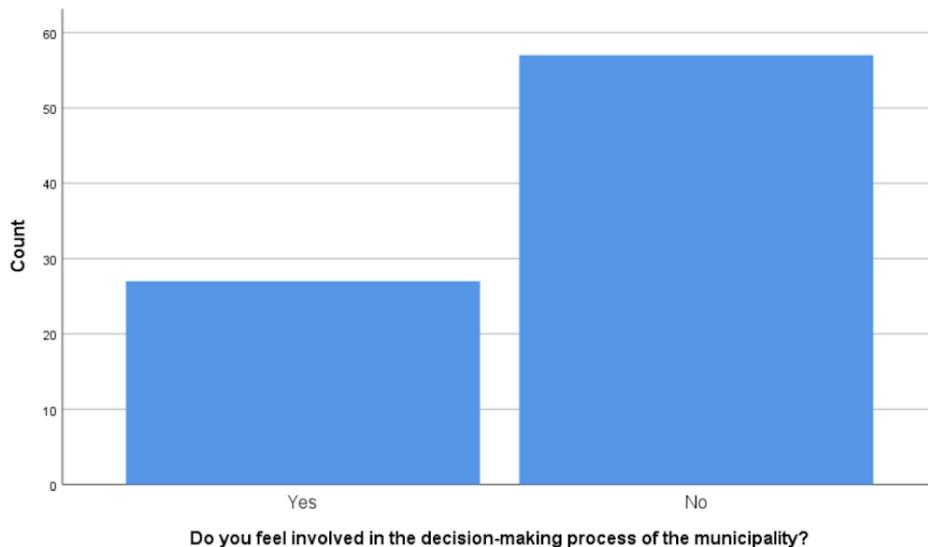
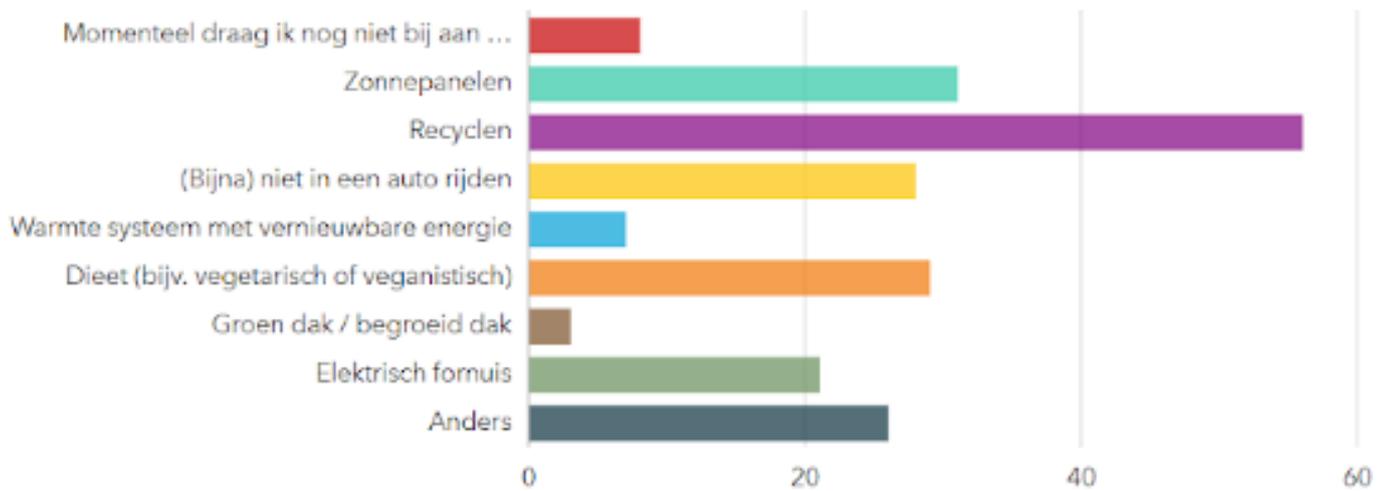


Figure 5 Column chart showing the residents' feeling of involvement in the decision-making processes of the Utrechtse Heuvelrug in Yes/No format retrieved from SPSS

### Sustainable living

Most surveyed people are already living quite sustainable. For example, 66.7% contribute by recycling. Thereafter, having solar panels (36.9%), focusing on a sustainable diet (34.5%) and driving a car less (33.3%) were the most popular actions undertaken to be sustainable (figure 6).

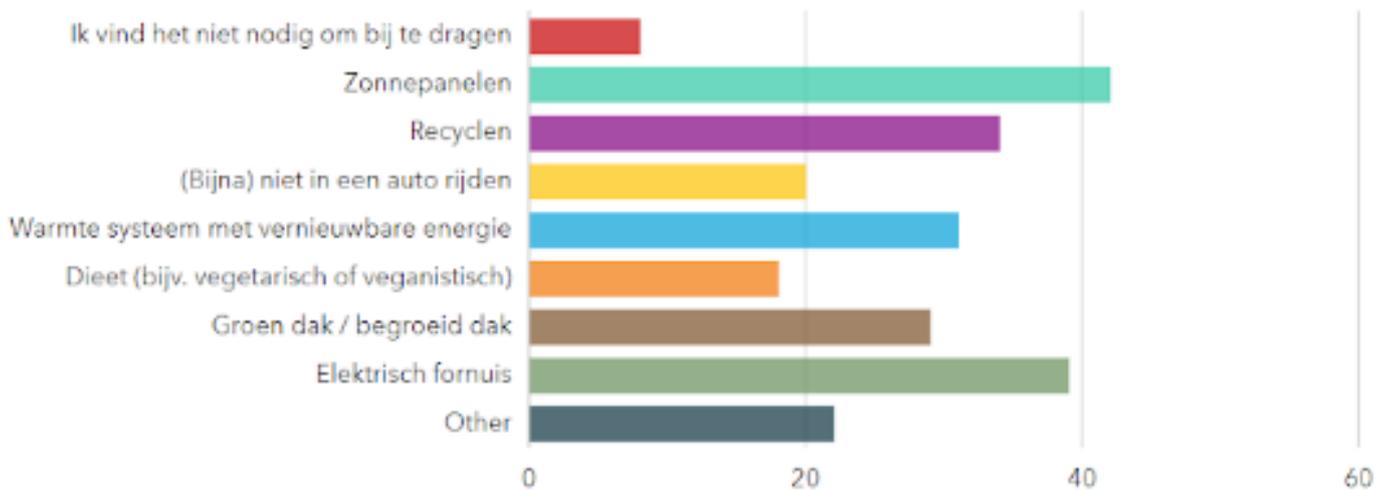
Furthermore, 74 people said that they do want to contribute (further) to sustainable living in the future as it is important for nature and can help the next generation. The residents not planning on contributing to sustainability found that they were already doing enough, were lacking (financial) resources to contribute, or thought it was a task for companies/municipalities.



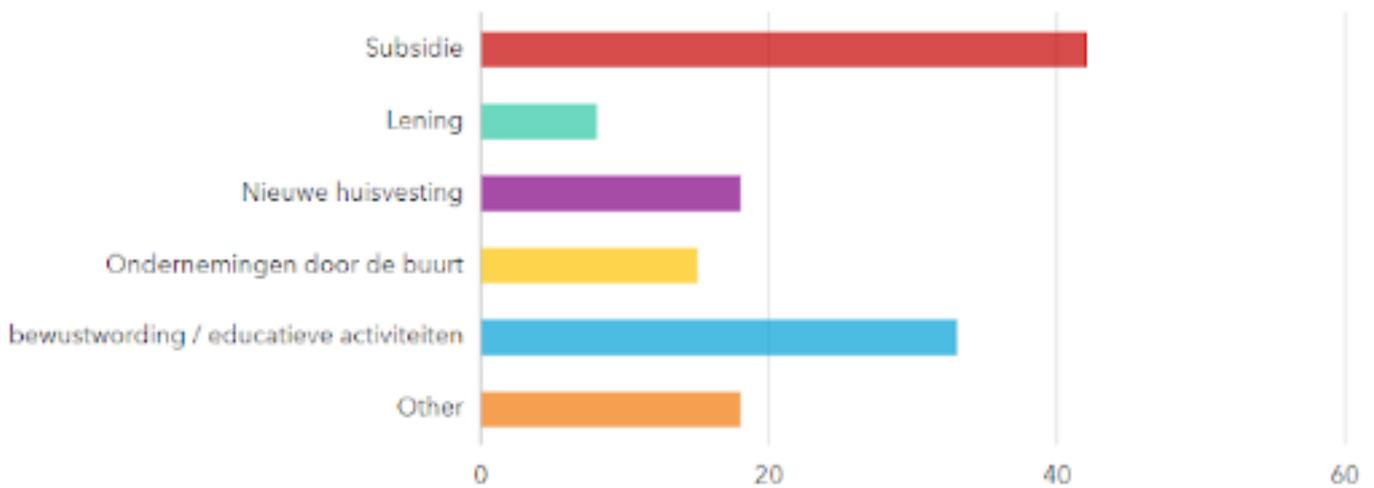
**Figure 6** Bar chart showing the residents' current contributions to sustainable living (in numbers of individuals opting for each choice) retrieved from Survey123

Respondents who opted for contributing envisioned this mostly through installing solar panels (50%), electric stoves (46.4%) and using renewable energy systems (36.9%) in their homes (figure 7). As the instalment of solar panels or new heating systems can be expensive, the residents were asked how the municipality could help them to achieve such changes.

Half of the respondents cared for subsidies from the government for expensive residential transitions (figure 8). Additionally, 39.3% of the respondents want the municipality to raise awareness about issues surrounding sustainability and offer more educational activities. Even if the municipality does not offer such resources in the future, 72.6% of the respondents would still continue contributing to sustainable living as planned already (figure 9).

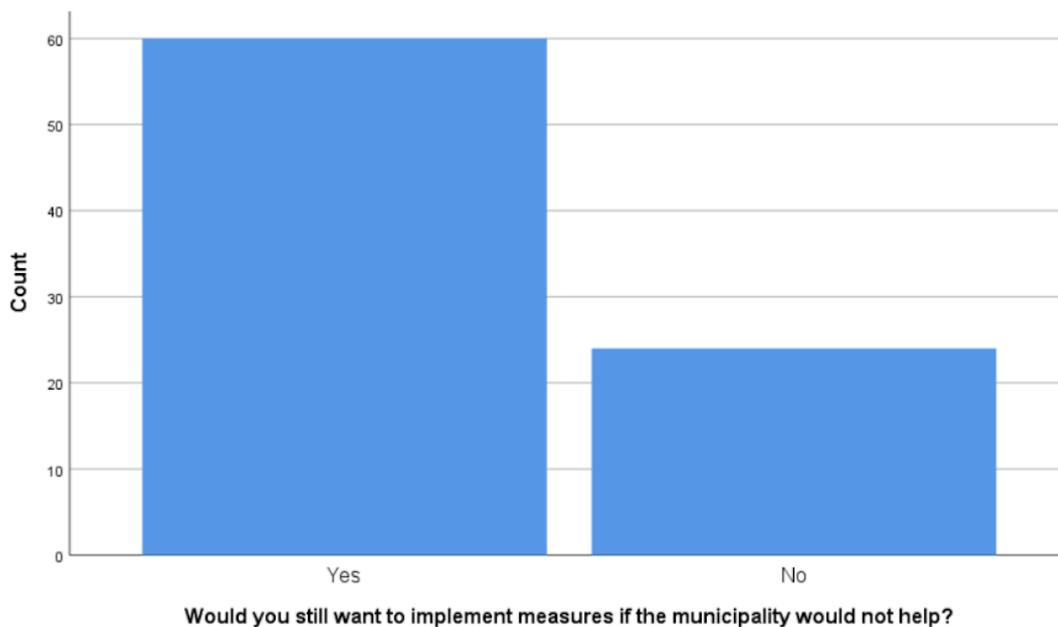


**Figure 7** Bar chart showing the residents' vision for contributions to sustainable living in the next 25 years (in numbers of individuals opting for each choice) retrieved from Survey123



**Figure 8** Bar chart showing the residents' vision of what would help them to implement sustainability into their home (in numbers of individuals opting for each choice) retrieved from Survey123

**Implementing measures individually**

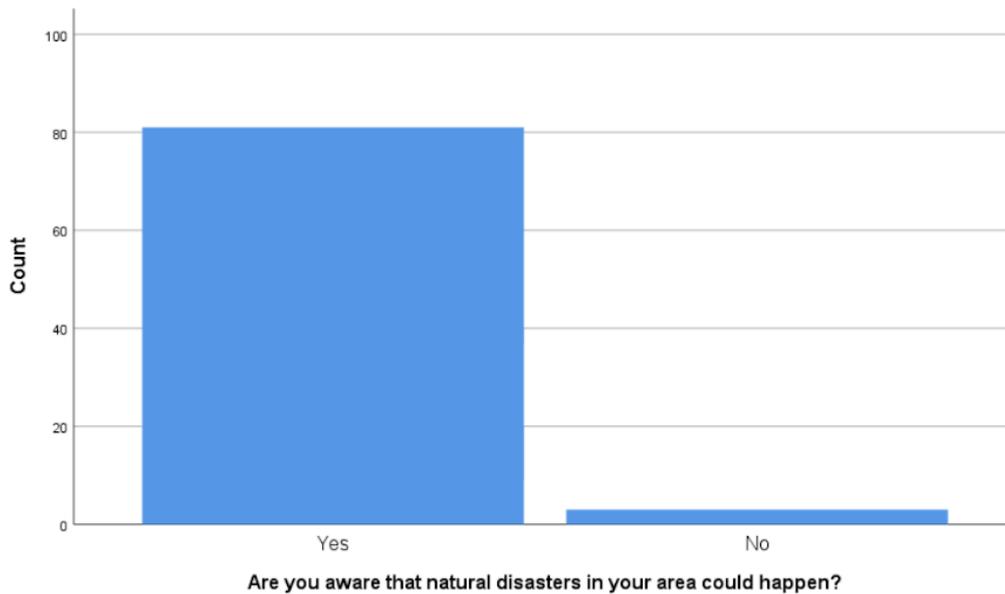


**Figure 9** Column chart showing whether residents would still implement measures individually without receiving help from the municipality, in Yes/No format, retrieved from SPSS

*Climate adaptation*

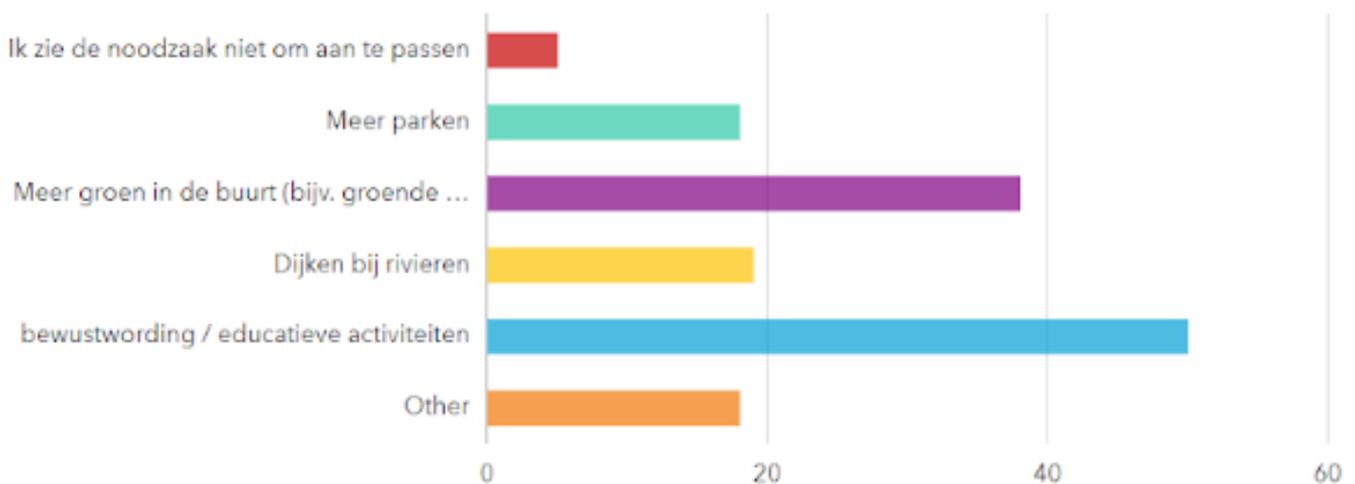
Interestingly, almost all people (n=81) claim to be aware of natural disaster possibilities due to climate change (figure 10). Currently, 30 respondents have green gardens and some (n=8) residents maintain their own rainwater catchment to reduce drought risks, retrieved from an open-answer question in the survey.

### Awareness of natural disasters



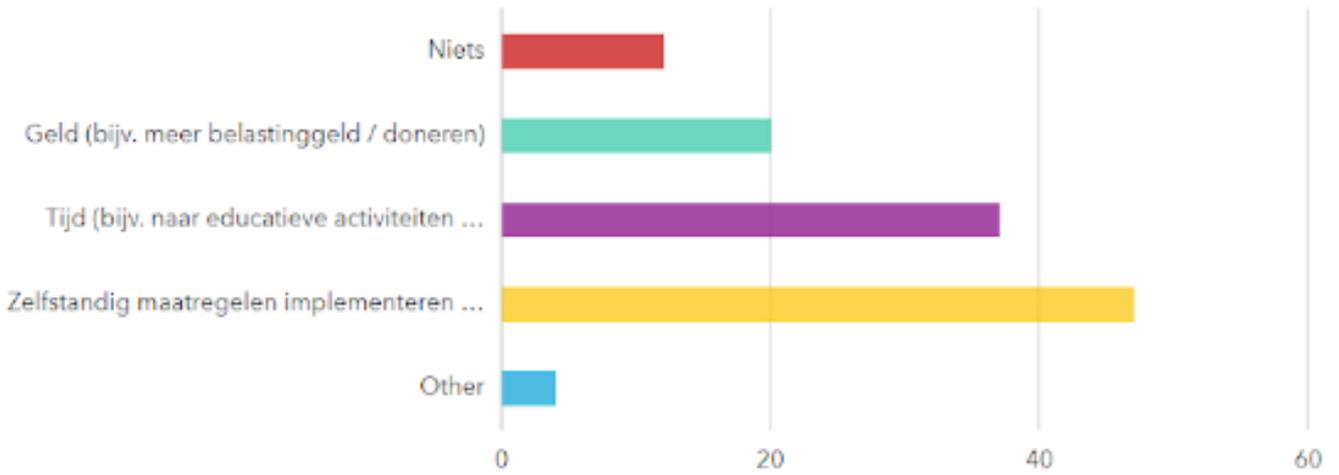
**Figure 10** Column chart showing whether residents feel aware of the possibility for local natural disasters in the future of the Utrechtse Heuvelrug, in Yes/No format, retrieved from SPSS

For climate adaptation, 59.5% would like the municipality to be more involved in raising awareness surrounding future challenges. Additionally, 45.2% would like to preserve nature, yet creating more parks is not considered to be as necessary as the towns are already surrounded by the national park (figure 11).



**Figure 11** Bar chart showing the residents' envisioned future municipality developments considering climate adaptation (in numbers of individuals opting for each choice) retrieved from Survey123

In order to make future changes feasible for the municipality, residents would not mind contributing in different ways, such as implementing individual measures (n=47), contributing time (n=37) and/or money (n=20). Nonetheless, there is a small number (n=12) that does not want to be involved (figure 12).



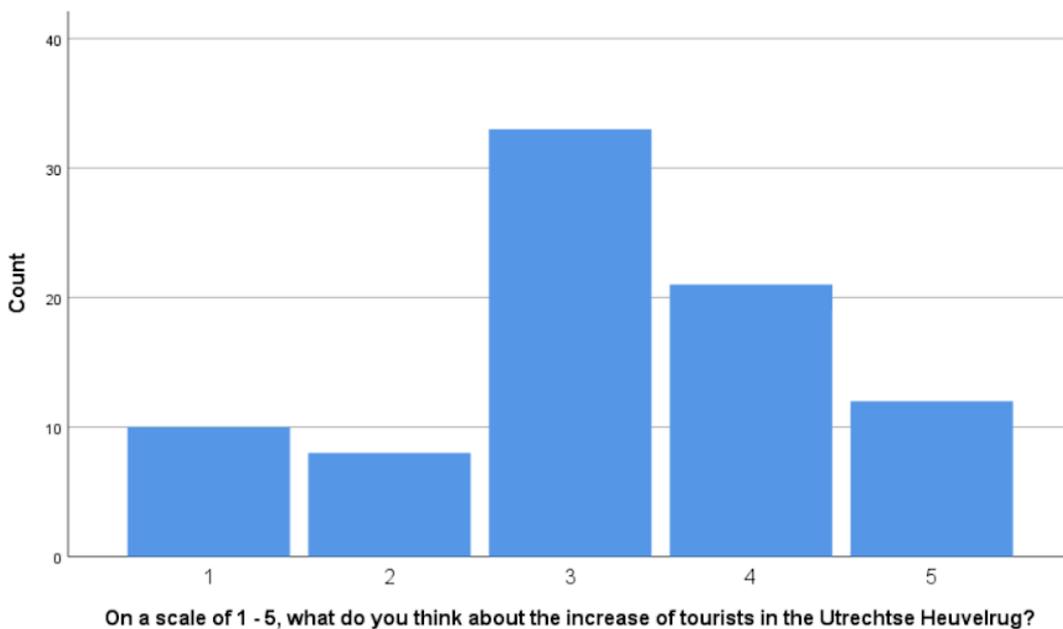
**Figure 12** Bar chart showing the residents' envisioned contributions to future municipality developments considering climate adaptation (in numbers of individuals opting for each choice) retrieved from Survey123

### Tourism

Overall, tourism is found the least important by the residents (figure 4). Residents notice that there are some tourists but it does not bring about irritations; when asking how they felt about the increase in tourists on a scale from 1-5, a neutral mean of 3.2 was answered (figure 14).

However, 33.3% do not want tourism to develop more in their area (figure 15). They find that there are already enough visitors and the cities should not be made more attractive as there will be an overload of tourists and it could cause degradation of nature. Nevertheless, the surveyed would like to see more shopping malls (n=24), swimming pools (n=23) and sport facilities (n=22). This is not to attract tourists, but to make the towns more attractive for young people and to stop the ageing population.

### Fondness of residents about tourists

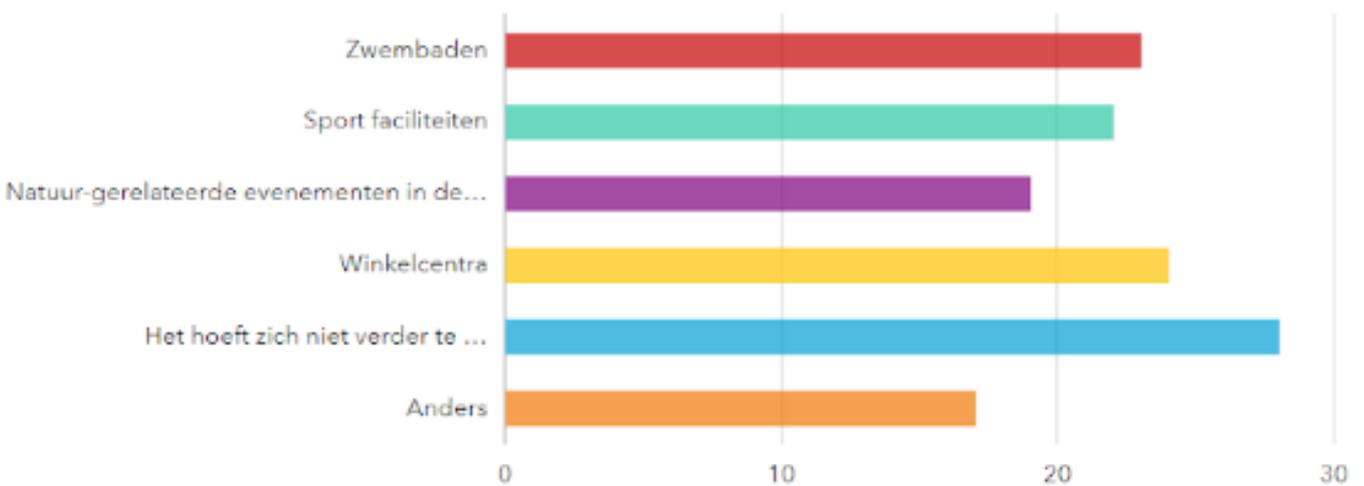


**Figure 13** Column chart showing the residents' level of fondness on the increase of tourism in the Utrechtse Heuvelrug, in Likert scale format (1 = least fond, 5 = most fond), retrieved from SPSS

## Descriptives

Descriptive Statistics						
	N	Range	Minimum	Maximum	Mean	Std. Deviation
On a scale of 1 - 5, what do you think about the increase of tourists in the Utrechtse Heuvelrug?	84	4,00	1,00	5,00	3,2024	1,16970
Valid N (listwise)	84					

**Figure 14** Descriptive statistics table of the resident's level of fondness on the increase of tourism in the Utrechtse Heuvelrug retrieved from SPSS



**Figure 15** Bar chart showing the residents' envisioned evolution of tourism in the next 25 years (in numbers of individuals opting for each choice) retrieved from Survey123

The analysed data will now be interpreted to construct narratives. We have established two narratives based on municipal involvement in future challenges surrounding the three topics. As we did not discover polarising views on the preferred developments for each topic, based on distinct demographics of residents for example, both narratives follow similar development trends.

Nevertheless, as figure 4 showed that many residents still do not feel heard by the municipality, and figure 5 showed that some residents prefer to take measures individually or not to be involved at all, we based our narratives on municipal involvement versus individual action taken by residents. In the narratives we discuss the plausible developments (from a residential point of view) for each of the variables in the conceptual framework (figure 1), as building blocks for the future.

### 3.2 Narratives

#### *Narrative 1; focus on municipality contributions and leadership*

Considering the mentioned data and looking at the conceptual framework, a narrative can be derived fitting the wishes of most residents, with much municipal involvement and where sustainable living becomes the focus (figure 1; figure 4). In promoting sustainable living amongst residents, the municipality has to help in terms of education, motivation and financial resources to make the implementation of sustainability available and feasible (figure 8).

They can start with organizing awareness campaigns and offering educational lectures for the residents on how to live more sustainably, what it can cost and what it can generate

(financially). This can also be done to make people aware of future challenges considering climate change, such as flooding or droughts (figure 11). When the residents are more aware of how they can contribute to climate adaptation, they can make plans for implementing measures in their homes. Furthermore, they can enhance the local biodiversity by implementing green roofs. In order to make sustainable living available for all residents, the municipality has to offer alternatives for people living in rental homes as well, as these are state-owned. Currently, it is not allowed to make changes in rental housing, yet if the municipality would create opportunities for this, the Utrechtse Heuvelrug could become more sustainable gradually and would not favour some types of residents over others. Financial resources are often a drawback for implementing practices to prepare for or mitigate climate change individually, but with municipal investments such practices can increase in the future (figure 8).

Many inhabitants of the Heuvelrug feel that their opinions for the future are not being heard by the municipality (figure 5). Nevertheless, the municipality will have to be the leading actor in making the Heuvelrug more sustainable and adapted to climate change whilst also keeping it attractive. They could invest more in the preservation of green in neighbourhoods and in public transport. Improving public transport, makes for a decrease in car emissions which battles climate change. Next to this, increased citizen participation can also enhance biking amongst citizens and the use of public transport for longer distances. Also, by investing in nature-based recreation, tourism does not necessarily have to increase, but it can strengthen the human-nature bond.

Lastly, to make the towns more attractive to its own citizens, the municipality can invest in sports facilities or shopping malls (figure 15) without putting a focus on increasing tourism, as this is not per se preferred by residents (figure 14). It is most likely that the renovation of some cities in the Heuvelrug will lead to somewhat more tourism in the future, but when the municipality focuses on specific requests of residents, such as more terraces or festivals to attract youngsters, it will be accepted.

#### *Narrative 2; focus on individual contributions of residents*

Another narrative can be derived from the wishes of most residents around the Utrechtse Heuvelrug, without much municipal involvement. Many residents are already contributing to sustainable living individually (figure 6). They want to continue to do so in the future, even when the municipality will not offer educational activities or financial support to implement measures for sustainability or climate adaptation (figure 9).

Despite efforts of residents such as recycling, installing solar panels and re-greening their gardens individually (figure 7), it will take more time for the Heuvelrug to become sustainable in the future, as residents have to accumulate resources themselves which might need more effort. Besides, less people will probably implement sustainable living in their homes than in the first narrative, as some residents live in rental homes for which the municipality would have to step in to install e.g. solar panels or to move away from natural gas.

Additionally, without municipal investment in awareness campaigns, less inhabitants will be confronted with the future challenges of the Heuvelrug and will feel less motivated to participate. These challenges might not be prioritised by residents if they are not properly educated about climate change risks, and do not receive enough support. This might decrease citizen participation and connectedness of the different cities in the municipality. As the inhabitants already do not feel heard by the municipality, this sense of disconnection could increase in the future with individualism of residents dealing with sustainability and climate change.

Nevertheless, the majority of citizens claims to be aware of natural disasters occurring because of climate change and are taking initiatives individually for climate adaptation as well (figure 10; figure 12). For example, some are already active in residential water retention practices. Moreover, municipal intervention to add more communal parks is not deemed necessary by residents (figure 11); they only want the current nature to be preserved, which is accompanied by less governmental interventions such as building houses.

Lastly, many residents do not want tourism to increase (figure 14) and are content with their quiet, small towns as it is. The municipality will not have to invest in other facilities of shopping malls as this might cause the cities to be busier and have more noise and environmental pollution.

## 4.0 Discussion

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The constructed narratives will be further discussed in the following section. We will also look at possible expected alternatives to the narratives that we have created. Additionally, we discuss our methodology, results and overall research.

### 4.1 *Alternative narratives*

As it has been mentioned in the results, we have not identified any significant correlations between residential demographics using statistical tests. The narratives that we have created are consistent between all age groups, income groups, and personal situations (e.g. whether people have children or not). This is the reason why we were only able to create two narratives, and that there are none focussed on specific demographic distinctions between residents. This might have occurred because our sample size was not large enough to be able to observe any significant differences, as we only had a sample size of 84.

Based on the results, we wrote two narratives. Yet, there are alternative plausible narratives that could have been developed. What is striking in the results is that tourism is a low priority among residents. The Utrechtse Heuvelrug is an area with a lot of nature that attracts many people and tourism could ultimately boost the municipality's economy. With a growing economy, the municipality could possibly make new investments for a better future for the residents which goes hand in hand with responding to climate adaptation and sustainable living.

The current narratives that we created could, in reality, go hand in hand. As discussed in narrative one, residents find it difficult to contribute on their own and would like institutions such as the municipality to help them do so. So, these two narratives are not mutually exclusive and can exist simultaneously. By this we mean that the local government can offer means to encourage people to live more sustainability (such as educational campaigns), whilst residents continue to take individual action as well. This is different from building a shopping mall, for instance, because that cannot exist and not exist simultaneously.

### 4.2 *Link to research aim*

To achieve the research aim, we looked into the current developments of the municipality. In terms of what current developments concerning sustainable living, climate adaptation and tourism best fit the narratives, there are some differences between them. The current developments have previously been discussed in the literature review, and will be discussed here again.

The municipality plans to create more tourist accommodations, to promote shopping centres, and to subsidise tourist projects (Utrechtse Heuvelrug, 2018). The narratives that we have constructed do not fit this vision. While according to the narratives, residents of the Utrechtse Heuvelrug do not necessarily want less tourism, they do not want more, as can be seen in the results. It should also be noted that the residents only want more recreation facilities if they are mainly for the residents themselves. The current plan to subsidise tourist projects does not fit this vision (Utrechtse Heuvelrug, 2018).

Furthermore, the first narrative suggests that residents actually want more subsidies to be able to live more sustainably in the future, as the municipality should play a major role. Right now, the municipality does have plans for residents to live sustainably in the future, but it does not state whether or not residents can receive subsidies to implement these changes (Utrechtse Heuvelrug, 2021). As subsidies play a major role in this narrative, this information is crucial in deciding whether these municipal plans fit the narrative. As for education, the municipality plans to educate the residents, so this fits the first narrative perfectly. Additionally, they already have plans to increase solar and wind energy in locations which are accepted by citizens (Provincie Utrecht, n.d.). Therefore, it is probable that the plans of the municipality do fit the future visions of the residents. However, for the second narrative it does need to be noted that even if residents were not to receive subsidies, many would still live more sustainably in the future. As it is focussed on the residents, this vision fits the current developments of the municipality.

For climate adaptation, the municipality mainly focuses on greening and not so much on creating awareness (Gemeente Utrechtse Heuvelrug, n.d. b). For the first narrative, the residents would actually like to see this the other way around, as there are already a lot of parks and greenery. The second one does not need greening nor education.

### 4.3 Comparison to other research

As the narratives we have built are inherently tied to the direct location and context of the Utrechtse Heuvelrug, they are only applicable to the residents of the municipality. This makes it hard to compare our findings to other narratives that have been created, as none of these other narratives exist in a vacuum (Bohensky et al., 2006; UK NEA, 2014).

Additionally, it is difficult as our narratives aim to combine the future visions of the residents on sustainable living, tourism, and climate adaptation. However, in the future, we could compare the results to the findings of a similar survey conducted by the Utrechtse Heuvelrug municipality on the residents' views. This survey is still being conducted right now, so a comparison cannot be done at this moment (Gemeente Utrechtse Heuvelrug, n.d. c). This would have been a relevant comparison as this survey was also conducted in the same location with a similar topic.

### 4.4 Strengths and weaknesses

For this research, we used convenience sampling. This entails that we used different distribution methods approaching the most accessible individuals, to get the largest possible sample. We tried to diminish bias by standardizing the survey questions, however through different ways of interviewing there has been a greater risk for (interviewer) bias in our research. As we asked some people for their opinion in person, and some for their opinion without ever seeing us. Participants that have engaged with us, responding to questions, may have been more likely to respond in socially desired ways (instead of answering truthfully). Also, they had the opportunity to ask us questions and we could probe or prompt, whilst we could not do so when people filled in the survey at home. The surveys were also handed out by different pairs of researchers on different days in different locations. This may have increased inter- and intra-interviewer variance, as it was impossible to approach every participant in the exact same way. Moreover, we filled out some surveys ourselves for some people as they felt more comfortable with answering verbally instead of using the phone. This might have led to interviewers first interpreting answers before writing them down, which could have increased bias.

For the respondents that only received a flyer there were no inter- or intra-interviewer variances, of course. However, these respondents might not have understood correctly what the purpose of our research was. This could have influenced our results. To add on to this, scanning a QR-code might bring about complications as older people might not have been familiar with the technology. Additionally, one of the goals of this research was to have at least 100 responses to our survey. However, we managed to collect only 84 responses. This is not a large difference, but the larger our sample size, the more accurate our results would be. We did not sample within all towns of the municipality, as Meerdbergen and Overberg had significantly fewer inhabitants so we did not want to over represent these places in our sample.

The strength of our method lies in the fact that our survey encouraged people to write down their thoughts on certain developments and the future, aside from simpler likert scale questions. This has allowed us to come up with more thorough and detailed narratives that are based on the actual views of the residents of the Utrechtse Heuvelrug. This, combined with the information from the likert scale questions and the knowledge on what people found most important, has given us reliable data to be able to create narratives.

Obviously, the way we posed the questions in the survey influenced our results greatly. The order in which we introduced the topics, and the topics themselves, could have influenced who responded to the survey and how they answered. Someone who is interested in sustainability might be more keen to fill in this survey than someone who is indifferent to it. This might have caused a bias and our data would be more reliable if this had played no role in the sampling. Also, questions can be interpreted differently by respondents, resulting in different types of answers. When analysing the data we found out that some questions ended up being imperfect indicators for what we wanted to know. For example, the question on how the respondents want to see tourism develop over the next 25 years got us responses from people who were just considering what recreational facilities they would like to see regardless of a potential increase in tourism. Lastly, some questions came heavy-handed as, for example, respondents older than 80 years were asked which developments they wanted to see in the next 25 years. This could have been thought more through to avoid any insensitivity and collect relevant data.

## 5.0 Conclusion

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The findings of our research are key elements for the future of the Utrechtse Heuvelrug. Indeed, the active participation of the residents showed the amount of involvement they are willing to give for their thoughts and voices to be heard. In order to construct a fair and just Utrechtse Heuvelrug, stakeholders' opinions need to be taken into consideration. In that sense, the research has been impactful as participation of the residents in imagining and building their future area is of great interest for decision-making processes.

Furthermore, the research showed that participation of residents in their municipality can provide new insights, opinions and ideas. In the future, involving more residents in projects could help gain a real sense of what is wanted and needed by the community as a whole. In that sense, the narratives, based on the responses of the surveys, could be useful tools for the municipality in future decisions.

As for the content of the research, the key results can be summarized shortly. The two narratives that we have constructed using the topics of tourism, sustainable living and climate adaptation, highlight different aspects of the Utrechtse Heuvelrug. The conceptual framework retrieved from the literature review allowed for building blocks in future developments to be explored. Nevertheless, based on the results of our surveys, all the narratives reveal the need for sustainable living to become the first priority in the municipality.

The first narrative, following the development of the Utrechtse Heuvelrug by the municipality itself, outlines the wish of the residents to have more guidance and help. They want the municipality to take more responsibility and actions when it comes to sustainability.

Nonetheless, the second narrative follows a different direction, where residents are the main actors in developing their municipality, e.g. achieving sustainable living, and where there is more shared responsibility. These two narratives have helped us visualise the different wants and needs of the residents to construct possible future developments for sustainable living, climate adaptation and tourism in the Utrechtse Heuvelrug. However, the combination of the two narratives will help develop a sustainable Utrechtse Heuvelrug most efficiently.

Furthermore, the Utrechtse Heuvelrug is most likely to develop faster and more equally if done by both the municipality and the residents. Moreover, residents want to put the emphasis on building a future where sustainable living becomes a norm and where future decisions and plans take sustainability into consideration.

To conclude, the aim of our research was to find out what the residents of the Utrechtse Heuvelrug envision for their municipality. By designing surveys and going on fieldwork week, we gained insights on their wishes, which led us to construct two possible narratives. It has become clear during this research that the residents have similar general visions for the future. However, more extensive research should focus on how sustainable living can be implemented in the Utrechtse Heuvelrug and what the exact costs and benefits of such future developments would be, for both state and residents. Furthermore, it would be interesting to see how residents could be more involved in the municipality using different approaches such as educational activities, awareness campaigns, local initiatives and more.

## 6.0 Relevance & Integration

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The results of this research have made the opinion of residents on a proper future scenario for the Utrechtse Heuvelrug clear, when considering the future challenges of climate adaptation, tourism and sustainable living. With the data collected from the survey narratives have been constructed, each with a different implementation focus. Narratives are a useful tool to imagine, describe, and communicate about the future. They are being under-utilized, as the social embeddedness of narratives is crucial for the inherent locality of future issues the Utrechtse Heuvelrug may face. Additionally, they can create a sense of certainty in uncertain times (Bohensky et al., 2006; UK NEA, 2014). The constructed narratives also elucidate whether and how they might differ from current municipal developments.

For society, creating narratives about these issues is a helpful tool to discuss the future. These three subjects are all related to climate change, which is an important topic concerning future challenges. The implementation of effective climate adaptation measures may be crucial for the Utrechtse Heuvelrug as a whole. Extreme weather could have disastrous effects for the ecosystem, so correctly adapting to them is necessary. For effective climate adapting measures to be taken, scientific information about vulnerabilities and possible measures needs to be available and comprehensible (Biagini et al., 2014; Cash et al., 2003). Narratives are a useful tool to be able to do this (Alcamo, 2008).

The same applies to sustainable living and tourism. Sustainable living is essential for a sustainable and CO<sub>2</sub>-neutral future for the municipality, but knowledge needs to be understandable for all stakeholders (European Environment Agency, 1997). The COVID pandemic has shown that tourism can also have detrimental effects on the environment of the Utrechtse Heuvelrug. Again, the availability of clear and digestible information is important to convey the message.

In order to make the narratives more accurate and relevant, integration with other subtopics is needed. Hereby objectives from different stakeholders surrounding the matter can be analysed and compared. All sub topics concerning the future of the Utrechtse Heuvelrug are relevant to our research (6A, 6B, 6D). The results of the distinct research can be combined to develop possible scenarios for the future of the Utrechtse Heuvelrug. Connections can be made between the sub-topics in which each group focuses on another aspect of the future, through a different lens. Correlations and differences can be analysed between these visions to ensure a future which is beneficial to all citizen-groups surrounding the Heuvelrug.

This approach makes it possible to redefine the problem focus and explore new understandings of the Heuvelrug to reach different solutions. The integrated narratives constructed this way will provide insights into desirable climate adaptation strategies, sustainable practices and tourism for the entire Utrechtse Heuvelrug.

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# Appendix 1

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## Questionnaire

### Introduction

Dear participant,

We are a group of students from Utrecht University who are doing research in the Utrechtse Heuvelrug to discover which possibilities for future developments of the municipality are preferred by residents. With your answers we can construct narratives which encompass your opinions on a plausible future concerning the topics of tourism, sustainable living and climate adaptation.

Participation is completely anonymous and the data will only be used for research purposes. At any time, you are free to withdraw from answering this questionnaire. In about 4 weeks, after the research, your (personal) data will be deleted.

The questionnaire will take around 10 minutes. Thank you in advance for participating.

### Personal information

1. What is your age? Choose one of the following options.

- <18
- 18-25
- 25-40
- 40-60
- 60-80
- 80-100

2. In which city do you live or is closest to you? Choose one of the following options.

- Amerongen
- Doorn
- Driebergen-Rijsenburg
- Leersum
- Maarn
- Maarsbergen
- Overberg

3. What is your average yearly income before taxes in 2020? Choose one of the following options.  
(Optional question)

- € 0 - € 20.385
- €20.284- €34.301
- €34.300 - €68.508
- > €68.508

4. What is your family situation? Choose (multiple) from the following options.

- I have children
- I have no children
- Married/In a relationship
- Divorced/Single

### Tourism

5. How often do you participate in recreational activities e.g. mountain biking, swimming, hiking?  
Choose one of the following options.

- Every day
- Multiple times a week
- Once a week
- Multiple times a month

- Once a month
- Multiple times a year
- Never

6. On a scale of 1/5, what do you think about the increase of tourists in the Utrechtse Heuvelrug this past year? (think about the economy, nature and your personal experience)

7. How would you want tourism to develop in the area for the next 25 years? Choose (multiple) from the following options.

- Swimming pools
- Sports hall
- Shopping malls
- Nature-based recreation events at the Heuvelrug
- Other, please specify: \_\_\_\_\_

8. If you are not in favour of an increase in tourism, why not? Please fill in an answer in the blank space.

\_\_\_\_\_

### **Sustainable living**

9. On a scale of 1/5, to what extent should sustainability be prioritised by the municipality? (think about climate change, biodiversity etc.)

10. Do you already contribute to sustainable living? Choose (multiple) from the following options.

- Solar panels,
- no car/ electric car
- Recycling
- renewable energy heating system
- vegetarian/veganism
- green roof
- electric stove
- I currently do not contribute to sustainable living
- Other, please specify: \_\_\_\_\_

11. Would you be willing to contribute to sustainability in the next 25 years? Why or why not? Please fill in an answer in the blank space.

\_\_\_\_\_

12. How do you visualise this contribution? if any? Choose (multiple) from the following options.

- Solar panels
- no car/ electric car
- renewable energy heating system
- vegetarian/veganism
- green roof
- electric stove
- I do not visualise such a contribution
- Other, please specify: \_\_\_\_\_

13. What factors would help you to implement sustainability in your home? (e.g. transition to renewable energy for heating) Choose (multiple) from the following options.

- Subsidy
- loan
- new housing
- neighbourhood initiatives
- awareness/educational campaigns
- Other, please specify: \_\_\_\_\_

14. If the municipality does not offer these options, would you still implement such measures into your home individually?

**Climate adaptation (flooding & drought focused)**

15. Are you aware that natural disasters in your area, as a result of climate change, could happen? (e.g flooding, droughts) Choose one of the following options

- Yes
- No

16. Are you already taking measures against these risks? (e.g. tiles in gardens, green roofs) Please fill in an answer in the blank space.

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17. On a scale of 1/5, to what extent should measures against these climate disasters be prioritised by the municipality? i.e. do you want the municipality to take more action to prevent future natural disasters concerning climate change

18. How would you like your municipality modified to adapt to climate change? Choose (multiple) from the following options.

- More parks
- Greening the neighbourhood (e.g green roofs)
- Dykes near rivers
- Awareness/educational campaigns
- I don't see the necessity for the municipality to adapt to climate change
- Other, please specify: \_\_\_\_\_

19. What would you be willing to contribute to these options? Choose (multiple) from the following options.

- Money (e.g. pay more taxes/donate)
- nothing
- time (e.g. go to educational courses/volunteering)
- implement climate adaptation measures to your neighbourhood individually (e.g.green roof)
- Other, please specify: \_\_\_\_\_

**Future scenarios**

20. What topics should the municipality invest more in/focus most on? Please fill in your top 3.

- Tourism
- sustainable living
- climate adaptation

21. Do you feel involved/ like you have a say in the future of the Utrechtse Heuvelrug? Choose one of the following options.

- Yes
- No

22. (Optional) What do you see for the Utrechtse Heuvelrug in the next 25 years? Please fill in an answer in the blank space.

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**By filling the survey, you accept that we collect the data and use it as mentioned above.  
Thank you for participating!**