Residents of Zeist and their barriers among sustainable food consumption

Group 4F Lena Deen (7027451) Isa van Delft (6805280) Ophely Regout (4964541) Merel Chattelin (6771130) Lilian Maimu Dora Yallop (4611192)

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1. Introduction

The foods which are produced and consumed by humans have a significant impact on the environment. With a growing population and a growing demand for food, there is an increase in greenhouse gas emissions, more land and water use for the production of food, and the impact of chemicals on nature to name some consequences (Reisch, 2013). Sustainable food is one way to mitigate these problems. , not everyone is willing to buy environmentally-friendly food products or is aware of the concept (Ecological Union, 2019). This is due to multiple obstacles hindering the consumption of sustainable food. The most common are money-, time-, social- and market-failure-related barriers (Goryńska-Goldmann, 2019). By identifying these barriers, one could come up with solutions in order to gain more awareness and engagement within sustainable food consumption.

Within this research sustainable food consumption can be characterized as the utilization of food items that react to essential requirements and bring personal satisfaction, while limiting the use of natural resources, harmful materials, and emissions of waste and pollutants over the life cycle, as so to not endanger the necessities of people in the future (Vermeir, 2020).

The research from a social perspective is important to find out what factors might influence certain behaviour when it comes down to food consumption and if there are any unknown barriers that are yet to be discovered. The Theory of Planned Behaviour (TPB) was used to discover these barriers since this framework is known for its effectiveness in understanding and foreseeing an individual's behaviour. The research focuses on the residents of the city Zeist, which is part of the Utrechtse Heuvelrug. In Zeist, there are multiple types of residential areas, e.g. areas with elderly people but also areas with students. Thereby, income is different per area since one area exists of households with high income and other areas with lower income per household. These factors also play a role in the buying of sustainable food products and are important to take into account when trying to tackle barriers.

A survey with TPB was conducted to gather and analyze the data from the residents of Zeist on their sustainable food consumption. The research question is 'What are the obstacles for the residents of Zeist in their willingness to purchase sustainable food and what is the influence of these obstacles?'.

and the sub-questions are 'What are the main obstacles for residents' willingness to purchase sustainable food?' and 'What influences sustainable purchasing behaviour among residents in Zeist in a positive or negative sense? The aim of the research is to identify the obstacles preventing people from consuming sustainable food and to investigate which obstacle influences this behaviour the strongest.

2. Literature review

2.1 Literature review and research gap

Several studies have been done about the obstacles for people to purchase sustainable food. The existing literature on barriers to sustainable food consumption defines several obstacles that can be categorized. The research of (Goryńska-Goldmann, 2019) identifies the following categories and barriers (see Figure 1):

- Economic-related barriers. These include the income of the household; the study shows that households with a better financial status are more likely to make changes towards sustainable food consumption. In addition, a lack of willingness to purchase sustainable food is experienced by consumers due to the increased food consumption costs coming with it.
- Time-related barriers. These obstacles relate to changing from previous consumption behaviour to new, more sustainable food consumption. This might incur a reorganization in food consumption and could result in a higher total amount of time needed for consumption due to factors such as the search for appropriate markets and the right products. This increase in time expenditure can work as an obstacle in starting to consume sustainably.
- Organizational-related barriers. The organizational barriers concern the need for consumers to get involved in new rules to meet environmental and ethical norms and standards. They will have to do research about sustainable ways concerning food production, food consumption, and waste management, for example. There is thus a necessity of self-control on purchasing and choosing food, and in treating waste sustainably.
- Social-related barriers. The social-related obstacles concern the need to change personal habits, and possibly changing those of family or household members as well. The possible dissatisfaction of (some) household members might cause a failure in achieving sustainable consumption among the household as a whole. Moreover, the lack of ability associated with changing habits and implementing self-control is associated with refusing pleasure. This can cause opposite tendencies towards the consumption model.
- Barriers related to market imperfections. These include the insufficient information provision, the difficulties experienced in accessing sustainable products as well as the limited assortment of sustainably produced products.

Economic barriers	Time barriers	Organisational barriers	Social barriers	Barriers resulting from market imperfections
Higher prices	Higher expenditure of time for balancing the consumption model in relation to conventional consumption	The need to be involved in the implementation of new rules	Unhappy family members	Difficult access to products
Costs related to procuremen t	Higher time expenditure as a result of searching for appropriate products	The necessity for self-control	New fashion	Narrow assortment
	Higher expenditure of time in connection with the preparation of meals within the household and the issue of self-help		Refusing of pleasure	Insufficient information

Figure 1: Categorized barriers related to sustainable food consumption (Goryńska-Goldmann, 2019).

Even though some research has been done on identifying the obstacles for sustainable food consumption and possible ways to overcome them, only a few studies have investigated the level of importance and influence of the defined barriers. Thus, it is much less known which obstacles are the most influential in the decision-making process about purchasing sustainable or conventional food. Furthermore, new influential obstacles hindering consumers from consuming sustainable food consumption might have developed over time that is not yet defined or was not defined before. Thus, obtaining more knowledge about current barriers in play and their level of influence on food consumption behaviour is of great importance. Because it plays a key role in defining possible solutions to eventually increase and stimulate sustainable food consumption.

2.2 Theoretical framework

The Theory of Planned behaviour (TPB) was used as a guide in this research (see Figure 2). The theory states that behaviour is dependent on motivation (intention) and ability (behavioural control) (LaMorte, 2019). It consists of concepts that represent a person's behavioural control; attitudes, behavioural intention, subjective norms, social norms, perceived power, and perceived behavioural control (LaMorte, 2019). According to (Luenendonk, 2019), explicit theoretical assumptions made in the theory are 1) the intention of the individual reflects the individual's attitude, 2) the subjective norms of the individual also have an impact on the individual's intentions, and 3) the intentions and behaviour of the individual are affected by the individual's perceived behavioural control, in which perceived behavioural control concerns internal control and external control.

The study of (Robinson & Smith, 2002) concludes that attitudes, beliefs, and confidence levels might have an influence on the decision of purchasing sustainable food. Furthermore, the Theory of Planned Behaviour is used extensively in prior research on purchasing behaviours as well. The

theoretical framework is therefore highly valuable in order to investigate, analyze and understand sustainable food consumption behaviour in Zeist.



Figure 2: The Theory of Planned Behaviour (Li & Jaharuddin, 2020).

3. Methodology

3.1 Research design

The conduction of the questionnaire is a very determining aspect of the research. In order for the questionnaire to collect the most detailed data set, the questionnaire must be as accessible as possible. This will ensure the most participants and therefore reflect the most reliable image. Firstly, the questionnaire must be conducted among a very diverse group of participants. This is the reason why the town Zeist was chosen, as it has a diverse population. This is because the collected data has to represent the different inhabitants of Zeist and their views and behaviour on sustainable food consumption. The questionnaire was distributed on social media platforms such as Facebook and in person through QR code flyers. People are more willing to fill out questionnaires in their own time, when they are not busy. This is why QR codes and online groups were chosen, as then participants can concentrate on it when they are not busy. In total, 500 QR flyers were distributed in Zeist. This was done by focusing on different regions (age, living situation, income) because the aim was to have a diverse sample group.

Secondly, the length of the questionnaire has a large influence as well. This is because 'The perceived length of a questionnaire further affects subsequent decisions to continue participating in a survey' (Peytchev, 2009; Villar, Callegaro, & Yang, 2013). Hence, the questionnaire's answering time was 5-10 minutes. With a length of 5-10 minutes, it was possible to captivate the interest and motivation of the participants.

Thirdly, the privacy of the participants must be guaranteed. The participants had to agree to a privacy statement in order for their data being used in the research. Furthermore, it was made clear that all answers are anonymous and would only be used in this research. No names, date of birth or other confidential data that could identify the individual was asked. (see Appendix 2).

3.2 Questionnaire design and justification

This study applies the TPB model to determine the extent of the influence of three variables (attitude towards the behaviour, perceived norms, and perceived behavioural control) on a person's behaviour within the Dutch town of Zeist. This is achieved through the use of a questionnaire that consists of questions designed to measure quantitatively each of these three variables. The questions are divided into three different types as follows:

- 1) 5-point Likert scale
- 2) Multiple-choice
- 3) Ranking

These three question types are chosen for this project because they are relatively easy to quantify when analyzing the data. Furthermore, a range of these question types is chosen to ensure

balanced viewpoints throughout the sample population. There are, however, some limitations of using such question types that include relying on the respondents' honesty.

3.3 Applied framework

This research applies the Theory of Planned Behaviour (TPB) to determine the obstacles to buying sustainable food in Zeist. This framework was used because it is proven to be effective in understanding and predicting an individual's behaviour (see Section 2.2). The TPB was integrated into the methodology because it is a comprehensive model that explains why certain behaviours occur or do not occur. The TPB model allows for a close examination of multiple variables that contribute to the final behaviour of the individual. Hence, it is a practical model that can be easily applied in order to identify the obstacles that may hinder sustainable food consumption behaviour in Zeist.

3.4 Operationalisation of variables

Table 1. shows the identified variables that may influence sustainable food consumption. Each variable is categorized according to the TPB factor group of either behaviour, attitude, perceived norms, or perceived behavioural control. The survey consists of questions divided into four categories to determine the level of influence each variable has on sustainable food consumption behaviour.

Factors group	Possible variables	Questions
Attitude	-Opinions on the transparency of sustainable labels -Willingness to travel extra distance for sustainable food -Importance of sustainable food	 "I think that sustainable food producers are transparent about their products and production processes" Would you travel an extra distance to buy sustainable food? If yes, then how far? On a scale of 1 to 5, how important is sustainable food in your life?
Perceived norms	 Surroundings (friends and family) Upbringing Governmental policies 	 "My parents paid a lot of attention to buying sustainable food products when I was little." "Sustainable food a topic that is often discussed in my group of friends or family?" "I think there has to be more advertisements from governments on sustainable food." (Government support instead of NGO)

Table 1: The categorization of the variables and survey questions according the TPB

Perceived behavioural control	 Perceived knowledge about food products Budget for groceries Education Diet Availability of sustainable food 	 "I am aware of the environmental impacts of 'non-sustainable food'." What is your current diet? Do you have high, moderate, or low access to sustainable food options in your living area? On a scale of 1 to 5, how knowledgeable are you on the food products you buy?
Behaviour	-Current sustainable food consumption behaviour	- Do you buy sustainable food, why?

3.5 Statistical analysis

The questions chosen were designed to elicit a response that would demonstrate the significance of the variables on sustainable food purchasing behaviour. Firstly, the answers to the question 'Do you buy sustainable food' were analysed. The answers represented different behavioural groups and were categorised accordingly. Subsequently, the responses for the other questions that aimed to analyse the attitude, perceived behavioural control and perceived norms, were coded into SPSS. For each answer, a Spearman's R correlation test was conducted with the software SPSS against the behaviour group. This was done in order to detect if and how each variable influences the final sustainable food consumption behaviour.

If a significant correlation was found, the exact relationship was investigated with bar graphs. This was done for each behavioural group in order to visualise their trends for answering each question. This enabled for an effective comparison of how each categorised behaviour's answering patterns and make distinctions.

Moreover, the participants were asked to rank obstacles according to the level of influence they believe it has on their personal behaviour. The mean score for each barrier was calculated using survey123. This was done in order to understand what are the most dominant factors that hinder sustainable food consumption. This was then combined with the analyses of the question 'I would be more sustainable if..'. The response rate for each multiple choice was calculated for the reason of seeing what would enable sustainable behaviour.

4.0 Results

4.1 Participants' profile

The survey was conducted among 83 residents of Zeist (female = 49, male = 33; other gender =1;). The majority of the participants are educated to at least VMBO Regarding their geographical distribution, 35 participants live in Zeist-Centre (42%), 19 participants in Zeist-West (23%), 13 participants in Zeist-East (13%), and 5 participants in Den Dolder (6%). The average household size per participant is 2.2 with an average monthly budget of 420ε . (see Appendix 3 for the breakdown of the participant's profile results).

4.2 Results for sustainable food purchasing behaviour

The participants were asked to indicate how regularly they buy sustainable food. The majority of the results were either that they often (38%) or sometimes (57%) buy sustainable food (see Figure 3). Thus, there are two dominant behaviour groups of "sometimes" categorised as low sustainable food consumption and "often" as high sustainable food consumption. The behaviour groups of "yes, always" and "no, never" will be excluded from the statistical tests due to the extremely low response rate.



Figure 3. Sustainable food consumption behaviour of the sample group of Zeist.

4.2.1 Facilitators for sustainable purchasing behaviour

The participants were asked to justify their reasons for buying sustainable food in order to determine possible facilitators for this behaviour. Out of the 83 respondents, 68 participants (82%) buy sustainable food due to the perceived environmental benefit, 24 participants (39%) for the better taste. A small number of respondents indicated that they buy sustainable food for religious reasons or because of their sustainable social circle (see Appendix 3 for full results).

4.3 Results for the variables of Attitude

4.3.1 Attitude towards food labels

The respondents were asked to indicate whether they believe that sustainable food producers are transparent about their products and production processes. There was a slight lean towards a negative attitude with 59% responding 'no' and 41% saying 'yes' (see Appendix 3 for full results). They were further asked to write the reasoning for their opinion. Generally, people who answered 'yes' gave two main reasons to justify their response as follows: (i) there is enough information available about food sustainability on the labels, and (ii) they trust the food producers. However, and despite these positive opinions, many of these participants also indicated that transparency can be improved.

On the other hand, the participants who answered 'no' (59%) stated three main reasons for their response as follows: (i) there is not enough trustworthy information available concerning sustainable food, (ii) identifying sustainable products is both difficult and vague, and (iii) sustainable production prioritises money too much.

Using a Spearman's R correlation test with SPSS, it was determined that there is no significant correlation between the opinions on the transparency of food labels and food shopping behaviour (see Table 2).

 Table 2. Spearman's R correlation results for sustainable food purchasing behaviour and opinions on sustainable food label transparency.

Test	Result
Correlation coefficient	-0.056
p value of correlation test	0.617

Correlation	is significant at p< 0.01	level.
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4.3.2 Willingness to travel for sustainable food

When asked, 56 (67%) of the participants said that they would not be willing to travel extra distance specifically for sustainable food and 27 (33%) said that they would. From the 27 willing respondents, an average up to 6.7 km would be traveled extra.

Using a Spearman's R correlation test with SPSS, a significant correlation between willingness to travel for sustainable food and sustainable food purchasing behaviour was detected (see Table 3).

Table 3. Spearman's R correlation results for sustainable food purchasing behaviour and willingness to travel for sustainable food

Test	Results
Correlation coefficient	0.548

p value of correlation test	0.000
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Correlation is significant at p< 0.01 level.

As indicated in Figure 4, participants who indicated no willingness to travel extra for sustainable food, often belong to the low consumption group. While participants that are willing to travel extra for sustainable food often belong to the high consumption group.



Figure 4 Willingness to travel an extra distance for sustainable food in relation to the consumption groups.

4.3.3 Opinions on the importance of sustainable food

The participants on average ranked sustainable food a 3.2 out of 5 for its importance in their life (1=lowest, 5=highest). Using Spearman's R correlation test with SPSS, a significant correlation was calculated between the importance of sustainable food and behaviour (see Table 4).

Table 4. Spearman's R correlation	results for sustainable food	l purchasing behaviour	and its importance
	in life		

Test	Results
Correlation coefficient	0.581
p value of correlation test	0.000

Correlation	is	significant	at p<	0.01	level.
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It was found that participants who buy more sustainable food also indicated that sustainable food is more important to them compared to those who buy less (see Figure 5).



Figure 5. A comparison of the two behavioural groups of how they ranked the importance of sustainable food.

4.4 Results for perceived norms

4.4.1 Upbringing

A total of 52 (63%) of respondents indicated that their parents did not pay attention to sustainable food when they were little. 19 (23%) of their parents did and 12 (14%) were neutral about the statement (see Figure 6).



Figure 6. Pie chart of the Likert scale answers for the variable upbringing.

The Spearman's R correlation test demonstrated a weak relation between the upbringing and sustainable food purchasing behaviour (see Table 5).

Table 5. Spearman's R correlation results for sustainable food purchasing behaviour and upbringing.

Test	Result	
Correlation coefficient	0.255	
p value of correlation test	0.020	

Correlation is significant at p < 0.05 level.

The most distinctive difference between the two behaviour groups was that 25 (53%) of 'low consumption' strongly disagreed with the statement, compared to 9 (28%) of 'high' consumption group, who strongly disagreed (see Figure 7).



Figure 7. Comparative bar graph of the different answers given by the 'high' and 'low' consumption groups for the statement for upbringing.

4.4.2 Family and friends

The majority of participants expressed either neutral (33%) or somewhat agree (28%) on the statement about sustainable food being discussed within their social circle (see Figure 8).



Figure 8. The total answers for the Likert scale question on social circle.

Furthermore, Spearman's R detected a significant positive correlation between sustainable food consumption behaviour and the discussion of sustainable food within their social surroundings (see Table 6).

 Table 6. Spearman's R correlation results for sustainable food purchasing behaviour and discussion within social groups.

Test	Result
Correlation coefficient	0.332
p value of correlation test	0.002

Correlation is significant at p < 0.01 level.

It was discovered that participants who bought sustainable food more often, also strongly agree more with the statement. Additionally, they had 0 responses for strongly disagreed, while the lower consumption group had 10 (21%) who strongly disagreed. (see Figure 9).



Figure 9. Comparative bar graph of the different answers given by the 'high' and 'low' consumption groups.

4.4.3 Governmental support

It was that 30 (36%) strongly agreed and 23 (28%) agreed that there should be more governmental support for sustainable food. This was followed with 17 (20%) neutral, 8 (10%) disagreed and 5 (6%) strongly disagreed. (see Figure 10)



Figure 10. Pie chart of the total Likert scale answers for the statement on governmental support.

Using Spearman's R correlation analysis, a relation between opinions on governmental support for sustainable food and behaviour patterns was shown (see Table 7).

 Table 7. Spearman's R correlation results for sustainable food purchasing behaviour and opinions on governmental support.

Test	Results
Correlation coefficient	0.357
p value of correlation test	0.005

Correlation is significant at p < 0.01 level.

The main difference between the two behaviour groups was that participants who sometimes buy sustainable food disagree (13%) and strongly disagree (9%) with governmental support. While the 'often' category disagreed 0%. (see Figure 11).



Figure 11. Comparative bar chart which depicts the different answering frequencies of the two behavioural groups on governmental support.

4.5 Results for perceived behavioural control

4.5.1 Perceived knowledge

The majority of respondents indicated that they have knowledge on the impacts of un-sustainable food products. This is due to 27 (33%) strongly agreeing and 36 (43%) agreeing to the statement (see Figure 12).



Figure 12.. The total answers for the statement on perceived knowledge.

Spearman's R correlation test determined that there is a significant correlation between perceived knowledge about food products and sustainable food purchasing behaviour (see Table 8).

Test	Results
Correlation coefficient	0.381
p value of correlation test	0.000

Table 8. Spearman's R correlation results for sustainable food purchasing behaviour and perceived

Correlation is significant at p< 0.01 level.

Furthemore, the participants were asked to rank their knowledge on sustainable food from 1 to 5 (1=low, 5=high). Correlation tests detected a negative and a weak relation between the score of knowledge and behaviour (see Table 9).

Table 9. Spearman's R correlation results for sustainable food purchasing behaviour and its importance

Test	Results
Correlation coefficient	-0.342
p value of correlation test	0.002

Correlation is significant at p< 0.01 level.

It was found that for both the questions, the high consumption group expressed that they believe that they have high knowledge about food products. Compared to the low consumption, who on average rated their knowledge at a lower scale. (see Figure 13 and 14).



Figure 13. The relation between the consumption groups and their answers on perceived knowledge.



Figure 14. The relation between the consumption groups and their scores given on perceived knowledge.

4.5.2 Results for diet

The respondents were asked about their current diet. The majority of participants answered "no specific diet" (43%) or "high vegetable consumption and low meat consumption" (29%). The further results for this question are diverse and can be found in the Appendix 3.

In addition, there is a positive but weak correlation found between the results for diet and sustainable food purchasing behaviour. (see Table 10).

Test	Results
Correlation coefficient	0.221
p value of correlation test	0.045

Table 10. Spearman's R correlation results for sustainable food purchasing behaviour and diet.

	Correlation	is	significant	at	p<0.05	level.
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4.5.3 Availability of sustainable food

The participants were asked about their access to sustainable food in their living environment. 52% of the respondents voted for "average", 40% for "high", 6% for "I don't know" and 2% for "low". The access to sustainable food is thus perceived as average/high by the majority. (see Figure 15).



Figure 15. Pie chart for the answers to availability of sustainable food

Furthermore, the correlation test detected no significant correlation between sustainable food purchasing behaviour and the availability of sustainable food in Zeist.

 Table 11. Spearman's R correlation results for sustainable food purchasing behaviour and availability of sustainable food in Zeist.

Test	Results	
Correlation coefficient	-0.157	
p value of correlation test	0.155	

Correlation is significant at p<0.01 level.

4.6 Barriers

In order to understand the most dominant barriers that hinder sustainable food purchasing behaviour, the participants were asked to express what would facilitate them to buy more sustainable products. 80% of participants said that they would buy more sustainably if the prices of sustainable food products were lower. Furthermore, 33% would implement sustainable food practises if information regarding sustainable food would be more transparent and 29% if the government would have stronger policies (see Appendix 3 for full results). These were the three most prevalent reasons for unsustainable food buying behaviour. Additionally, they were asked to rank barriers according to their level of influence on their personal sustainable food purchasing behaviour (see Table 12).

Barrier	Average ranking (maximum score is 8 with it having a high influence)
The price of sustainable food products	7.2
Norms and habits	5.7
Lack of knowledge	4.7
Surroundings (friends, family, social media)	4.5
Diet	4.2
Difficulty identifying sustainable foods and non-sustainable foods	4.1
Willingness to contribute	4.1

Table 12. The average score for each barrier on sustainable food purchasing behaviour given by the participants.

Most of the barriers have a similar ranking between 4.1 and 4.7. The range of these barriers is 0.6. The second highest ranking obstacle is 'norms and habits', with an average rank of 5.7. The most dominant was 'price' which received a score of 7.2 out of 8.

5.0 Discussion

5.1 Analysis of reliability

The research on the barriers of sustainable food consumption among the residents of Zeist resulted in new insights, however some uncertainties were identified during the research as well. The reliability and validity of the collected data will be analyzed in this discussion. The first uncertainty posed in this research is the reliability of the collected data. The data, collected with the use of a questionnaire, provides an insight into the behaviour and opinions of 83 residents of Zeist. The questionnaire was conducted both physically and online to strive for the most inclusive and diverse group of participants. By conducting the questionnaire physically, residents of Zeist that would not be able to participate in the research online, were included. The diversity among the participants influences the reliability of the collected data. By conducting the questionnaire physically we aimed to increase this reliability. Moreover, the number of participants determines the reliability of the outcome of the research as well. With 83 participants, a relatively high number, the reliability of the collected data increased. However, the distribution of the participants over the different regions in Zeist is uneven. The largest part of the participants (42%) live in the centre of Zeist. The other regions of Zeist are less represented in the group of participants. This could influence reliability negatively. The even distribution of the participants over different regions in the research area is something to consider in the future.

Secondly, an uncertainty proposed in this research involves the willingness and sincerity of the participants. The willingness to participate in the research was not as high as expected. The online conduction of the questionnaire did not result in much data. However, the physical conduction of the questionnaire contributed to a large part of the collected data. The willingness of people to participate was higher in the physical conduction than in the conduction and this is something to consider carefully in future research. Additionally, the sincerity of the residents is at question as well. When conducting the questionnaire in person, a 'social pressure' can be experienced by participants. The participants may feel as if their truthful answer is less socially acceptable and opt for a different response. This was most likely higher with questions asking about their personal sustainable behaviour. This could have influenced the outcome of our research. However, the conducting of the questionnaire online could have reduced this effect since the 'social pressure' was reduced.

5.2 Comparison to the literature and validity

Despite this, the results are coherent with the literature review. The collected data of the research of sustainable food consumption of the residents of Zeist indicated the relevance of the research by Goryńska and Goldmann (2019). The findings in the research are in line with the literature by Goryńska and Goldmann (2019). The collected data indicates similarities between the former research and the research among the residents of Zeist. The data implies relations and differences

between the economic-, time-, organizational-, social-, and market-related barriers between the research in Zeist and the research by Goryńska and Goldmann (2019).

Firstly, the economic-related barrier, proposed in the Goryńska and Goldmann research, is identified within this research. Price is identified as the most influential barrier. Therefore, the price of sustainable food has a large influence on the consumption of sustainable food among the residents of Zeist. This can also be concluded from the research by Goryńska and Goldmann (2019). Since the outcomes from the research in Zeist are in line with the research by Goryńska and Goldmann (2019), the validity of the outcome is justified. We can conclude that the price, and the part of the income people are willing to spend on sustainable products, therefore has the largest influence on sustainable food consumption in Zeist.

Secondly, the relationship between time-related barriers and sustainable consumption was identified. The data indicated that 67.4% of the participants would not be willing to travel an extra distance for sustainable products. This would imply that the barrier of time, proposed by Goryńska and Goldmann, has a significant influence on the consumption of sustainable food. However, the data indicated that the residents of Zeist already have a high availability of sustainable products. This could also explain why participants would not be willing to travel any further since the products are already available. Therefore, this relationship does exist but is not very strong.

Thirdly, the organizational-related barrier exists in this research as well. The data shows that participants would buy more sustainably if the message of sustainable food would be promoted more and if sustainable products would be subsidized. Thus, this includes a wish for more government interference to improve the sustainable behaviour among the participants.

Fourthly, the social-related barrier came forward within the ranking of barriers as norms and habits, which turned out to be the second highest barrier. This shows that people might be more reluctant to buy sustainable food products because therefore changing behavior is necessary. This finding is in compliance with the literature of Goryńska and Goldmann (2019) and additionally, the research by Robinson and Smith (2002) who concluded that attitude, beliefs and confidence are of influence on the consuming behaviour of sustainable food.

Lastly, the market-related barrier is not identified within the research although it did come forward in the literature review. The accessibility to sustainable food in the area was tested among the participants. This showed a percentage of 51,8% average accessibility and 39,8% high accessibility to sustainable food options. This outcome is not in line with the research by Goryńska and Goldmann. The literature describes difficulties in accessing sustainable products and having limited sustainable food products offered. Since the outcomes of the research are not

compatible, the validity of the outcome, high accessibility to sustainable food products in Zeist, is at question.

5.3 Interpretation of results

It was found in the results that most of the variables of the TPB had an influence on the final sustainable food purchasing behaviour. From perceived behavioural control it was discovered that with increasing perceived knowledge on food products, there was an increase in the purchasing of behavioural food. This suggests that by expanding the public's knowledge about the adverse effects of conventional agriculture, a rise of sustainable food consumption could be set in motion. It should be noted that this is the perceived knowledge of the individual and not the actual knowledge. Researching how the true comprehension on this topic influences final behaviour would be an interesting subject for further investigation.

Moreover, all of the variables of the perceived norms have a weak correlation with the sustainable food purchasing behaviour. Participants, who had a higher consumption behaviour, indicated that they also discuss sustainable food with their social group more, believed that their parents paid attention to sustainability more and also advocated for more governmental support. However, upbringing was also detected in having the weakest relationship with behaviour. Therefore, it can be concluded that an individual's raising is not the most important factor in their food habits. Governmental support had the strongest correlation from the three variables. This was also supported in the multiple choice question 'I would be sustainable if..' with 29% stating that stricter governmental policies are needed. Hence, the outcome of this research indicates and recommends that stronger governmental aid for sustainable food consumption is essential.

The most influential variables were found in the attitude of people. It was calculated that the willingness to travel extra and their opinions of the importance of sustainable food had the highest correlation coefficient. Therefore, it can be concluded that researching ways to increase the public's attitude towards sustainable food is crucial to pave a more sustainable future.

Another vital finding was the dominant facilitator and obstacle for buying sustainable food. 68 (82%) respondents buy sustainable food for the environmental benefits. This suggests that the residents of Zeist are generally concerned for the environment and are willing to buy sustainable food for this reason. However, the price was chosen by 80% of participants as a barrier. Furthemore, price was ranked as the overwhelming highest obstacle for buying sustainable food. (something how the government has the power to decrease the price.

6. Conclusion

In conclusion, all of the identified variables of TPB, except for availability or opinions of sustainability labels' transparency, had a correlation with sustainable food purchasing behaviour. The most notable were the variables from attitude: willingness to travel extra and opinions of importance of sustainable food. These two variables had the strongest influence on the behaviour of the participants. This means that by increasing a positive attitude towards sustainable food would result in the highest desirable sustainable food purchasing behaviour.

Furthemore, the respondents who bought more sustainable food also recorded a higher number of positive answers to the questions. For example, they ranked the importance of sustainable food in their life high compared to participants who indicated that they buy less sustainable products. In general, people who buy sustainably are more engaged with the topic of sustainable food. Another important finding was that the most dominant obstacle that hinders the buying of sustainable food was price. Compared to other barriers, price was consistently ranked as having the highest influence. The second most influential obstacle was norms and habits.

Therefore, it can be concluded that the main obstacles for residents' willingness to purchase sustainable food is the price and norm and habits. To further answer the research question, if the barriers would be increased, they would influence the sustainable purchasing behaviour negatively. On the other hand, if the variables of the TPB would be enhanced, this would result in a positive influence on sustainable food consumption behaviour. Hence, it is vital to mitigate the barriers and improve the attitude, perceived norms and perceived behavioural control in order to shift towards more sustainable behaviour.

Furthermore, the barriers for sustainable food consumption found in this research are similar to the ones found in the research of Goryńska and Goldmann (2019). However, the results of this research show the influence of the different barriers on sustainable purchasing behaviour as well. The level of influence is important to take into account when designing solutions that should be implemented to support sustainable food consumption. The results of this research thus helps in further steps such as designing solutions to this sustainability problem. Designing solutions can reduce or even overcome the significant barriers found in this research in order to stimulate sustainable food consumption.

This is the reason why this research strongly recommends governmental support on all aspects of the TPB and dominant barriers. The aim to shift towards a more sustainable future involves more research and possible solutions on this. This would specifically involve a reduction of the prices of sustainable food products. For example, subsidies on sustainable products and taxes on non-sustainable food products could decrease the price barrier encountered by people. This could influence their consumption behaviour drastically. Additionally, another approach recommended would be to increase the knowledge of people on sustainability and the public's attitude. A

possible solution could be to pay more attention to education on this topic from an early age. Moreover, advertisement could also increase visibility and interest. More thorough knowledge on sustainable food leads to a higher consumption of sustainable food. This is also supported by the data in this research. Therefore, the importance of increasing knowledge and attitude is essential in shifting towards more sustainable consumption. Finding the means to do this could be an interesting and vital topic for future research.

7. Relevance

The aim of this research is to find the obstacles that hinder sustainable food consumption behaviour among the residents in Zeist. This is vital because by understanding the level of influence the barriers have on the residents' behaviour aids we can further investigate how to implement possible solutions. Furthermore, this is a step towards promoting sustainable food consumption on a large scale in order to support sustainable development. The topic of this research is in addition targeting the Sustainable Development Goals (SDG's). These goals are Zero hunger (2), Decent work and economic growth (8), and Clean water and sanitation (6). The United Nations advocates to promote sustainable agriculture in order to alleviate numerous problems that these SDGs address. Thus, our research is relevant at a large scale.

SDG 8 aims to progressively improve global resource efficiency in consumption and production. It also strives for decoupling economic growth from environmental degradation. SDG 2 intends to mitigate the threats to the food system and promote small-scale food producers. This is important in order to ensure food security and cease global hunger (United Nations, n.d.). Moreover, SDG 6, addresses the issue that conventional agriculture accounts for 70 percent of the global water waste (Wired, 2017). Sustainable agriculture can contribute to these goals.

The topic of sustainable food covers multiple, strongly interlinked subtopics. The subtopic discussed in this research is 'Residents and their willingness to contribute to sustainable food'. Strong correlations between another subtopic 'Residents and perceptions on sustainable food can be found. The perception of residents on sustainable food could influence their willingness to contribute to sustainable food consumption. Therefore, in this research, the knowledge and perception of the participating residents are also questioned. Since these subtopics are strongly interlinked, the data from both the research on 'Residents and perceptions on sustainable food' and our research could be combined. By combining the data, a broad and thorough image can be formed. This could improve formulating answers to the proposed research questions. Furthermore, a different subtopic, 'Services of Food forests for recreationists' can also be linked to our subtopic. This subtopic includes people's willingness to buy forest foods. Willingness to buy forest foods, a more sustainable alternative, includes the willingness to contribute to sustainable food consumption. This indicates a relationship between the two subtopics.

The aim of the research on 'Residents and their willingness to contribute to sustainable food' is to identify the barriers preventing people from buying sustainable food. These barriers will possibly have a more broad influence and also play a role in the research on other subtopics of the topic 'Sustainable food'. The identification of these barriers will provide an insight into the perception of the participants on sustainable food in a broader context. The barriers could form the basis of the improvement of sustainable food consumption in the region of the Utrechtse Heuvelrug. This research therefore contributes to answering the overarching research question

'What are the challenges and opportunities for sustainable food production and consumption on the Utrecht Heuvelrug and around?'.

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Appendix 1: Data management plan

The data of the residents participating will be collected by the use of a survey. This survey will provide us with a broad dataset on different variables and their influence on sustainable food consumption. The collected data must represent the actual situation and therefore sincerity is very important. This is why the privacy of the participants has to be guaranteed at all times. We will have the participants agree on a privacy statement before the start of the questionnaire. Additionally, we will clearly explain that all respondents will remain anonymous. We will also state that the collected data will be used only for this research. The data will be stored on a private drive during the research and the collected data will be destroyed after the research is done. This was worded for the participants as:

'We are Global Sustainability Science students from Utrecht University and we're conducting research on sustainable food purchasing behaviour in Zeist. The definition of sustainable food is food products that meet human essential requirements while also limiting the use of natural resources, harmful materials, and emissions of waste and pollutants over the life cycle, so as to not endanger the necessities of people in the future. Your response will be very helpful for our research. The survey will take around 10-15 minutes to complete and all participants will remain anonymous. All data will be used for our research only. There are no risks associated with your participation, but you have the right to stop the survey at any time.

Do you give you explicit and informed consent for us to process the data we receive from this survey?

· Yes

 \cdot No

Thank you for filling out this survey!'

Appendix 2: Survey Questions

General/personal:

What is your gender?

- Male
- Female
- Other:....

What is your age? 1 16-18, 2 19-23, 3 24-29, 4 30-35, 5 36-40, 6 41-50, 7 51-60, 8 61-70, 9 71-80

What is your highest completed education level? (If you are an international, choose the equivalent Dutch education level)

- 1 Vmbo
- 2 Havo
- 3 Vwo
- 4 Mbo
- 5 Hbo
- 6 Wo
- 7 Other:

Which part of Zeist do you live in?

- 1 Zeist-Noord
- 2 Zeist-Oost
- 3 Zeist-West
- 4 Zeist-Centrum
- 5 Den Dolder

What is your budget for groceries each month approximately? 0-1500 euros, drag the bar

Indicate how many people are in your household (please check the first box if you do not spend your monthly budget for groceries on anyone but yourself).

- 0/alone
- 1
- 2
- 3

- 4
- 5
- 6
- 7
- 8
- 9
- 10 or more

Do you buy sustainable food?

- 1 Yes, always
- 2 Often
- 3 Sometimes
- 4 No, never

If yes, (sometimes, often) what are the reasons you buy sustainable food? Multiple answers can be selected.

- Environmental reasons
- Sustainable food is healthier
- Sustainable food tastes better
- · Religious reasons
- My social surroundings also buy sustainable food
- Other:....

If no, what are the reasons you do not buy sustainable food? Multiple answers can be selected.

- · Sustainable food is too expensive
- The travel time to purchase sustainable food is too much
- Sustainable food isn't much available in my region
- Not interested in changing my buying behaviour
- · I have never really considered buying sustainable food
- · Other:....

Awareness/knowledge/responsibility:

Please indicate to what extent you agree or disagree with the following statements.

- "I am aware of the environmental impacts of 'non-sustainable food'."
- strongly agree
- somewhat agree
- neutral
- somewhat disagree
- strongly disagree

"I think that sustainable food producers are transparent about their products and production processes.

- Yes, why so....?
- no, why not.....?

What sustainable food labels do you buy? Please mention them (fill in no, if you don't buy sustainable food labels)

• Open ended question

On a scale of 1 to 5, how knowledgeable are you on the food products you buy?

Diet/lifestyle:

What is your current diet?

- Vegan
- Vegetarian
- Pescatarian
- Raw food diet
- High meat consumption and low vegetable consumption
- High vegetable consumption and low meat consumption
- Ready-made foods and takeaway
- High protein consumption
- Only local and organic labelled food
- Low-calorie diet
- No specific diet
- Other:.....

Is there a specific reason for your current diet? Multiple answers can be selected.

- There is no specific reason
- To reduce the environmental impact
- Ethical reasons in regards to the treatment of animals
- Ethical reasons in regards to social impact
- Weight loss
- To achieve exercising goals
- Reduce costs
- Time management
- For taste
- Childhood habits

- I became more aware of the impact of certain food products
- Other:.....
- How high would you rank the importance of sustainable food in your life?
 - ranking 1-5 (drag bar thing)

Social group behaviour:

Please indicate to what extent you agree or disagree with the following statements.

"My parents pay/paid a lot of attention to buying sustainable food products when I was little."

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- Strongly disagree
- •

"Sustainable food is a topic that is often discussed in my group of friends or family"

- · Strongly agree
- · somewhat agree
- · neutral
- somewhat disagree
- · strongly disagree

"I think there has to be more advertisement from governments on sustainable food." (Government support instead of NGO)

- Strongly agree
- Somewhat agree
- Neutral
- Somewhat disagree
- strongly disagree

I would buy more sustainably if...

- the school would educate me more on the topic
- I would do more research on the topic

- if there was more transparent information on the topic
- prices of sustainable food would be lower
- my friends and family would eat sustainably
- the government would implement stronger policies on sustainable food
- I would have more sustainable food options closeby (decrease travel time)
- other:....

Availability/willingness:

Do you have high, moderate or low access to sustainable food options in your living area?

- High
- Moderate
- Low
- I don't know
- Would you travel an extra distance to buy sustainable food? If yes, then how far?

· bar drag thing

Barriers:

Which of the following barriers influence your shopping the most? Rank the following barriers in order from highest to lowest

- the prices of sustainable food
- norms and habits
- surroundings (family, friends, social media etc.)
- lack of information
- willingness
- diet
- difficulty identifying sustainable food and non-sustainable food
- other:...



Appendix 3. Results for the answers

Figure. Column chart of the age distribution among the participants



Figure. Column chart of the highest completed education level among the participants



Figure. Column chart of the monthly budget for groceries among the sample residents



Figure. Column chart about the number of persons in the households of the participants Table. Current diet of the respondents

	Coun	
Answers	t	Percentage
Vegan	1	1.2%
Vegetarian	7	8.43%
Pescatarian	2	2.41%
High vegetable consumption and low meat consumption	24	28.92%
Ready-made foods and takeaway	1	1.2%
High protein consumption	1	1.2%
Low-calorie diet	2	2.41%
No specific diet	36	43.37%
Other	9	10.84%

Table. Answers to the statement 'I believe that sustainable food producers are transparent about their products and production processes.'

Answer	Frequency Percentage	
Yes	34	40.96%
No	49	59.04%



Figure_Answers to the transparency statement.

Answer	Frequency	Percentage
Yes	27	32.53
No	56	67.47

Table Answers to	'Would vo	u travel ex	tra distance for	r sustainable food?'
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Figure_Answers to 'Would you travel extra distance for sustainable food?'

Table	Daina tanah	t about	austainable	food	whom	onomina	
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Answer	Frequency	Percentage
Agree	11	13.25
Somewhat agree	8	9.64
Neutral	12	14.46
Somewhat disagree	17	20.48
Disagree	35	42.17



Figure_Answers to the statement 'My parents paid attention to sustainable food when I was little'

iuning .				
Answer	Frequency	Percentage		
Agree	7	8.43		
Somewhat agree	23	27.71		
Neutral	27	32.53		
Somewhat disagree	16	19.28		
Disagree	10	12.05		

Table_Answers to 'Sustainable food is a topic that is often discussed with my friends and family'.



Figure_Answers to the statement 'Sustainable food is a topic that is often discussed with my friends and family'.

Table_Answers to the question 'I believe that there should be more governmental support from the government for sustainable food'.

Answer	Frequency	Percentage
Agree	23	27.71
Somewhat agree	30	36.14
Neutral	17	20.48
Somewhat disagree	8	9.64
Disagree	5	6.02



Figure_Answers on the statement about governmental support for sustainable food.



Figure_Relation between the consumption groups and their diets



Figure_Answers about the perceived access to sustainable food of the respondents.