Holwerd aan Zee and the opinion of locals

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Abstract

This research focuses on assessing the perspective of local inhabitants in Holwerd regarding the Holwerd aan Zee project. Holwerd aan Zee is a project which is set up by inhabitants of the village with the goal to boost the regional economy and to counter the population decrease in the area. In addition to these economic and demographic effects, the project will also lead to enlarged ecological circumstances. The project has a high degree of citizens participation. The central research question is: "*To what extent do the local people of Holwerd support the project of 'Holwerd aan Zee'?*". To answer this question, surveys were spread among the residents of Holwerd.

Findings are that inhabitants are positive and therefore supportive of Holwerd aan Zee. The average grade that the 79 respondents gave the project is a 6,9 out of 10. The study identified breaking through the dyke as the only variable which is significantly related with a positive linear relationship to the overall grade of the HaZ project. Therefore, this variable is affecting the overall grade the most. The many changes to the project and time of the process are downsides which decrease the support of inhabitants.

Different ideas for further research are given. For example, the effects of including social norms within the research.

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1. Introduction

1.1 Introducing Holwerd aan Zee

Dutch people have been fighting against both seawater and water from the rivers for many centuries (Mostert, 2020). Think about the All Saints's Flood of 1170 or the North Sea Flood in 1953, for example. Therefore, water management is an important factor in planning in The Netherlands. Due to, among other things, the rising sea level (Van Koningsveld, 2008) and heavy rainfall (Kraaijvanger, 2023), water management is especially important regarding the future of our country. Tialda Haartsen noted that more planning projects shift from 'fighting against the water' towards a more open view and 'working together with the water' (Aerts, 2019). An example of this is the project of Holwerd aan Zee, which is translated to 'Holwerd at Sea'. This project involves replacing part of the sea dyke with a sluice and establishing a buffer lake on the northern side of Holwerd (Holwerd aan Zee, n.d.). The main reasons behind this project are the increasing unemployment and the decreasing quality of life. The project is groundbreaking in its kind, due to its high rate of citizen participation (Moreno et al., 2016).

Holwerd is a small mound village in the Northern part of the Frysian province in The Netherlands. Before the year 1100, the village was attached to the Wadden Sea and experienced a great amount of trade (Koenders, 2015). An estuary connected Holwerd to the sea (Haartsen, 2009). Haartsen (2009) mentions in his report that the sea dyke was built around 1100 to prevent the area from flooding. In current days, Holwerd deals with a decline in its population, like many other rural areas (De Groot & Nap, 2018). Holwerd had a decline of almost 3% in the year 2021 (AllCharts, 2023). Especially before the year of 2015, there was a large decrease in population numbers, and since then the decline has diminished (AllCharts, 2023). The village also deals with a rise in unemployment and younger inhabitants who decide to leave the area (Hansen, 2023). The ferry port for the connection to Ameland is located on the northern side of the village. This results in many tourists passing the village, however, they are not visiting the village itself (Moreno et al., 2016).

Thus, to give Holwerd a boost, both ecologically and economically, a group of inhabitants set up the idea of HaZ (Holwerd aan Zee, n.d.). The initiators argue that this will give a boost to Holwerd's economy and will counter its population drop (Oldenhuis, 2018). Next to these advantages, it is also expected to create new ecological opportunities in the area (Moreno et al., 2016).

Most research about the project goes into the biodiversity and ecological aspect, and not so much into the opinion of locals. However, in current days, opinions of locals and bottom-up decision-making are valuable subjects in planning practices (Pissourios, 2014). This study will help to fill this research gap. As for societal relevance, HaZ claims to offer a great deal of improvements for the rural area and its inhabitants, especially on economic and demographic level. It is also important to know how locals feel about the project, as it affects their life.

1.2 Research problem and research questions

The aim of this research is to find out what the different opinions of locals in Holwerd are about HaZ. The perspective from Holwerd's inhabitants can guide the initiators in deciding whether the project should be developed or not, and can at a later stage lead towards the most beneficial design. To reach this aim, the following question will be asked: "*To what extent do the local people of Holwerd support the project of 'Holwerd aan Zee'?*"

The sub-questions, which will give a clearer view on the project and its process, are listed below:

- *What is the general opinion of inhabitants about the Holwerd aan Zee project?*
- *Which aspects of the project have the largest influence on inhabitants' opinions on the project as a whole?*
- *What are the opinions of locals about the process around the establishment of Holwerd aan Zee?*

1.3 Structure of thesis

The thesis is structured as follows. Chapter 2 consists of the theoretical framework, explaining the project of HaZ and the theories and concepts that are relevant for this research. Chapter 3 presents the methodology, which will explain how the data was collected and processed through SPSS. In Chapter 4 the results of this research will be explained. Lastly, a conclusion will be drawn in Chapter 5. Here, suggestions for future research will be given as well.

2. Theoretical framework

Chapter 2 is divided into an explanation of the project, which can be found in Chapter 2.1, and a link to relevant concept and theories, which are explained in Chapter 2.2. In this last section, the conceptual model can be found as well. The expectations can be found in Chapter 2.3.

2.1 The project

Holwerd aan Zee is a project whereby Holwerd will be connected to the Wadden Sea by breaking down part of the sea dyke (Holwerd aan Zee, n.d.). In this opening, a sluice will be place to maintain the safety. This sluice will close in case of high water and will prevent sea sludge from entering the lake and blocking the entrance (Moreno et al., 2016). A buffer lake will be created between the village and the seadyke. The lake will be connected to the sea through the sluice. In this lake, a harbour and two small islands will be created. One of the islands will be used for recreational purposes, by building holiday homes, and the other will function as a breeding area for birds (Moreno et al., 2016). The design of the project is visible in Image 1.

Image 1: Holwerd aan Zee
Source: HolwerdaanZee.nl

The project has many purposes. Firstly, the project will serve as an economic boost for the local inhabitants in Holwerd (Holwerd aan Zee, n.d.) This is gained by creating different recreational purposes around the lake and in Holwerd to attract tourists (Van der Klaauw et al., 2017). In February 2024, a study about the willingness of tourist companies to locate in Holwerd will be published by Leisurebrains (Van der Meulen, 2024).

Secondly, the project is also expected to boost the ecological system in the area. This is due to the fact that the lake will experience tides and a variety of both sweet and salt water (Faber, 2021). According to Dankers and Steenbergen (2004), transitions between sweet and salt water are important for the quality of the water, the coastal system, and the animals that live here. Therefore, they suggest to create more gradual transitions to the Wadden Sea, in the Northern Netherlands. The breeding islands for birds, will be created within the lake, will also be beneficial for the ecology (Holwerd aan Zee, n.d.).

Thirdly, the placement of the sluice will have a positive effect on the dredging of the shipping channel from Holwerd to Ameland. Due to the opening in the dyke, the waterflow will be increased, which will lead to less sediment and thus to less frequent dredging and its costs (Faber, 2021).

Fourthly, the project is expected to counteract the population decrease. The village is experiencing a decline, which was almost 3 percent in 2021 (AllCharts, 2023). In addition to this population decline, younger inhabitants decide to leave the area (Hansen, 2023).

Hence, the project is expected to boost the livability of the village.

The project was initiated by four inhabitants of Holwerd, named Hessel Hiddema, Theo Broersma, Marco Verbeek en Jan Zijlstra. Together with members from the village interest group, they form the foundation of the project (Holwerd aan Zee, n.d.). The process of the project is done via bottom-up decision-making. Inhabitants created the idea, and it was not ordered from a higher level of government. As part of this bottom-up decision-making, meetings are organised where inhabitants can express their opinion and ideas about the project.

Landowners and farmers are important stakeholders of the project, since the project will be implemented on land which is currently not owned by the municipality (Moreno et al., 2016). Thus, to create the lake, the land needs to be bought from these landowners. In addition, the project will influence the work of farmers, which will be mentioned later in this chapter. Other important stakeholders are the municipality, the province, and Rijkswaterstaat. The initiators depend on larger stakeholders like the province and Rijkswaterstaat for the implementation of the project. Without the support of the province, there is a smaller chance of the project being finalized (Vogelbescherming, 2023). According to Marco Verbeek, especially the financial support of the province is important for the project (Omrop Fryslân, 2023). Oomen (2014) is convinced that HaZ is the perfect example of a participation society, due to the method of decision-making and the many stakeholders involved.

The project does not only come with advantages. Van der Klaauw et al (2017) noted in their research that the realisation of HaZ will come with an increased chance of salination of the ground. This is a consequence of the incoming salty water from the Wadden Sea into the lake (De Groot & Nap, 2018). Hu & Schmidhalter (2004) noted that not all crops can survive the saline environment and that the agricultural productivity in the area will decrease. Possible solutions could be nutrient management and the cultivation of crops that are adapted to a saline-rich ground (Swarajyalakshmi et al., 2003). Singh (2015) also suggests the use of water drainage systems. Salination is not the only problem that farmers experience regarding the project. The lake will be created on a location which is currently owned by farmers. Therefore, farmers need to sell their land. They will be compensated with money, however, farmers would prefer to get land back in return, since this is a more stable form of income (Holwerd aan Zee, 2019). Not all farmers are opposed to the project. Frans Antonides, a farmer in Holwerd, believes that the project will be beneficial for the whole environment, thus, including the farmers in the area (NPO, 2023). He does note, however, that in order to reach this, the plan should be well communicated to inhabitants and other involved parties. Due to these high risks for the agricultural business, the LTO, a Dutch agricultural organisation, decided to step back as an involved stakeholder (Omrop Fryslân, 2022). Wetterskip Fryslân, the involved water authority, also withdrew their participation in the project, mainly due to the undetermined situation around future maintenance (Van Kesteren, 2022).

The project was introduced in 2013. Up to the year 2020, there was no definite design of the project (Omrop Fryslân, 2019b). The main elements of the project, like replacing the dyke with a sluice and the combination of a salt and sweet water lake, are still present after the discussions about the design of the project. Verbeek noted that this was due to the new insights that kept appearing (Omrop

Fryslân, 2019b). In addition, the design of the project changed throughout the years, due to the required permits (Stuurgroep Holwerd aan Zee, 2023).

A voting in April 2023, concluded that 85% of the municipal council members voted for the continuation of the project (Noardeast-Fryslân, 2023). The province decided earlier that year that the project could continue if more clarity was given and certain requirements were met (Stuurgroep Holwerd aan Zee, 2023). At the end of 2023, the initiators sent a letter to the province, in which they give the requested clarification about the budget and maintenance, and in which they explain their following steps (Stuurgroep Holwerd aan Zee, 2023).

Jan Zijlstra, one of HaZ's initiators, expects that the construction of the lake can start in 2025. He clarified that they are currently working on purchasing the required property (Zijlstra, 2024). The purchase of 32 hectares of ground, out of the total 43 hectares, has been arranged (Van der Meulen, 2024). Nowadays, the main obstacle of the project is the financial situation (Holwerd aan Zee, 2019). This situation is uncertain, and therefore the province has not yet agreed to The costs of the project are estimated around €110 million (Van der Meulen, 2024). This amount is including the maintenance for the following 20 years (Zijlstra, 2024). The province contributed €10 million (Omrop Fryslân, 2019a), the state contributed €7 million through a Regional Deal, and the municipality contributed €5,5 million (Zijlstra, 2024). In addition to these amounts, the Waddenfonds invested €8,3 million (Wouda, 2020) and the National Postcode Lottery donated €15 million to the project (Stadszaken, 2023). Despite these investments, there is a shortage of money in the budget. The foundation of the project expects to receive the rest of the money from the Waddenfonds, the regional agricultural deal, the state, and the income from the soil and sludge that will be dug out (Van der Meulen, 2024). This budget is an expectation, and therefore will not be guaranteed before the summer of 2024. Whether HaZ will be implemented or not, will be decided by the province, based on the data that is expected to come out in the summer of 2024 (Stuurgroep Holwerd aan Zee, 2023).

2.2 Related theories and concepts

As mentioned in the previous chapter, an economic boost is expected as result of the project. Van der Klaauw et al. (2017) note that the increase in tourism gives locals the opportunity to create more amenities in the village, which will result in an economic boost and more employment opportunities. New amenities will arise and old amenities can be better maintained by this economic enhancement (RTL Nieuws, 2023). Sijtsma et al. (2012) note in their research that the mainland coastal area along the Wadden Sea is lagging behind in tourism numbers, compared to the islands themselves. Therefore, this expected boost in tourism can be positive for the area. A similar project along the Waddencoast is Lauwersmeer. The tourist park Esonstad, which is located next to the lake, has a positive influence on the regional economy in its area (Leystra, 2013). This study also concluded that local inhabitants were positive about the park.

Next to the ecological advantages of the project, which were mentioned in Chapter 2.1, the placement of the sluice can lead to worries among the inhabitants. The heightmap of The Netherlands (WUR, n.d.), which is visible in Appendix IV, shows that Holwerd and its surrounding area lay relatively low. Due to this, there is a higher chance of flooding in the area and the plan to open up the dyke counteracts the idea to keep the country safe from the water. Bos (2011) noted in his research that the Groninger seadyke created a sense of safety for local people. Nonetheless, Bos also noted that most inhabitants were not afraid of the dyke breaking. To measure the risks in this area because of the dyke replacement, the Coastal Vulnerability Index can be used. This is a tool to measure the vulnerability around coastal areas, mostly with estuaries (Denner et al., 2015). This risk assessment can help future planning (Denner et al., 2015).

One of Haz's goals is to give the declining region a boost. Holwerd is located in the municipality Noardeast-Fryslân, which is labelled as 'Krimpregio' (Rijksoverheid, 2019). This means that the number of inhabitants is declining. These areas are at risk of experiencing the arrival of low-income families and empty houses (Verwest et al., 2009).

Van Dijk (2014), professor and chairman of the Wadden Academy, indicates that inhabitants must initiate solutions by themselves to get out of the declining population spiral. This is in line with the inhabitants in Holwerd, who initiated the project. Argent et al. (2009), who studied amenities and rural change in Australia, note that inhabitants are most likely be pulled towards a village by the supply of attractive amenities.

When the project will be implemented, the village of Holwerd will be changing. A Norwegian study about place development showed that someone's view towards a development is highly influenced by place attachment (Vorkinn & Riese, 2001). Someone's reaction to place change is highly influenced by place attachment, which can be defined as the relationship between people and their surroundings (Anton & Lawrence, 2016). Vorkinn and Riese (2001) showed that people who are more attached have a higher chance of seeing a development as negative. How people react to place change is, among other things, influenced by how they are informed of the change (Anton & Lawrence, 2016). Another way to predict how people react to place change is the Theory of Planned Behaviour. In this theory, people's behavioural intentions are predicted based on their own attitudes, subjective norms, and perceived behavioural control (Read et al., 2013). In their research about the arrival of windfarms, Read et al. concluded that windfarms themselves did not cause resistance, but rather inhabitant's subjective norms and past behaviour. To relate this to the project of HaZ, it would mean that inhabitants with a negative view towards the project would not primarily act based on the design of the project, but they would base their opinion on their social norms and attachment to the village.

The decision-making process of the project is done with a bottom-up approach. In bottom-up planning, the community and its needs, problems, and expectations are central (Pissourios, 2014). Kunar et al. (2016) note in their research that the participants who had more influence, were overall happier about the project and its process. However, they also noted that this form of decision-making is less effective and takes more time compared to the top-down approach.

The concepts and theories that were mentioned in this chapter are potentially influencing the opinion of local inhabitants towards HaZ. In addition, the ecological consequences, salination, and financial situation, which were mentioned in chapter 2.1, also affect someone's opinion towards the project. These concepts come together in the conceptual model below. It shows that the project of HaZ has effect on the possible flood risk, ecology, economy, agriculture, population, and place change. The economic situation influences the number of tourism and employment in the area. All these factors come together as main influences to determine someone's opinion about the project. Next to these factors that are influenced by the project itself and personal data (gender, age, etc.), the literature also reveals that the decision-making process, someone's social norms, place attachment, and the financial situation are relevant when someone forms their opinion about the project.

Image 2: Conceptual Model
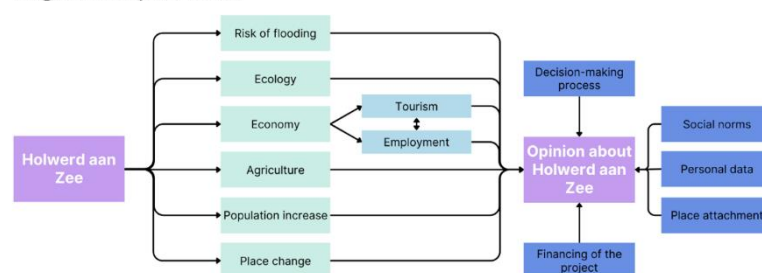
Source: Authors own, made with Canva.com

2.3 Expectation

It is expected that the inhabitants of Holwerd will have a positive view towards HaZ. The project will have a positive effect on the region where Holwerd is located. It is therefore expected that the advantages of HaZ will outgrow the disadvantages. It is expected that the inhabitants are enthusiastic about the form of decision-making and citizen participation. Therefore, local people will most likely, in general, support the project of HaZ greatly, especially due to the expected positive impact on the village.

3. Methodology

To answer the research questions of this project, and thus to determine the opinion of inhabitants about HaZ, a quantitative research approach was chosen. More specifically, surveys were conducted. The survey started with questions about the overall opinion of the project, which were followed by questions about the components and the process of the project. At the end, respondents were asked to fill in demographical information about themselves. The survey was distributed in Dutch since the inhabitants are better known with this language and they can therefore better express their opinion about the project. The Dutch version of the survey is visible in Appendix I and the English translation is added in Appendix II.

The participants for this survey are the inhabitants of Holwerd. Szolnoki and Hoffmann (2013) note that surveys are more representative if they are done in real life, based on the lower response rate of online surveys. Therefore, the surveys were spread face-to-face in the village of Holwerd, by going door-to-door. This also resulted in small informative conversations about the project with inhabitants. The survey was presented both on paper and with a QR-code that led to a Google Form. This way, participants had the option to decide how they preferred to fill in the survey. For the paper version, the answers were picked up approximately an hour later to give participants their time when filling in the survey. To get an as representative sample as possible, the data was collected in all neighbourhoods in the village, at different moments during the week. This led to more respondents and a smaller possibility of a sample bias. The data was collected on three different days, particularly on a Wednesday, a Saturday, and a Monday. The study has shown that the sample is representative of the population in Holwerd. Further explanations about this will be done in Chapter 4.

The collected data was inserted and analysed in SPSS. The survey answers, which were given in a range from 1-10, are ratio variables, due to its absolute value of zero and the ability to rank the variables with equal intervals. Because of the comparison with several independent variables, a Multiple Linear Regression was performed. The variable "What grade would you give the project of HaZ?" was used as a dependent variable. The grades of 'ecological effects, 'economic effects, 'breaking through the dyke' and 'bottom-up decision-making' were included as independent variables. Therefore, the overall grade that the project received was explained by the different grades that respondents gave to these four sub-categories. While conducting the test, the expected outcome was that there would be a linear relationship between the dependent and independent variables. The threshold of the test was set at 95%. In addition to the MLR, the descriptive statistics of the data were processed into tables.

Some collected variables were left out of the MLR, due to the issue of multicollinearity. This means that two independent variables can be linearly predicted based on each other, and therefore lead to false results. To solve this problem, the Variance Inflation Factor (VIF) of all variables was measured. A VIF-value above 5 indicates a correlation that most likely affects the regression output (Zach, 2020). As a solution, the regression was performed with the four most important independent variables, namely 'ecological effects, 'economic effects', 'breaking through the dyke', and 'bottom-up decision-making'.

This decision was based on Choueiry (n.d.), who notes that in case of collinearity, a solution would be to only keep the key variables. Next to the VIF-value, the Tolerance value is also a good indication of collinearity, namely if it is below 0,1.

Before participating in the research, participants were informed about their rights during the data collection process. It was explained how the data would be processed and that participation is completely voluntary. In the survey, participants had to agree with the terms of data use. At the end of the survey, an e-mail address was given to the participants in case they had questions about the research or the data storage. The data was stored in an environment that is only accessible with a password. This was done by encrypting the Google Forms, its Excel file, and the SPSS file.

4. Results

During the data collection, several observations have been made. Most inhabitants were very willing to tell more about the project, the village, and their view on it. Not many houses were for sale, unlike what was expected based on the literature. Nevertheless, relatively many houses started to decay. The village seemed calm and quiet. Not many inhabitants were out on the streets.

The survey has been filled in by 79 respondents. 41 of these respondents are female, and 38 are male. This differs slightly from the inhabitants of Holwerd since 51% of the village is male and 49% female (CBS, 2023). The respondents' educational levels differ from primary school to university level. However, the most common educational levels are MBO and HBO. These two categories add up to 73,4% of the respondents. Of these two, MBO is the most frequent level, which corresponds with the data from Holwerd (CBS, 2023). The age of the respondents differed from 13 to 87 years, with an average of 49 years. In Holwerd, the largest age group is between 45 and 65 years old (CBS, 2023). The average age of the respondents lies within this largest age group. The descriptive statistics of the respondents' gender, level of education, and age are also visible in Appendix III.e. The average number of years that the respondents have been living in the village is 27 years. This means that respondents have, on average, lived 56% of their lives in Holwerd. 58% of the respondents thought about the idea of moving away from Holwerd.

4.1 General opinion

Table 1, which is visible on the next page, shows the average grades that the project and its components received from the respondents. As is visible in the table, the project of HaZ receives a 6,9 on average. Appendix III.d shows an overview of the descriptive statistics of the survey question "What grade would you give the project of HaZ?". Table 3.4.1 in this appendix shows that the median is 8. This is also visible in Figure 3.4.3. Respondents also gave a 6,9 on average to the question about the expected arrival of more tourists and facilities.

Many inhabitants talked enthusiastic about the project and its consequences. One inhabitant noted, for example, that the publicity of the project had positive effects for the village. The opportunities for the region were also stated as positive effects of the project. Respondents also expressed their positive wonder and enthusiasm about the increasing liveliness of the village. In addition, they were also positive about the project being a citizens initiative. One respondent wrote down that he is optimistic about this project being a stimulation for other citizens to initiate a project which improves their environment.

The expected salination, costs, and politics around the project were often mentioned as unpopular features of the project. During the literature research, the effects on the agricultural sector and the financial situation were found as critical points of the project. Some inhabitants felt like the project initiators were acting merely out of their own interest.

Inhabitants also expressed their worries about the possible relocation of the boat terminal to Ameland. Currently, the ferry to Ameland is leaving from Holwerd, which creates good circumstances for Holwerd. Due to silting and dredging costs, the boat terminal will most likely relocate to Ferwert (De Boer, 2023), which is a village towards the west. However, this might impact Holwerd.

Table 1: Average grades

		Grade
On a scale from 1-10, how interested are you in the project of HaZ?		6,8
What grade would you give the project of HaZ?		6,9
What grade would you give the separate components of the project?	[The expected ecological consequences]	5,2
	[The expected economical consequences]	5,8
	[Breaking through the dike]	5,4
	[The connection to other Frisian waters]	5,9
	[The construction of islands in the lake]	5,6
	[The construction of the lake on a location which is now agricultural land]	5,5
	[The construction of a harbour]	5,5
	[The expected increase in facilities]	6,1
	[The expected increase in employment opportunities]	6
	[The expected increase in tourism]	5,9
	[The way of Bottum-up decision making]	6,5
To what extend do you think the project is feasible?		6,2
To what extend are you confident that the project will actually be implemented?		5,6
To what extend do you think there will be more tourism and new facilities in Holwerd, as a result of the project?		6,9
To what extend do you think the arrival of more tourists in Holwerd is is a positive change?		6,7

(Source: author's own)

4.2 Components of the project

The grades for the different components of the project is visible in Table 1. The expected ecological consequences received the lowest average grade, specifically a 5,2. The highest grade is given to the decision-making form. All components score between a 5 and a 7. This is mostly sufficient, although not extremely high. The average score of the components is a 5,8.

Several inhabitants mentioned that they were living in Holwerd because the village is peaceful and quiet. Some revealed that they were therefore not enthusiastic about the expected increase in tourism. This disclosure was not found in the related literature and is not in line with the targets of the HaZ project. The expected increase in tourism received a 5,9 in the survey. This is above the average grade of components, and is therefore not fully in line with their expressed feelings about this.

Inhabitants were also worried about the possible rise in housing prices, which would emerge from the increasing economic situation, and the placement of the sluice. One respondent wrote down that it would be irresponsible and not smart to challenge the sea. This component received a 5,4, which is insufficient.

As mentioned in the methodology, the performed MLR experienced multicollinearity issues. The calculated VIF-values of all the variables are visible in Appendix III.c. As visible in the table, most values are above the desired threshold of 5. Therefore, the model shows multicollinearity. In addition, the correlation table in Appendix III.b shows high Pearson Correlation Coefficients between the independent variables itself. Therefore, the test was performed again with different variables, which caused more reliable results. This regression, including the collinearity statistics, is visible in Appendix III.a. The VIF variables of this analysis are all below the explained threshold of 5. The Tolerance value is above the set limit of 0.1.

The p-value, shown in Table 3.1.2, of this test is below 1%. The threshold for this test was set at 95%, which means that the test is significant. Therefore, the test's hypothesis of no linear relationship can be rejected.

In Table 3.1.1 it is visible that the model is able to explain 62,4% of the variance of the dependent variable. This is calculated by looking at the R-Squared value of 0.624.

Table 3.1.3 shows the outcome of the regression analysis. Here, all the independent variables are measured separately in relation to the dependent variable. The p-values in Table 3.1.3 indicate whether the separate independent variables predict the dependent variable significantly. The only independent variable that is significantly related to the overall grade of the project, is breaking through the dyke, since its p-value is below 0.001. The relationship between this variable and the overall grade the project received is positive, since the coefficient is 0.383, which is above 0. This means that a higher grade of breaking through the dike will result in a higher grade for the project as a whole.

The other independent variables are not significant, since their p-values are above the limit of 0.005. This means that there is not enough evidence for them to significantly explain the overall grade of the project.

Thus, breaking through the dyke has the largest positive influence on inhabitants' opinion on the project of HaZ as a whole.

4.3 Opinions about the process of HaZ

In the survey, 20 respondents, out of the 79 respondents in total, indicated that they are actively involved in the decision-making process. The majority of these 20 respondents are visiting the information meetings. A few respondents reported that they had been active in the past, but due to the slow process, they are not anymore.

A survey question asked what grade the respondents would give the bottom-up decision-making process of the project. The average of the 79 responses was 6,5 out of 10. 15 respondents gave the process a 10, which was the highest grade possible. This grade is also the mode. 5 respondents graded the project with a 1, which was the lowest grade possible. From the separate project components, the decision-making form received the highest grade. Many inhabitants expressed their happiness towards the rate of citizens participation.

During the data collection, some inhabitants mentioned that fewer inhabitants showed up at the project meetings. Their explanation was the time that has passed by since the start of the project in 2013. They mentioned that the project is taking too long before its realisation. This is in line with the theoretical framework, which touched upon the fact that bottom-up decision-making takes more time. A respondent added to this that too little concrete information was given. During the time that the project has been in progress, 34 respondents changed their opinion about the project. In this time, many changes have occurred to the design and the time of implementation. Survey respondents mentioned that this impacted their view of the project negatively. For some, it is unclear what the current design of the project is. Thus, respondents note a lack in communication about the design of the project and when it will be implemented.

Some respondents mentioned that they did not believe in the realisation of the project due to the reoccurring postponement and changes of the plan. This is visible in the response to the question "To what extent are you confident that the project will actually be implemented?", which received an average of 5,6 points out of 10. Not all respondents agree with this, for example, some indicated that the changes improved the project and made it more feasible and thought through.

Not only did inhabitants experience displeasure due to the delays, the municipality also considered pulling back its investment due to the changes of the project that kept occurring.

Jan Zijlstra (2024) explained that the excitement about HaZ among inhabitants has ups and downs. When new actions are taken, people get excited, however, when there is no news about the project

for a while, inhabitants start to lose faith in the completion of the project. He added that planning projects take time before implementation. He gave an example of a project in Zeeland, which took over 30 years to complete. To elaborate, he explained that many inhabitants would most likely not be aware of this.

5. Conclusion

Thus, this research answered the question "*To what extent do the local people of Holwerd support the project of 'Holwerd aan Zee'?*".
In general, inhabitants are positive towards the project since they gave it an average of 6,9 out of 10. In addition, most other survey questions were answered with a positive attitude.
It was shown that the opinion about breaking through the dyke is the only variable that significantly explains the overall grade that respondents gave the project of HaZ. Therefore, this variable is affecting the overall grade the most. This relationship is positive, which means that the higher the grade of breaking through the dike, the higher the grade the project received as a whole.
According to the inhabitants, the most positive element of the project, is the bottom-up decision-making. However, it was expected that people were more positive about the process. Instead, many respondents indicated that the process took too long and too many changes occurred.
Thus, to answer the main question, inhabitants are supportive of the project, since they see the expected effects as positive for the village and its region. However, the time of and change to the project decrease the amount of support that inhabitants have towards HaZ.

During the research, I experienced trouble regarding the MLR and multicollinearity. The independent variables predicted each other, which led to false test results. Looking back at the chosen variables, 'economic consequences', 'increase in tourism', 'increase in employment opportunities', and 'increase in facilities' are likely to go hand in hand. In hindsight it also seems logically that someone's opinion about project elements is correlated to their opinion about the whole project. After an extensive investigation of the variables, I decided to go through with 'ecological effects, 'economic effects, 'breaking through the dyke', and 'bottom-up decision-making'. This decision was based on the literature and the variables' adequate VIF-scores. After the remaining of these four variables, the results were trustworthy.
Another issue that occurred during the research was a change in the design of HaZ. At the end of December 2023, a link to the new design was posted on LinkedIn. The survey of this research also focused on elements of the project that will be excluded from this new design. The four variables in the MLR are still applicable to the new situation. There will still be a sluice in the dike wall, and the economic and ecological situation are expected to grow. However, there will be more emphasis on the ecology than before. In addition, there will be water on the western side of the village as well. Here, the campsite will be located by the water, instead of building recreational houses. Thus, the project still tries to achieve a better economic and ecological situation for the village and region, but not all survey questions are accurate anymore.
The MLR in this study was performed without the personal characteristics of inhabitants. However, this could be preferable to include. Therefore, it is suggested to add these characteristics in future research about this subject. It would also be interesting to look further into the effects of social norms and the perceived risks for the area and the inhabitants, and its effect on the opinions of inhabitants towards the project. Another idea for future research is to look into the relocation of the boat terminal to Ameland. Several inhabitants expressed their worries about this development during the data collection process of this research.

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Appendix I: Survey

Enquête Holwerd aan Zee

Voor mijn studie Sociale Geografie en Planologie aan de Rijksuniversiteit Groningen doe ik onderzoek naar het project Holwerd aan Zee. Binnen dit onderzoek wil ik graag in kaart brengen hoe de inwoners denken over het project van Holwerd aan Zee.

Zou u mij mee willen helpen met mijn onderzoek, door deze enquête in te vullen? Het zijn 17 vragen, en het invullen duurt ongeveer 6 minuten.
Alvast bedankt!

Groeten van Miriam

Vragen over het project HaZ

Bent u bekend met het project van Holwerd aan Zee?
- ○ Ja
- ○ Nee

Op een schaal van 1-10, hoe geïnteresseerd bent u in het project van Holwerd aan Zee?
(*1 is het meest negatief en 10 het meest positief*)
1   2   3   4   5   6   7   8   9   10

Holwerd aan Zee is een initiatief van vier dorpsbewoners om de bevolkingskrimp en dalende economie tegen te gaan. Hun idee is om een gat in de dijk te maken en om een getijde meer te maken ten noorden van het dorp. Het gat in de dijk zal worden vervangen door een sluis die bij hoog water zal sluiten. Het idee achter het project is dat dit zal zorgen voor meer toeristen die de regionale economie zullen stimuleren. Dit zal onder andere voor meer voorzieningen zorgen.

Wat voor cijfer geeft u het project Holwerd aan Zee?
(*1 is het meest negatief en 10 het meest positief*)
1   2   3   4   5   6   7   8   9   10

Wat voor cijfer tussen 1 en 10 geeft u de verschillende onderdelen van het project Holwerd aan Zee?
Deze vraag gaat over de aparte onderdelen van het project. Hierbij kunt u aangeven welk cijfer u de losse onderdelen geeft. Hierbij is 1 het laagste en 10 het hoogste. Het getal kunt u op de stippellijn invullen.

- Verwachte ecologische gevolgen (combinatie van zoet en zout water in het meer, het (mogelijk) zouter worden van de bodem en toename van de biodiversiteit)   ....
- Verwachte economische gevolgen   ....
- Het doorbreken van de dijk   ....
- De connectie naar andere Friese wateren   ....
- Het aanleggen van eilanden in het meer   ....
- Het aanleggen van een meer op de huidige plek van landbouw grond   ....
- Het aanleggen van een jachthaven   ....
- De verwachte toename van voorzieningen   ....
- De verwachte toename van de werkgelegenheid   ....
- De verwachte toename van het toerisme   ....
- De manier van Bottom-up besluitvorming (het idee is afkomstig van buurtbewoners, en niet opgelegd vanaf een hogere instantie zoals de gemeente)   ....

Bij de volgende vragen kunt u antwoorden met een getal tussen de 1 en de 10. Hierbij is 1 het laagste en 10 het hoogste.

In hoeverre vindt u het project van Holwerd aan Zee haalbaar?

1   2   3   4   5   6   7   8   9   10

In hoeverre heeft u er vertrouwen in dat het project daadwerkelijk zal worden uitgevoerd?

1   2   3   4   5   6   7   8   9   10

In hoeverre denkt u dat er meer toerisme en nieuwe voorzieningen in Holwerd zullen komen door het project?

1   2   3   4   5   6   7   8   9   10

In hoeverre vindt u het een positieve verandering dat er meer toeristen worden verwacht in Holwerd?

1   2   3   4   5   6   7   8   9   10

Er zullen nu twee open vragen over Holwerd aan Zee volgen.

Is uw mening over Holwerd aan Zee in de loop van de tijd veranderd? In wat voor opzicht?

………

………

Bent u actief betrokken bij de besluitvorming van het project? Zo ja, op wat voor manier?

Actief betrokken houdt bijvoorbeeld in dat u naar vergaderingen gaat of uw mening laat horen bij het maken van beslissingen.

………

………

Vragen over uzelf

De volgende paar vragen zullen over uzelf gaan.

Wat is uw geslacht?
- ○ Vrouw
- ○ Man
- ○ Anders

Wat is uw leeftijd?

…………………. jaar

Wat is uw hoogst behaalde opleidingsniveau?
- ○ Middelbare school
- ○ MBO
- ○ HBO
- ○ Universiteit
- ○ Anders, namelijk: ……………………………………….

Heeft u er ooit zelf aan gedacht om te verhuizen uit Holwerd?
- ○ Ja
- ○ Nee

Hoelang woont u al in Holwerd?
…………………. jaar

Wat is de voornaamste reden dat u in Holwerd blijft wonen?
……………………·………………………………………………………………

Afsluitende vragen

Heeft u verder nog dingen die u graag kwijt wilt over het project van Holwerd aan Zee?
………………….

Wilt u graag de resultaten van het onderzoek ontvangen?
Het e-mailadres zal alleen worden gebruikt om de resultaten naar te versturen. Verder zal het dus nergens voor worden gebruikt en ook niet in combinatie met uw ingevulde antwoorden.
Dan kunt u uw e-mailadres hier achterlaten: …………………………………….

Ik ga akkoord met de deelname aan dit onderzoek en het verwerken van mijn ingevulde gegevens.
De data zal alleen worden gebruikt voor dit onderzoek en niet worden doorgestuurd naar derden. De data zal worden bewaard in een bestand die is beveiligd met een wachtwoord.
Voor vragen over consent en de omgang met uw data kunt u altijd contact opnemen via het e-mailadres M.k.pierik@student.rug.nl.
   ○   Ik ga akkoord.

Dank u wel voor het invullen van deze enquête over Holwerd aan Zee! Voor extra opmerkingen of vragen mag u altijd contact met mij opnemen op het e-mailadres M.k.pierik@student.rug.nl.

Appendix II: Survey translation in English

For my study Human Geography and Planning at the University of Groningen, I am conducting research about the project of 'Holwerd aan Zee'. For this research, I would like to sketch an image of the opinion of residents about the Holwerd aan Zee project.

Would you mind helping me with my research by filling in this survey? The survey consists of 17 questions and it takes about 6 minutes to complete.
Thank you in advance!

Best regards, Miriam

Questions about the project HaZ

Are you familiar with the Holwerd aan Zee project?
- ○ Yes
- ○ No

On a scale from 1-10, how interested are you in the Holwerd aan Zee project?
(*1 is the most negative and 10 the most positive*)
1   2   3   4   5   6   7   8   9   10

Holwerd aan Zee is an initiative of four inhabitants to boost the declining population and economy. Their idea is to make a hole in the dike and create a tidal lake north of the village. The gap in the dike will be replaced by a sluice, which will close at high tide. The idea behind the project is that this will provide more tourists who will boost the regional economy. This will, among other things, result in more amenities.

What grade do you give the Holwerd aan Zee project?
(*1 is the most negative and 10 the most positive*)
1   2   3   4   5   6   7   8   9   10

What grade between 1 and 10 do you give the different components of the Holwerd aan Zee project?
This question is about the separate components of the project. You can indicate which grade you give each individual component. 1 is the lowest and 10 the highest. You can fill in the number on the dotted line.
- Expected ecological effects   …….
- Expected economic growth   …….
- Breaking through the dike   …….
- The connection to other Frisian waterways   …….
- The construction of islands in the lake   …….
- The construction of a lake on the current location of agricultural land   …….
- The construction of the harbour   …….
- The expected increase of amenities   …….
- The expected increase of employment   …….
- The expected increase of tourism   …….
- The way of bottom-up decision-making   …….

For the following questions, you can answer with a number between 1 and 10, where 1 is the lowest and 10 is the highest.

To what extent do you think the Holwerd aan Zee project is feasible?
1   2   3   4   5   6   7   8   9   10

To what extent are you confident that the project will be implemented?
1   2   3   4   5   6   7   8   9   10

To what extent do you think there will be increased tourism and new amenities in Holwerd, as a result of the project?
1   2   3   4   5   6   7   8   9   10

To what extent do you believe it is a positive change that more tourists are expected in Holwerd?
1   2   3   4   5   6   7   8   9   10

The next two questions will be open questions about Holwerd aan Zee.

Has your opinion about Holwerd aan Zee changed throughout the years? In what way?
……
……

Are you actively involved in the decision making process of the project? If yes, in what way?
Actively involved means for instance being present at meetings.
……
……

Questions about yourself

What is your gender?
- ○ Female
- ○ Male
- ○ Other

What is your age?
…………………. year

What is your highest achieved education level?
- ○ High school
- ○ MBO
- ○ HBO
- ○ Universiteit
- ○ Other, namely: …………………………………….

Have you thought about moving away from Holwerd?
- ○ Yes
- ○ No

For how long have you been living in Holwerd?
…………………. year

What is the main reason that you continue to live in Holwerd?

………………….……………………………………………………………

Closing questions

Do you have anything else to add about the project?

………………….

Would you like to receive the results of the research?

The e-mail address will only be used to send the results to. Therefore, it will not be used for anything else or in combination with your completed answers.

If so, you can write down your e-mail address here: …………………………………….

I agree to participate in this study and process my completed data. The data will only be used for this study and will not be forwarded to third parties. The data will be kept in a password protected file.

For questions about consent and the processing of your data, you can always contact me via M.k.pierik@student.rug.nl.

- ○ I agree.

Thank you for filling in the survey about the Holwerd aan Zee project! For other comments or questions you may always contact me at the e-mail adress M.k.pierik@student.rug.nl.

Appendix III: SPSS outputs

III.a Multiple Linear Regression

Table 3.1.1: MLR Model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.790[a]	.624	.604	1.599

a. Predictors: (Constant), Bottum_up_besluitvorming, Ecologische_gevolgen, Doorbreken_dijk, Economische_gevolgen

Source: SPSS

Table 3.1.2: MLR ANOVA output

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	305.913	4	76.478	29.920	<,001[b]
	Residual	184.035	72	2.556		
	Total	489.948	76			

a. Dependent Variable: Cijfer_HaZ

b. Predictors: (Constant), Bottum_up_besluitvorming, Ecologische_gevolgen, Doorbreken_dijk, Economische_gevolgen

Source: SPSS

Table 3.1.3: MLR Coefficients

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	2.523	.482		5.239	<,001		
	Ecologische_gevolgen	-.129	.120	-.136	-1.072	.287	.325	3.074
	Economische_gevolgen	.178	.123	.184	1.452	.151	.326	3.064
	Doorbreken_dijk	.383	.100	.465	3.822	<,001	.353	2.837
	Bottum_up_besluitvorming	.284	.114	.328	2.492	.015	.301	3.318

a. Dependent Variable: Cijfer_HaZ

Source: SPSS

Table 3.1.4: MLR Collinearity Diagnostics

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Ecologische_gevolgen	Economische_gevolgen	Doorbreken_dijk	Bottum_up_besluitvorming
1	1	4.723	1.000	.01	.00	.00	.00	.00
	2	.137	5.871	.76	.02	.00	.13	.00
	3	.060	8.853	.11	.35	.09	.72	.00
	4	.043	10.525	.12	.62	.43	.07	.19
	5	.037	11.237	.01	.00	.48	.08	.80

a. Dependent Variable: Cijfer_HaZ

Source: SPSS

III.b Correlation Matrix

Table 3.2.1: Correlation Matrix

Correlations

		Ecologische_gevolgen	Economische_gevolgen	Doorbreken_dijk	Connectie_friese_wateren	Aanleggen_van_eilanden	Aanleggen_op_landbouwgrond	Aanleggen_jachthaven	Toename_voorzieningen	Toename_werkgelegenheid	Toename_toerisme	Bottum_up_besluitvorming
Ecologische_gevolgen	Pearson Correlation	1	.760**	.727**	.675**	.716**	.777**	.678**	.710**	.666**	.683**	.755**
	Sig. (2-tailed)		<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001
	N	77	77	77	77	77	77	77	77	77	77	77
Economische_gevolgen	Pearson Correlation	.760**	1	.723**	.714**	.741**	.768**	.785**	.823**	.823**	.838**	.760**
	Sig. (2-tailed)	<,001		<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001
	N	77	78	78	77	77	77	77	77	77	77	77
Doorbreken_dijk	Pearson Correlation	.727**	.723**	1	.846**	.769**	.874**	.825**	.814**	.811**	.797**	.759**
	Sig. (2-tailed)	<,001	<,001		<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001
	N	77	78	78	77	77	77	77	77	77	77	77
Connectie_friese_wateren	Pearson Correlation	.675**	.714**	.846**	1	.760**	.798**	.784**	.784**	.776**	.733**	.717**
	Sig. (2-tailed)	<,001	<,001	<,001		<,001	<,001	<,001	<,001	<,001	<,001	<,001
	N	77	77	77	77	77	77	77	77	77	77	77
Aanleggen_van_eilanden	Pearson Correlation	.716**	.741**	.769**	.760**	1	.859**	.846**	.832**	.830**	.815**	.740**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001	<,001	<,001
	N	77	77	77	77	77	77	77	77	77	77	77
Aanleggen_op_landbouwgrond	Pearson Correlation	.777**	.768**	.874**	.798**	.859**	1	.891**	.866**	.844**	.838**	.835**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001	<,001
	N	77	77	77	77	77	77	77	77	77	77	77
Aanleggen_jachthaven	Pearson Correlation	.678**	.785**	.825**	.784**	.846**	.891**	1	.921**	.893**	.901**	.791**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001	<,001
	N	77	77	77	77	77	77	77	77	77	77	77
Toename_voorzieningen	Pearson Correlation	.710**	.823**	.814**	.784**	.832**	.866**	.921**	1	.935**	.912**	.822**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001	<,001
	N	77	77	77	77	77	77	77	77	77	77	77
Toename_werkgelegenheid	Pearson Correlation	.666**	.823**	.811**	.776**	.830**	.844**	.893**	.935**	1	.942**	.806**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001		<,001	<,001
	N	77	77	77	77	77	77	77	77	77	77	77
Toename_toerisme	Pearson Correlation	.683**	.838**	.797**	.733**	.815**	.838**	.901**	.912**	.942**	1	.793**
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001		<,001
	N	77	77	77	77	77	77	77	77	77	77	77
Bottum_up_besluitvorming	Pearson Correlation	.755**	.760**	.759**	.717**	.740**	.835**	.791**	.822**	.806**	.793**	1
	Sig. (2-tailed)	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	<,001	
	N	77	77	77	77	77	77	77	77	77	77	77

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS

III.c VIF-values

Table 3.3.1: VIF-values of all components of the project

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ecologische_gevolgen	.265	3.769
	Economische_gevolgen	.215	4.652
	Doorbreken_dijk	.161	6.196
	Connectie_friese_wateren	.233	4.295
	Aanleggen_van_eilanden	.202	4.955
	Aanleggen_op_landbouwgrond	.104	9.600
	Aanleggen_jachthaven	.097	10.316
	Toename_voorzieningen	.082	12.137
	Toename_werkgelegenheid	.070	14.326
	Toename_toerisme	.083	12.070
	Bottum_up_besluitvorming	.232	4.307

a. Dependent Variable: Cijfer_HaZ

Source: SPSS

III.d Descriptive statistics − What grade would you give the project of Holwerd aan Zee?

Table 3.4.1: Descriptive statistics grade HaZ

Statistics

wat voor cijfer geeft u het project

| N	Valid	79
	Missing	0
Mean		6.89
Median		8.00
Mode		8

Source: SPSS

Table 3.4.2: Frequencies grade HaZ

wat voor cijfer geeft u het project HaZ?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	6.3	6.3	6.3
	3	6	7.6	7.6	13.9
	4	3	3.8	3.8	17.7
	5	5	6.3	6.3	24.1
	6	10	12.7	12.7	36.7
	7	9	11.4	11.4	48.1
	8	18	22.8	22.8	70.9
	9	13	16.5	16.5	87.3
	10	10	12.7	12.7	100.0
	Total	79	100.0	100.0	

Source: SPSS

Figure 3.4.3: Histogram grade HaZ
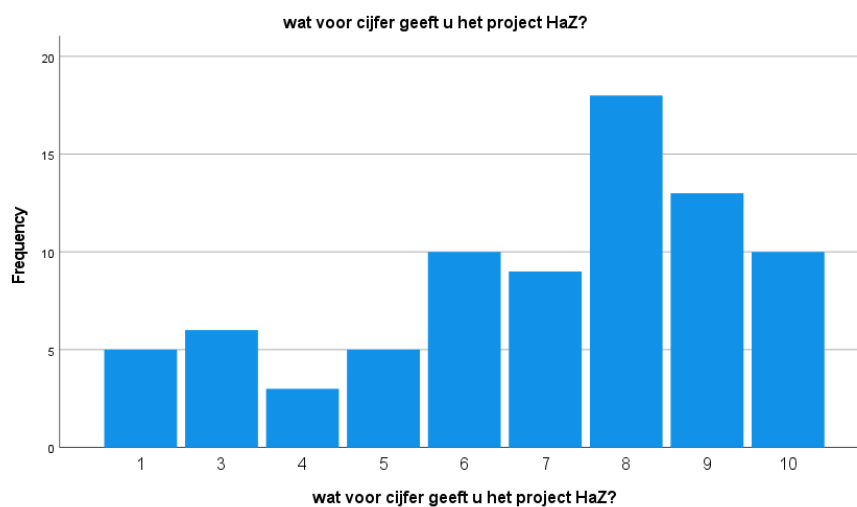
Source: SPSS

III.e Descriptive statistics – Gender, age and level of education

Table 3.5.1: Descriptive statistics gender

Geslacht

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Man	38	48.1	48.1	48.1
	Vrouw	41	51.9	51.9	100.0
	Total	79	100.0	100.0	

Source: SPSS

Table 3.5.2: Descriptive statistics level of education

Wat is uw hoogst behaalde opleidingsniveau?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	HBO	28	35.4	35.4	35.4
	Kleuterleidster diploma A en B	1	1.3	1.3	36.7
	Lagere school	1	1.3	1.3	38.0
	MBO	30	38.0	38.0	75.9
	Middelbare school	11	13.9	13.9	89.9
	Middelbare school, Landbouwschool.	1	1.3	1.3	91.1
	Universiteit	7	8.9	8.9	100.0
	Total	79	100.0	100.0	

Source: SPSS

Table 3.5.3: Descriptive statistics age

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Leeftijd	79	13	87	49.46	19.120
Valid N (listwise)	79				

Source: SPSS

Appendix IV: Heightmap of The Netherlands

Image 4.1: Heightmap
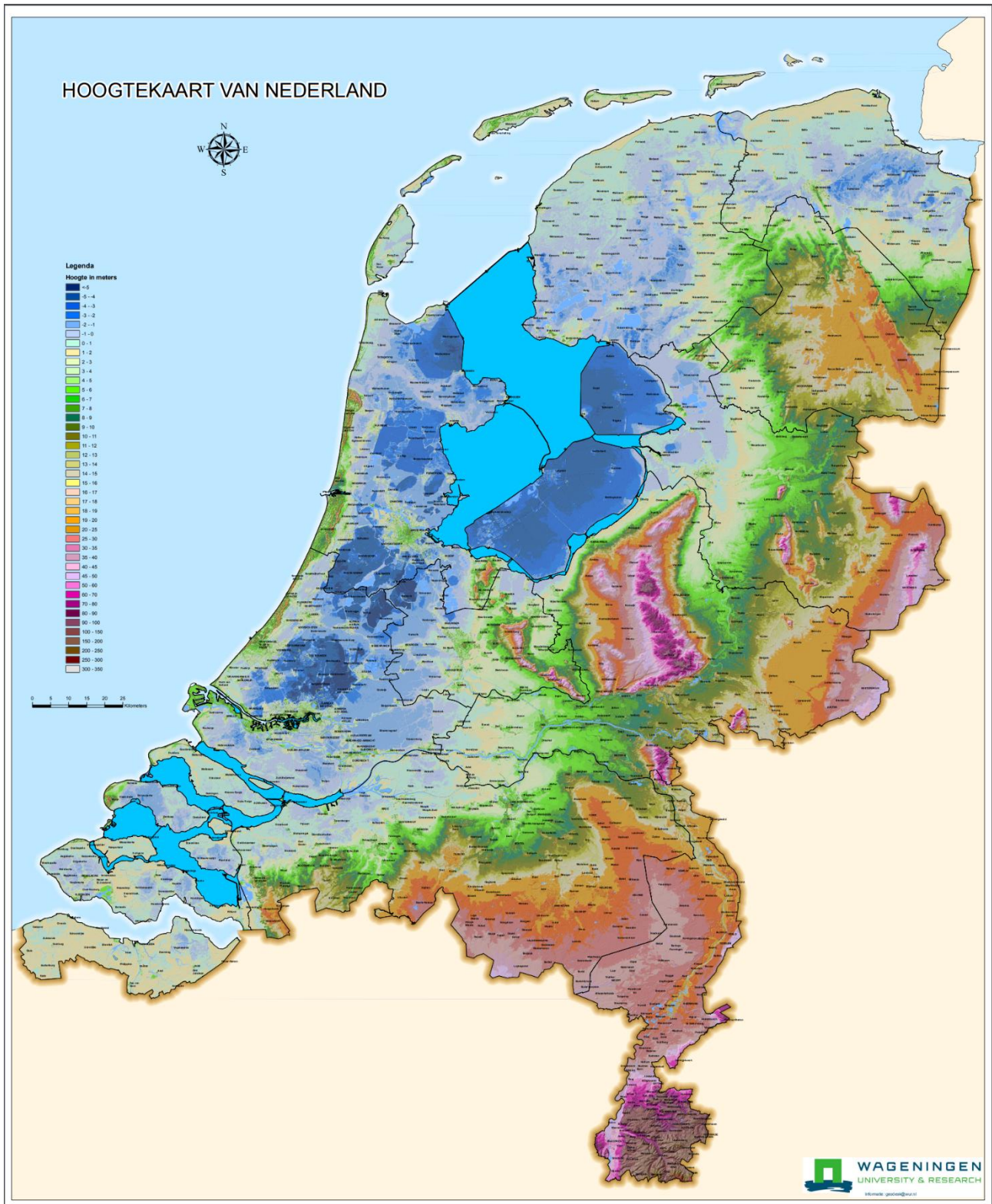
Source: Wageningen University of Research