Thesis Thomas van der Heide
S2928264

Figure 1: Intensive farming in the Netherlands (Kooijmans, 2019)

Abstract

Agriculture has recently become a heavily debated topic in the Netherlands. New laws and regulations have put pressure on the sector to change, but have run into stiff resistance from those employed in the sector. Organisations such as the Farmers Defence Force claim that the people in the Randstad area of the Netherlands do not understand the sector, and its economic importance to the Dutch economy. The literature supports the argument of groups in the population having different views on the agricultural sector, based on their location. The sample consists of 174 respondents in three groups, residents of the Randstad, the Northern Netherlands, and the rest of the country, referred to as 'Other'. The analysis has shown that differences in the level of knowledge regarding the economic situation of the agricultural sector can be found between groups, based on their location. The differences found were not only based on where respondents lived, but also on their age, gender and level of education. However, the expected significant difference between respondents from the Northern Netherlands and respondents from the Randstad was not observed.

Key words

Agriculture, Rural Economy, Rural and Urban differences, agricultural knowledge.

Table of contents

Background

The nineteenth of February marked the appearance yet another agricultural protest in the Netherlands. Farmers made an attempt to reach the Hague and to protest against what they feel are unfair conditions for farmers. This continued a trend of farmers protesting in large numbers against the government policy regarding the nitrogen issues (Hart van Nederland, 2020). The 'nitrogen problem' in the Netherlands seems far from resolved.

The main issue regarding nitrogen in the Netherlands is that the country has so far been incapable of conforming to the European standards. The European standard for the maximum allowed level of nitrogen is set at 200 µg/m3, a level that the Netherlands exceeds (European Commission, 2010). Higher levels have been deemed unhealthy and possibly dangerous to both population and environment (CLO, 2019).

Figure 2: Farmers protesting in Groningen (NOS.nl, 2019b)

In the Netherlands, the agricultural sector produces forty six percent of all nitrogen (Nu.nl, 2019). With this percentage, they are the largest producer of nitrogen dioxide in the Netherlands (Nu.nl, 2019). To combat the nitrogen problem and avoid sanctions from the European Union, the government of the Netherlands has decided to halve its nitrogen output (Smit, 2019).

In order to reach this goal of halving the nitrogen output, several new proposals were introduced in other polluting sectors (NOS.nl, 2019a). Transport was shown to be another large source of nitrogen pollution (Nu.nl, 2019). New laws were enacted to limit the driving speed on highways to one hundred kilometres per hour. Lower driving speeds would reduce the nitrogen output of cars, thereby helping reduce the total output of nitrogen in the

Netherlands (Nu.nl, 2019). The law was received with widespread criticism and exasperation (NOS.nl, 2019a). Critics of the new law point to the fact that transport is only a small contributor to the nitrogen problem, and that agriculture played a much larger share (Van der Horst, 2019). These critics view this piece of legislature as unfair, feeling they shoulder the blame for a problem that was not caused by them (Van der Horst, 2019).

In total, the Netherlands produced 230 million kilos of nitrogen in 2017. Of these 230 million kilos, the agricultural sector produced 106 million kilos of nitrogen. Of these 106 million kilos, 94 million kilos were produced by the livestock part of the sector (CLO, 2019). This means that the livestock sector produced 88 percent of the nitrogen of the agricultural sector, and 38 percent of the total nitrogen output of the Netherlands (CLO, 2019). Critics of the new driving speed law state that the lower driving speed will only reduce nitrogen output by 210.000 kilos of nitrogen, a drop in the bucket on the national scale (Van der Horst, 2019) (Bremmer, 2020). Some groups have taken to criticising not just the government, but the agricultural sector as well. Cries of misconduct and a lack of solidarity with the rest of the country circulated in the media (Van der Horst, 2019) (Hart van Nederland, 2020).

The ensuing stress on the system led to protests from both the farmers as well as from parties that felt that the agricultural sector should be reduced (Hart van Nederland, 2020). A notable group of farmers has since united itself in an organisation known as the 'Farmers Defence Force', or FDF. In a video on their website, the FDF claims that they are "tired of the Hague" and that "the Hague promises a lot but does nothing" (FDF, 2020). FDF president Mark van den Oever has also stated that farmers are a repressed and small group that is under huge pressure (Omroep Brabant, 2019).

With the most vocal body of farmers, in the form of the FDF, stating that they are unnecessarily being repressed by the Hague and other groups saying that the agricultural sector needs to halve its nitrogen output, this has become a controversial and divisive issue. Numerous opinion pieces have sprouted up on the internet and in newspapers with opinions reaching from stating that the protesting farmers have proven that it is impossible to enter a dialogue with them (Van der Horst, 2019) to opinions of respect and solidarity with these same farmers (Kraa, 2019). However, these articles all target specific actions of specific groups and often shift away from the core of the debate. Articles such as these hardly discuss the key figures within the debate and could indicate a general lack of knowledge of these figures (Van der Horst, 2019) (Kraa, 2019).

The agricultural sector, as well as work in rural landscapes, often brings up feelings of the rural idyll in people (Haartsen, 2003). This can influence people's perception of the agricultural sector and sway it towards the FDF's standpoint of a small, repressed group of people (Omroep Brabant, 2019). Yet, organisations like the FDF provide a narrative of systematic underappreciation for both their function as the provider of food and other nutritional goods, as well as a lack of appreciation for their economic benefits to the country (FDF.nl, 2020).

Repeatedly, they have demanded more respect from the rest of the country (RTLZ.nl, 2019). Members of the organisation converged on the Mediapark in Hilversum on the eighteenth of December 2019 to protest the skewed view of farmers that the media produced (RTLZ.nl, 2019). Not only do they claim that the general public lacks knowledge of their position, they also claim that this lack of knowledge is greater in the Hague and the Randstad (FDF.nl, 2019).

In previous research into the agricultural sector, it has been shown that opinions regarding agriculture and the rural landscape are just as much influenced by the characteristics of the observer as by the characteristics of the observed (Van der Heide, 2013). If the characteristics of the observer can influence their opinions, they can also influence their interest, and thereby their knowledge of the subject.

The issue that therefore arises is: can this knowledge gap between the Randstad and other areas of the Netherlands be found and verified?

The research question following from these problems is therefore:
To what degree does the level of knowledge of the economic strength of the agricultural sector differ between residents of the Randstad and residents of the Northern Netherlands?

The sub questions needed to explain this research question are:
What exactly is the economic value of the agricultural sector in the Netherlands?
Why could differences in the level of knowledge be expected between rural and urban groups?
Why have the areas of the Randstad and the North of the Netherlands been selected?

Theoretical framework

Landscape, and the changing of it, is sometimes expressed as the interaction between nature and man's activities to change it into something more suitable to its needs (Antrop, 1998). This requires a comparison between two different situations in time. A good point of reference to analyse the change in this landscape would be the change from small scale farming to large scale farming using chemical fertilizer. This change occurred around the start of the twentieth century and fundamentally changed the dynamic of agriculture in the Netherlands (Van der Heide, 2012). Before the advent of chemical fertilizer, the nutrient poor sandy soils of the Netherlands, as well as the limited availability of traditional manure-based fertilizer, led to low agricultural yields (Van der Heide, 2012). With the introduction of chemical fertilizer, large scale dairy farms could become increasingly more profitable and most of the agrarian output was now sold at the market (Van der Heide, 2012). This led to the current situation in which the agricultural sector uses the rural land as centres of production, selling surpluses on the market (Bos, 2013).

The agricultural sector in the Netherlands is currently influenced by external factors. These originate from both the European Union's laws and the international market (Van der Heide, 2012). However, while sources such as Van der Heide (2012) state that the agricultural sector as a whole has been affected, Helming et al (1992) state that the dairy sector was affected more than the other sectors due to the implementation of the milk quota system. This article notes a 64 percent decline in prices per kilogram of milk and a distinct shift in their position in the economy, from freely growing businesses to being limited by quotas and laws (Helming et al, 1992).

Not all of the laws and regulations regarding the agricultural sector are this limiting (Silvis, 2009). Many laws regarding the agricultural sector exist to protect the environment (Helming, 1992). The European Commission bundled a number of these existing laws in the Cork Declaration (European Commission, 1997). This declaration puts forth the idea of sustainable intensification: agricultural growth and sustainability not being mutually exclusive (European Commission, 1997). However, this term is often criticized, for example in Tittonell (2014) which states that it is a loose term used to defend agricultural intensification. When focussing specifically on the Netherlands, publications such as Bos (2013) criticize sustainable intensification for pushing the sector to its limits, taking up a large share of the available land and reducing ecological diversity for the sake of economic growth. In the Netherlands, the agricultural sector does indeed use the majority of available land (CBS, 2018) (CBS, 2019a). While authors such as Bos (2013) and Tittonell (2014) might criticise the European Commission's sustainable intensification legislature as not being restrictive enough, others such as Helming (1992) and Jongeneel (2008) state that these laws have severely limited the growth of dairy farms. This creates an unclear image of the current situation of the Dutch agricultural sector. Therefore, the first question is raised: What exactly is the economic value of the agricultural sector in the Netherlands?

The Netherlands exports a large share of agricultural goods compared to similar countries (Silvis, 2009). This means that the importance of agricultural export on the trade balance of the Netherlands is also high (Van der Heide, 2012) (CBS, 2020a) (CBS, 2020b).

The actual number of people working in the agricultural sector is relatively low: in 2017, roughly 250.000 people worked in the agricultural sector on a total 8.651.000 working people, or roughly 2.8 percent (CBS, 2019a). Despite this, in 2015 2.236.317 ha of the total 4.154.303 ha, roughly 53.8 percent, of all land in the Netherlands was used for agricultural purposes (CBS, 2018) (figure 3). In 2007, the agricultural sector amounted to 9.6 percent of the total national added value, equalling 47.9 billion euros (Van der Heide, 2012). The sector is therefore a profitable one. In 2003, an analysis showed that of the one hundred most competitive flows of goods in the Netherlands, about half of them originated from the food and agricultural sector (Van der Heide, 2012).

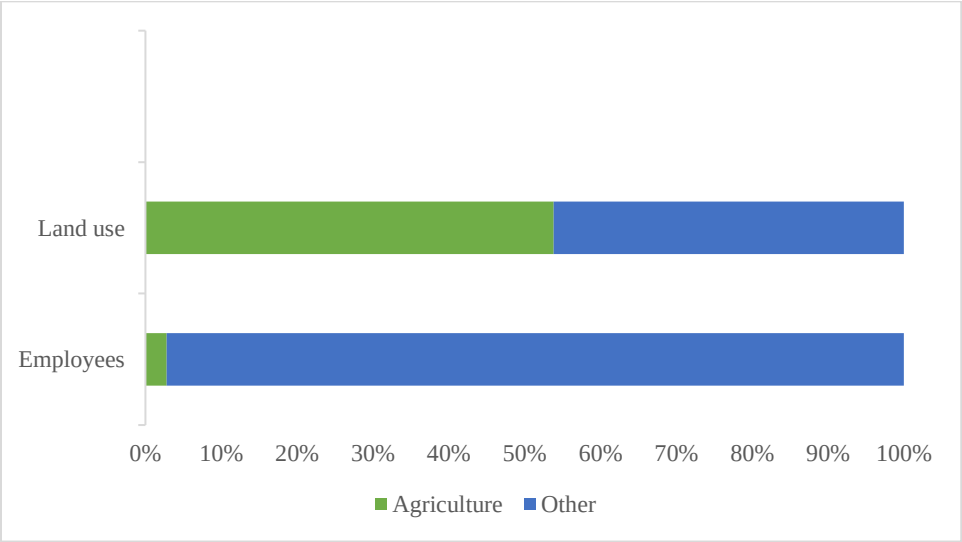

Figure 3: the 2,8 percent of the total workforce employed in agriculture uses 53,8 of the land in the Netherlands (Author, 2020)

With such a large percentage of the national added value being created by such a small group, it creates the impression that the agricultural sector is a healthy and strong part of the economy (CBS, 2018) (CBS, 2020a).

However, an issue with the small size of the Netherlands arises at this point. The Netherlands is the world's second exporter of agricultural goods, behind the United States and ahead of Germany (CBS, 2016). These countries however, have an advantage over the Netherlands: excess land. Both countries are many times larger than the Netherlands and therefore have more land to designate for agricultural uses. Therefore, in these countries, the demand of land for their agricultural sector is less problematic than in the Netherlands (CBS, 2020a). The agricultural sector in the Netherlands has developed to become so intensified that even the Dutch government refers to it as an agro-industrial complex, rather than simply as agriculture (Agricultural Economics Research Institute, 2009).

The idea of an agro-industrial complex stands in stark contrast to the ideas of the rural idyll (Cloke, 2006). In Cloke (2006), the argument is made that the rural idyll reflects the farmland as artisanal, rather than industrial. Furthermore, it is argued that the idyllic view of rural farmland is often paired with positive nostalgia, likening it to a simpler time (Cloke, 2006). Similarly, Frouws (1998) shows a difference between the idealised nature of the rural farmland that is a provider of food in harmony with nature, compared to the view of profit-oriented businesses damaging ecology. Frouws (1998) also argues that farmers can even be seen as producers of surpluses that place a heavy burden on European budgets when the rural idyll is taken out of the equation.

The rural idyll also influences why the FDF specifically targets the Randstad as lacking understanding (FDF, 2019). The FDF attempts to use the misunderstandings regarding the agricultural sector that originate from the rural idyll as a means to divide the population in two groups. The FDF also states that there is a difference in the population between "those who work hard and those who profit of their work" (FDF, 2019b). They deem this group to include both politicians and the so called 'climate Salafists' (FDF, 2019b). This shows differences in how the farmers view themselves, and how they are viewed by the urban politicians and 'climate Salafists'. The FDF views this in a 'with us or against us' light, stating that there are only those who work hard and those who only profit from this work (FDF, 2019b). They also attempt to distance themselves from the notions of the rural idyll (FDF, 2019). The most common misconceptions the organisation tries to address is the nostalgic romanticizing of the economic activities in the rural area, a characteristic of the rural idyll described in Cloke (2006). The idea behind this is twofold. For one, it dispels romantic ideas about rural life and instead shifts the focus on the hard work of the farmers and the economic value of their sector. Secondly, it is a form of 'othering', where you either are a hard worker that stands with the FDF, or you are simply profiting from the hard work of others under the guise of ecological motivations, while comfortably living in cities. In this way the FDF creates a strong group identity, while also educating the public on the importance of their work. This also means that the FDF believes the rural idyll, and the misconceptions that come with it, to be a strictly urban phenomenon, and the literature shows that there is at least some credence to this claim.

It should however be stated that, while the FDF claims to represent the entire agricultural sector, and in their words 'all the hardworking people', they mostly represent dairy farmers (FDF, 2019). This means that while they claim to represent a much larger group, they mostly look out for the group that is under the most pressure, due to dairy farmers producing the majority of agricultural nitrogen output (CLO, 2019).

Figure 4: Livestock farming is the main source of nitrogen pollution in the agricultural sector (Ishmael, 2017)

Cloke (2006) argues that the idea of a rural idyll originated in the cities as an idealised, nostalgic view of past living conditions. These idealised situations often do not take the continued intensification of agriculture into account, and view the rural similarly to the status quo of centuries ago. Both Cloke (2006) and Frouws (1998) show that more often, those in cities have views that align with the rural idyll. Coeterier (1993) even states that many living in cities believed there were more non-agricultural activities already taking place in the rural landscape than those who lived in the rural areas. Bos (2013) even states that the scale enlargement of individual farms of the last few decades has gone mostly unnoticed by the rest of the country.

The idea of the rural idyll is thus a location bound one, more commonly found in urban areas (Cloke, 2006). If such viewpoints regarding the agricultural sector can be location bound, would this also be the case for knowledge regarding the sector? The second sub question is therefore: Why could differences in the level of knowledge between the urban and rural groups be expected?

In previous studies, differences in opinion between rural and urban population groups could be seen. Studies have shown that the urban group in the United States preferred rural development strategies over preserving traditional rural economies (Willits, 1995). Sources such as Coeterier (1993) additionally show differences between rural and urban groups in terms of opening the rural area to new activities, with the urban population group being more receptive to less land being used by agriculture. Additionally, Frouws (1998) shows that there exists a discourse that views rural and urban life as entirely different mentalities, with the former being a centre of production and the latter a centre of consumption. These sources show that there are definitive differences between the rural and urban populations in how they view the agricultural sector.

Other sources such as Frick (1995) took the differences between rural and urban knowledge regarding the agricultural sector further than just the rural idyll and opinions. Analysing differences between rural and urban high school students showed that the rural sample was significantly more knowledgeable about the agricultural elements of rural life (Frick, 1995).

It can therefore be stated that the literature shows definitive differences in both opinion rurality and agriculture and differences in knowledge of the agricultural sector (Frick, 1995) (Willits, 1995). With these facts in mind, it can be stated that a difference in knowledge between the rural Northern Netherlands and the urban Randstad can be expected.

In order to correctly analyse the differences of rural and urban, a clear parameter for what is rural and what is urban is needed. In the literature, sources such as Isserman (2005) and Frick (1995) use population densities to determine the rurality of areas. However, in a country as densely populated as the Netherlands this becomes very complicated.

Since rural and urban in the context of this paper are not necessarily defined along lines of geographical parameters, a conceptual definition is more useful. Halfacree (1993) provides the definition that will be used in this paper. This paper states that the rural area can be identified by the structures that operate there that are linked to it (Halfacree, 1993). In the Netherlands, agriculture is distinctly linked to the rural landscape, as it comprises most of the available land (CBS, 2019b). Therefore, this paper will view the areas where the land use is primarily dominated by agriculture as rural.

To find the differences in knowledge levels between rural and urban populations in the Netherlands, two locations need to be compared. This leads to the final sub question: why have the areas of the Randstad and the Northern Netherlands been selected?

The Northern Netherlands, the provinces Friesland, Groningen and Drenthe, show some of the lowest population densities in the Netherlands, with Drenthe being the lowest in the entire country (CBS, 2020b). Additionally, in all three of these provinces agriculture is a very prominent land use (CBS, 2019). In comparison, the Randstad area has a far higher population density, as well as far lower agricultural land use (CBS, 2019b) (CBS, 2020c). These areas therefore fill these roles quite well.

Literature in the past analysed differences in opinion and knowledge between rural and urban groups. however, research into knowledge took place outside the Netherlands. This paper attempts to bridge this knowledge gap and add to the literature.

Conceptual model

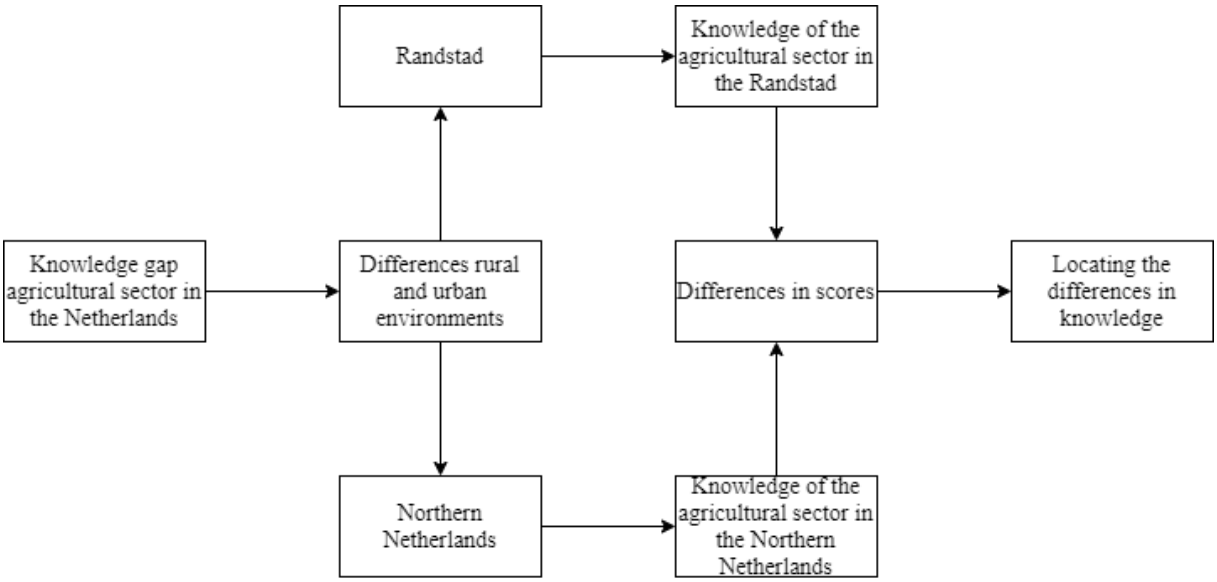

Figure 5: conceptual model (Author, 2020)

The model is created to check if there is a difference in the knowledge level between the two established groups. They are therefore split up and tested separately. They are then compared based on the actual level of knowledge in the groups, their differences in points of view relating to the agricultural sector, their differences in values and their connection to agriculture. In this way the model gets more specific with each consequent step. The individual factors within the model will be tested in a survey and using statistical testing.

Hypotheses

H0: There is no difference in the level of knowledge between people living in the North of the Netherlands and people living in the Randstad area, with regards to the economic strength of the agricultural sector in the Netherlands.

H1: There is a difference in the level of knowledge between people living in the North of the Netherlands and people living in the Randstad area, with regards to the economic strength of the agricultural sector in the Netherlands.

Methodology

The chosen method of data collection is a survey. Since the main type of data to be collected is a comparison to see if the level of knowledge is higher in one area than the other, quantitative data is more suitable for this comparison. The most suitable way to obtain quantitative data on matters of both opinion and knowledge is using a survey.

In order to reach as many respondents as possible the survey was distributed online. This choice was made ahead of the start of the survey, before the coronavirus made other means of

conducting the survey impossible. The online survey was chosen in order to reach a large number of respondents in a way that is more efficient than physical surveys, due to the distance between the two sampling locations. The survey was made using the online programme Qualtrics (Qualtrics, 2005). The survey contained a total of thirteen questions, both multiple choice, Likert scale opinion questions and an open question that asked the respondents to fill out the numeric part of their postal codes. This allowed enough anonymity for the respondents to ensure their privacy was protected and simultaneously ensured the generation of suitable data for a location-based variable. General sample descriptive questions were asked at the start of the survey. This was done to create a general overview of how the sample was divided along lines of education, gender and age (Figure 7).

Additionally, these questions ask whether the respondent has a background, or is currently employed in the agricultural sector. Having a background in this sector could mean that these respondents would be more aware of the situation in the sector, and therefore have a better knowledge of the economic situation. Another question in this portion asks whether the respondents know people that are currently employed in the agricultural sector, and if so, how many (Appendix 7).

The Likert scale opinion questions generate opinion-based variables. This is done to see if there was a correlation between knowledge and appreciation of the agricultural sector.

Finally, a series of knowledge-based questions is used to ascertain the knowledge level of the respondents. The respondents were asked to answer a number of multiple-choice questions regarding the economic strength of the agricultural sector and a question that asked them to rank the size of the Dutch agricultural sector compared to those of other countries. All of these questions have answers that have objectively correct answers.

The selection of questions has been made to ensure that the survey can test for the possibility of a difference in the knowledge level regarding the agricultural sector. If this difference were to be found, it would be important to investigate whether the difference is situated along the lines of the respondent's demographics, location, education, labour background or opinion regarding the sector.
The survey was distributed on social media, through personal pages and specific respondent sharing pages. This generated a total of 196 respondents. Of these 196 respondents, 174 completed the full survey.

The location variable differentiates respondents from the Randstad from those from the Northern Netherlands and those from other areas of the Netherlands. The recipients were placed in the group 'Northern Netherlands' if their postal code fit anywhere in the postal codes used in the three northernmost provinces of the Netherlands: Drenthe, Friesland and Groningen. The postal codes that have any coverage in the three northern provinces are codes starting with: 77, 78, 79 and 83 to 99 (PostNL, 2020). Finding a clear and universally accepted definition for which area the Randstad incorporated was revealed to be difficult. Due to lacking definitions from PostNL as to which postal codes are part of the Randstad area, the

OECD definition of the Randstad was chosen as a template (OECD, 2007). Upon this base map, an overlay of PostNL postal code system was placed (PostNL, 2020). This resulted in the following Randstad postal codes: 10 to 15, 19 to 31, 33 to 37, 39, 41 and 42. Any of the recipients that did not enter a postal code that started with the numbers 10 to 15, 19 to 31, 33 to 37, 39, 41, 42, 77, 78, 79 or 83 to 99, were placed in the group ‘other’. They were not used to answer the main research question, but were used to find if differences in knowledge existed in other areas of the country.

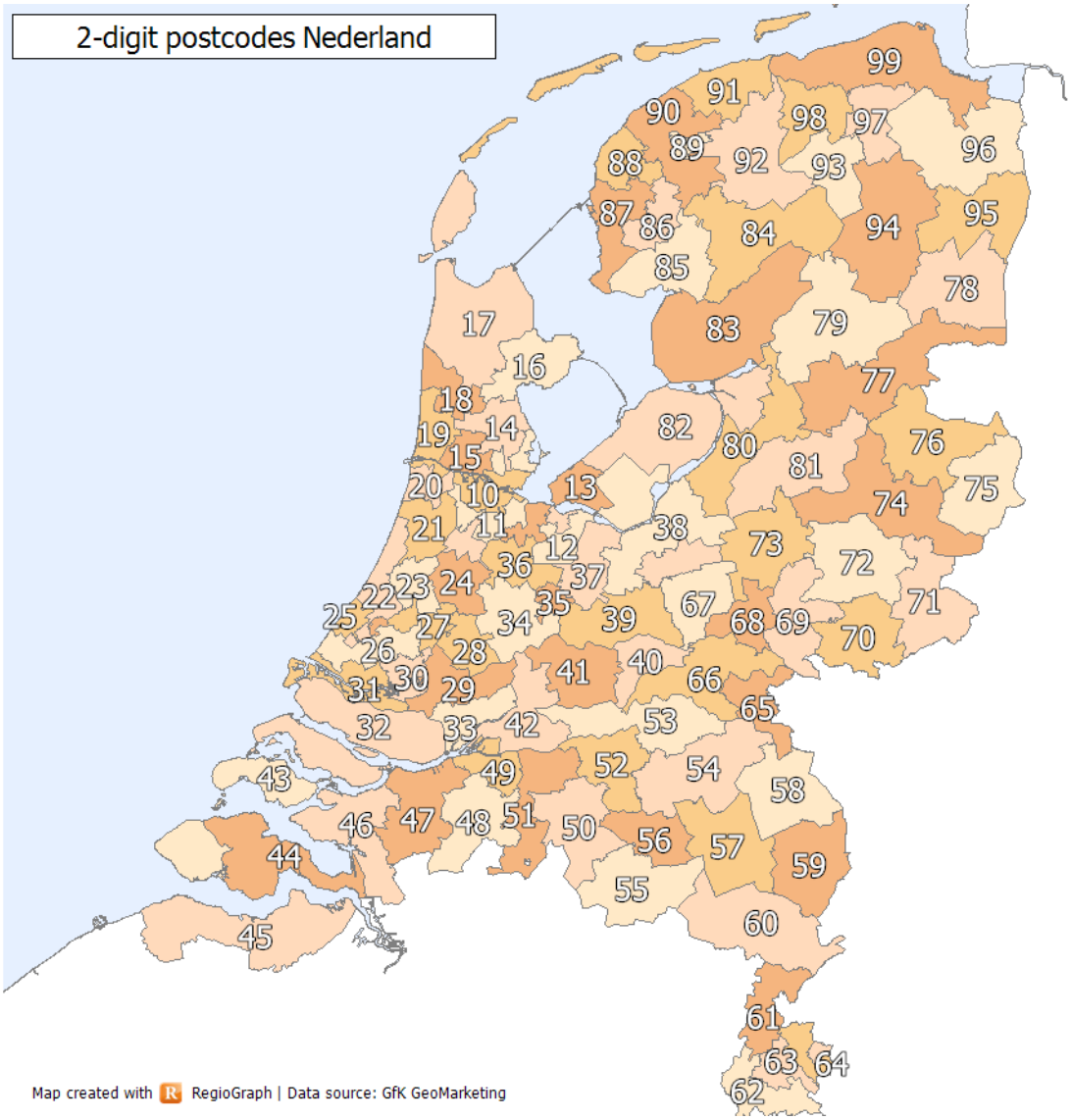

Image 6: The two-digit coverage areas of Dutch postal codes (Postnl, 2019)

The knowledge-based questions were all closed questions where the respondent either had to pick from a number of options or rank the Dutch Agricultural sector from 1 to 196. For all of these questions there was a factually correct answer. The survey interpreted the answers of the respondents as choices rather than right or wrong. Therefore, the answers for each of the questions had to be recoded into dummy variables, with the right answer as a one and the wrong possible answers as a zero. The correct answer to question nine would be “2-5 percent”. For question ten, there are five options to choose from. While the question is

phrased as a question of opinion, there are two correct answers and three false ones. Due to the fact that the first three answer options, “Zeer negatief”, “Negatief” & “Niet positief, niet negatief” lead to a different secondary question, where all answer options were factually wrong. This second set of questions asks for specific values in terms of profits or losses of the Dutch agricultural sector. The correct answer for 2019 would be a profit of 56.4 billion Euros (CBS, 2020a). However, as it is assumed that this exact number is not known to the greater public, an approximation is requested. The correct answer for question eleven (b) is therefore “51 - 75 miljard euro winst”. Similarly, for question twelve there is a correct answer, as the Dutch agricultural sector objectively exports more than it imports. The right answer to question thirteen would be two, as this is the ranking the Dutch agricultural sector has on the world scale.

These questions asked specifically for the respondents to answer to the best of their knowledge. These questions related exclusively to the economic and employment aspects of the agricultural sector, and did not relate to the current nitrogen debate. The questions were specifically chosen to assess a broad grasp on the economic characteristics of the sector. A number of the most important parameters of a sector’s economic situation, such as employment rate, the added value of the sector and this sector’s size compared to that of other countries are included. This ensured that, rather than knowledge of a few simple facts, actual concrete knowledge of the sector was needed to answer all four questions correctly.

A new dummy variable was computed to analyse the results of these knowledge-based questions. Each correct answer gave the respondent one point, on a scale of zero to four. These scores were non-cumulative, meaning that a score of two meant exactly two questions answered correctly, not at least two questions answered correctly.

Results

Sample descriptives

Preliminary descriptive statistics show that 56.9 percent of respondents is female and 43.1 percent is male. When asked about their age, 81.6 percent of the respondents fell in the youngest category, ages 18 to 30. Furthermore, 65.5 percent of the respondents were categorized as the being part of the group with the highest possible level of education.
The respondents were divided into three groups: 'Randstad', 'Northern Netherlands' and 'Other'. The groups were fairly evenly distributed with 33.9 percent of the respondents belonging to the group 'Randstad', 39.7 percent to the group 'Northern Netherlands' and 26.4 percent belonging to the group 'Other' (Figure 9). In the population, the total amount of inhabitants in the group 'Northern Netherlands' is 1.723.829, the total number of people in the 'Randstad' group is 8.252.442 (CBS, 2020c). Subtracting these numbers from the total population of the Netherlands, 17.282.163, leaves 7.305.892 people that live in the area categorised as 'Other'. In percentages this would mean that 9,975 percent of people in the population live in the 'Northern Netherlands' area, 47,752 percent live in the 'Randstad' area and 42,275 percent live in the 'Other' area. This shows a bias in the sample, with the 'Northern Netherlands' being heavily overrepresented and the other two areas being underrepresented. Additionally, the vast majority of the respondents seemed to fall into the youngest age group and in the highest level of education. This shows a substantial bias in the sample.

		Frequency	Percent
Valid	Man	75	43,1
	Vrouw	99	56,9
	Total	174	100,0

Figure 7: gender demographics of the sample (Author, 2020)

		Frequency	Percent
	VMBO, MBO	27	15,5
	HAVO, VWO	31	17,8
	HBO, WO	114	65,5
	Anders, namelijk:	2	1,1
	Total	174	100,0

Figure 8: education level of the sample (Author, 2020)

Of all respondents, 2,3 percent stated to be currently employed in the Dutch agricultural sector, while 9,2 percent had been employed in the sector in the past. The vast majority of the respondents, 88,5 percent, had never been employed in the agricultural sector (Appendix 8). In this demographic, the sample is close to the population as the vast majority of people in the Netherlands do not have a background in agriculture (CBS, 2019a).

With a mean of 3,47, most people viewed the agricultural sector neutrally to positive, with very negative to very positive being ranked as one to five. Of all respondents, 37,4 scored their view of the agricultural sector as ‘neutral’ and 43,1 percent scored it as ‘positive’. This indicates a moderately positive general view on the agricultural sector (Appendix 16).

When respondents were asked to rate the importance of the Dutch agricultural sector for the economy, results were generally positive. The mean of the scores was 7,39 on a scale of one to ten. The most picked answer, with 32,2 percent of all scores, was an eight. This indicates a very positive view on the importance of Dutch agriculture for the economy (Appendix 16).

Scores

Of all 174 respondents, only eighteen respondents knew the correct answer to question thirteen (appendix 14). For question nine (appendix 10), 38 people found the correct answer. For question 11b, 45 respondents answered correctly. Of all knowledge-based questions, question number twelve (appendix 13) was the most correctly answered question, with 149 out of the 174 completed surveys showing the correct answer (Figure 9).

		Score					
		,00	1,00	2,00	3,00	4,00	Total
Locatie gebaseerd op PC	Randstad	10	27	21	1	0	59
	Noord-Nederland	4	38	18	9	0	69
	Overig	4	18	15	7	2	46
Total		18	83	54	17	2	174

Figure 9: scores based on location (Author, 2020)

Nearly all respondents scored correctly on at least one knowledge-based question, with only 10,3 percent of respondents selecting no correct answers (Figure 10). The largest group of people answered one question correctly, with most of them correctly answering whether or not the Netherlands imported or exported more agricultural products The smallest group of respondents, only two people, answered all four questions correctly, making up only 1.1 percent of the sample. The postal codes associated with these two correct responses were 6662 and 6511, both being part of the group ‘other’. Neither of these respondents ever worked in the agricultural sector, but one of them knew several people currently employed in the agricultural sector.

		Frequency	Percent
Valid	,00	18	10,3
	1,00	83	47,7
	2,00	54	31,0
	3,00	17	9,8
	4,00	2	1,1
	Total	174	100,0

Figure 10: Frequencies of correctly answered questions (Author, 2020)

Men answered more questions correctly than women. Using a t-test the average score of men was shown to be significantly higher than that of women (figure 11).

		t	df	Sig. (2-tailed)
Score	Equal variances assumed	3,386	172	,001
	Equal variances not assumed	3,292	140,253	,001

Figure 11: T-test between men and women (Author, 2020)

The older age groups often scored higher than the youngest group. However, all of the older groups are relatively small and the youngest group covers the majority of the sample.
The group with the lowest level of education scores comparatively worse than the other two groups, with no member of this group answering more than two questions correctly. The differences between the lowest education group and the other group are significant (Figure 12).

		t	df	Sig. (2-tailed)
Score	Equal variances assumed	-2,680	103	,009
	Equal variances not assumed	-2,589	81,172	,011

Figure 12: T-test between respondents from the Randstad and the 'Other area' (Author, 2020)

Respondents from the Randstad area scored the worst, a t-test shows that respondents from this group scored significantly lower than those in the 'Other' group (Figure 15).

The one-way ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6,789	4	1,697	2,950	,022

Figure 13: results of the one-way ANOVA (Author, 2020)

To analyse the differences in the data, a one-way ANOVA was chosen as the method of analysis. Since there is only one dependent variable, a one-way ANOVA suffices. Here, the respondent's postal code was used as the grouping variable and the score as the dependent variable. The ANOVA was found to be significant at 0,022 percent (figure 13). This indicated a significant variance in the means of the three groups. To examine exactly where this variance had occurred and between which groups, a post-hoc test was needed.

Post hoc testing

The chosen post-hoc test was the Bonferroni correction. This specific post-hoc test fits with the issue in the analysis, since it is suitable for a situation with multiple comparisons. The null hypothesis, there is no difference in the level of knowledge between the Randstad and the Northern Netherlands, is tested here. Additionally, the test analyses the option of knowledge being significantly higher in any one area than the others. In the Bonferroni correction, only the relationship between the 'Other' and the Randstad area showed significant variance, at a significance of 0,019 (figure 14).

(I) Locatie gebaseerd op PC	(J) Locatie gebaseerd op PC	Mean Difference (I-J)	Std. Error	Sig.
Randstad	Noord-Nederland	-,24343	,14817	,307
	Overig	-,45357*	,16436	,019
Noord-Nederland	Randstad	,24343	,14817	,307
	Overig	-,21014	,15906	,565
Overig	Randstad	,45357*	,16436	,019
	Noord-Nederland	,21014	,15906	,565

Figure 14: the Bonferroni correction (Author, 2020)

Regression model

In order to analyse which specific variables can similarly influence the score, and explain the differences between the regions, a linear regression model was used. The Anova test accompanying the regression model was significant at a level of 0.001. The R squared associated with the model was 0.143, implying that 14.3 percent of the observed variance can be explained by these variables. In the model the constant and four other variables were significant (figure 15). These variables were location (0.019), gender (0.10), Age (0.016) and level of education (0.046). The other variables such as knowing people in the agricultural sector and the respondent's opinion of the agricultural sector were all not significant (figure 15).

		B	t	Sig.
1	(Constant)	1,507	2,130	,035
	Locatie gebaseerd op PC	,196	2,378	,019
	1. Wat is uw geslacht?	-,346	-2,622	,010
	2. Wat is uw leeftijd?	,177	2,441	,016
	3. Wat is uw hoogst behaalde opleidingsniveau	,172	2,010	,046
	5. Werkt u momenteel in, of heeft u ooit in de landbouwsector gewerkt?	-,244	-1,528	,128
	6. Kent u mensen (familieleden, vrienden, etc.) die momenteel in de	-,034	-,635	,526

landbouwsector werken? Zo ja, hoeveel?			
7. Wat is uw huidige beeld van de Nederlandse landbouwsector?	-,080	-,916	,361
8. Hoe belangrijk is volgens u de landbouwsector voor de Nederlandse economie?	,039	,877	,382

Figure 15: Regression model (Author, 2020)

Discussion

The analysis of the survey aimed to see if location was of influence on the level of knowledge respondents had on the economic situation of the Dutch agricultural sector. The location variable was shown to be significant, but this was also true for the variables of age, education and gender. The location variable helped answer the main research question: To what degree does the level of knowledge of the economic strength of the agricultural sector differ between residents of the Randstad and residents of the Northern Netherlands?
However, the other variables that were significant raise different issues. Demographic variables such as age, education level and gender were also significant (Figure 5). These variables do not directly relate to the main research question but did explain a degree of the variance found in the different scores.

The findings of significant differences based on location are in line with previous research (Frick, 1995). The analysis confirms that there is a significant difference in knowledge of the agricultural sector between the very urban area of the Randstad, the less urban 'Other' area and the rural 'Northern Netherlands'. However, rather than the idea put forth in Frick (1995) that the rural population has more knowledge than the urban, the results are more in line with those of Cloke (2006) and the FDF, which imply that lower knowledge can be found in urban areas, when compared to all other areas.

The fact that there were no differences between any of the groups when it came to the appreciation of the agricultural sector, is directly opposed to the idea that the FDF tries to create (FDF, 2019b). The FDF creates an image of a lack of respect for the agricultural sector that is location based (FDF, 2019a). This has not been shown by the analysis, where respondents were very positive no matter their location. Additionally, the theory implies that the rural idyll is both associated with a very positive view on the rural and a lower knowledge of current affairs in this area (Coeterier, 1993) (Cloke, 2006). This would imply that the group with a higher opinion of the agricultural sector would also have lower scores on the knowledge-based questions. However, this is not the case as nearly all respondents held positive opinions regarding the sector, and a correlation between these variables was not shown by the data. More generally, opinion and views in general showed no significant influence on the knowledge of the respondent.

Reflection

While several of the variables have been shown to be significant, the low explained variance of the model means that more variables are needed in order to truly find out what has an influence on level of knowledge. The variables that have been found to be significant could be

used in further research. They can be used as grouping variables or as part of a different regression model. As these variables only explained a small amount of the variance, additional variables should be added to future models in order to increase explained variance. As it stands right now, the majority of variance has remained unexplained and could be the target for further research. Future research should aim to repeat the tests using a sample that is more representative of the Dutch population.

The observed sample bias most likely originates from the chosen method of sampling. The survey was distributed exclusively on social media, using personal pages and specific respondent searching pages. The former of which had an overrepresentation of people in the Northern Netherlands while the latter was mostly populated by other students. This explains the overrepresentation of both inhabitants of the Northern Netherlands as well as an overrepresentation of young, highly educated respondents.

Further research should attempt a more careful sampling method; a broader way of sampling, combining both online and physical sampling. Physical sampling would ensure a better representation of the older generational groups, which are often less literate in the field of computers. Furthermore, sampling should specifically target those working in the agro-industrial complex. This group would be assumed to have a much higher knowledge of the sector, thus providing a group the other groups could be tested against.

The fact that the ‘other’ group of the sample is the group that showed the best results also shows that more targeted research is needed. The variables that cause this group to score better are simply not known at this moment. The area from which this group originates shows both large agricultural land uses, as well as many urban centres. Future research could investigate whether the combination of these factors correlates to higher knowledge of the agricultural sector, or if this area houses further hidden variables. These variables could increase the explained variance of the model, which is currently very low.

A final group that should be taken into consideration are environmental activists. The FDF specifically targets this group in their criticism and calls them ‘climate Salafists’. They claim this group is the least educated and knowledgeable regarding the sector, and the most willing to reduce its economic output (FDF, 2019b). This group gets specific attention from the organisation and is thus worth investigating in further research.

While the findings of this paper are in line with the arguments made by the FDF, they can neither be confirmed nor denied. The variance explained by the model is too small to state that the observations hold true for the population and the sample is biased.

Conclusion

The analysis has shown that the data does not support the acceptance of the alternative hypothesis, and leads to the conclusion that there is a difference in the level of knowledge based on location, with regards to the economic strength of the agricultural sector in the Netherlands. The null hypothesis, "There is no difference in the level of knowledge between people living in the North of the Netherlands and people living in the Randstad area, with regards to the economic strength of the agricultural sector in the Netherlands", is not rejected by the data. The area of the Netherlands a respondent came from, as well as their age, gender and level of education have a significant influence on their knowledge of the economic situation of the Dutch agricultural sector. However, there was no significant difference between the respondents from the North of the Netherlands and respondents from the Randstad; the difference stems from the respondents from the 'Other' group and other variables. The sample however showed bias compared to the population on age and education. Therefore, no conclusive remarks can be made regarding the influence on knowledge levels of these variables. The variance in the test scores these variables are able to explain is 14.3 percent of the total variance found within the test scores.

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Appendices

Appendix 1, the survey introduction

Vragenlijst landbouw

Q2 Welkom bij deze vragenlijst over de Nederlandse landbouwsector.

Het doel van deze vragenlijst is het meten van de kennis van Nederlanders over de landbouwsector. De vragenlijst bestaat uit een aantal vragen die kijken naar uw achtergrond, een aantal meningsvragen en ten slotte een aantal kennisvragen. De kennisvragen kijken vooral naar de economische kant van de landbouwsector.

Appendix 2, survey question 1

Q3 1. Wat is uw geslacht?

- ○ Man
- ○ Vrouw

Appendix 3, survey question 2

Q4 2. Wat is uw leeftijd?

- ○ 18 - 30 jaar
- ○ 31 - 40 jaar
- ○ 41 - 50 jaar
- ○ 51 - 60 jaar
- ○ 61 - 70 jaar
- ○ 71 jaar of ouder

Appendix 4, survey question 3

Q5 3. Wat is uw hoogst behaalde opleidingsniveau?

- ○ VMBO, MBO
- ○ HAVO, VWO
- ○ HBO, WO
- ○ Anders, namelijk: _____

Appendix 5, survey question 4

Q6 4. Wat zijn de vier cijfers van uw postcode?

_____

Appendix 6, survey question 5

Q7 5. Werkt u momenteel in, of heeft u ooit in de landbouwsector gewerkt?

- ○ Ja, ik ben momenteel werkzaam in de landbouwsector
- ○ Ja, ik ben in het verleden werkzaam geweest in de landbouwsector
- ○ Nee

.

Appendix 7, survey question 6

Q8 6. Kent u mensen (familieleden, vrienden, etc.) die momenteel in de landbouwsector werken? Zo ja, hoeveel?

Nee, ik ken geen mensen die momenteel in de landbouwsector werken

- ○ Ja, ik ken 1 of 2 mensen die in de landbouwsector werken
- ○ Ja, ik ken 3 - 5 mensen die in de landbouwsector werken
- ○ Ja, ik ken 6 - 10 mensen die in de landbouwsector werken
- ○ Ja, ik ken meer dan 10 mensen die in de landbouwsector werken

Appendix 8, survey question 7

Q9 7. Wat is uw huidige beeld van de Nederlandse landbouwsector?

- ○ Zeer negatief
- ○ Negatief
- ○ Neutraal
- ○ Positief
- ○ Zeer positief

Appendix 9, survey question 8

Q10 8. Hoe belangrijk is volgens u de landbouwsector voor de Nederlandse economie?

Hier staat 1 voor "Helemaal niet belangrijk" en 10 voor "Erg belangrijk".

1	2	3	4	5	6	7	8	9	10

Appendix 10, survey question 9

Q11 9. Hoeveel procent van de werkenden in Nederland denkt u dat werkt in de landbouwsector?

- ○ Minder dan 1 procent
- ○ 2 - 5 procent
- ○ 6 - 10 procent
- ○ 11 - 15 procent
- ○ 16 - 20 procent
- ○ 21 - 25 procent
- ○ Meer dan 25 procent

Appendix 11, survey question 10

Q12 10. Hoe denkt u dat de landbouwsector bijdraagt aan de Nederlandse economie?

- ○ Zeer negatief
- ○ Negatief
- ○ Niet negatief, niet positief
- ○ Positief
- ○ Zeer positief

Appendix 12, survey question 11

Q13 11a. Hoeveel verlies denkt u dat de landbouwsector jaarlijks draait?

- ○ Minder dan 25 miljard euro verlies
- ○ 25 - 50 miljard euro verlies
- ○ 51 - 75 miljard euro verlies
- ○ 76 - 100 miljard euro verlies
- ○ Meer dan 100 miljard euro verlies

Appendix 13, survey question 12

Q14 11b. Hoeveel winst denkt u dat de landbouwsector jaarlijks draait?

- ○ Minder dan 25 miljard euro winst
- ○ 25 - 50 miljard euro winst
- ○ 51 - 75 miljard euro winst
- ○ 76 - 100 miljard euro winst
- ○ Meer dan 100 miljard euro winst

Appendix 13, survey question 12

Q15 12. Denkt u dat de Nederlandse landbouwsector meer **importeert** of meer **exporteert**?

- ○ Meer import
- ○ Meer export

Appendix 14, survey question 13

Q16 13. Hoe groot denkt u dat de totale Nederlandse landbouwsector (import en export) is in verhouding tot die van andere landen? Het gaat hier om totale grootte, niet berekend per inwoner.

Hieronder kunt u invullen wat u denkt dat de wereldwijde rangpositie van Nederland is met betrekking tot de grootte van de landbouwsector (een getal tussen 0 en 197). U hoeft alleen het getal in te vullen.

_____

Appendix 15, survey ending

Q17 Hartelijk bedankt voor het invullen van deze vragenlijst.

Om de vragenlijst in te leveren dient u op de rechter pijl onderin het scherm te klikken.

Appendix 16, full tables of statistical testing

ANOVA

Locatie gebaseerd op PC

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6,789	4	1,697	2,950	,022
Within Groups	97,240	169	,575		
Total	104,029	173			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,378[a]	,143	,102	,80504

a. Predictors: (Constant), 8. Hoe belangrijk is volgens u de landbouwsector voor de Nederlandse economie?

Hier staat 1 voor "Helemaal niet belangrijk" en 10 voor "Erg belangrijk"., 2. Wat is uw leeftijd?, 5. Werkt u momenteel in, of heeft u ooit in de landbouwsector gewerkt?, Locatie gebaseerd op PC, 3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice, 1. Wat is uw geslacht?, 6. Kent u mensen (familieleden, vrienden, etc.) die momenteel in de landbouwsector werken? Zo ja, hoeveel?, 7. Wat is uw huidige beeld van de Nederlandse landbouwsector?

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17,870	8	2,234	3,447	,001[b]
	Residual	106,935	165	,648		
	Total	124,805	173			

a. Dependent Variable: Score

b. Predictors: (Constant), 8. Hoe belangrijk is volgens u de landbouwsector voor de Nederlandse economie?

Hier staat 1 voor "Helemaal niet belangrijk" en 10 voor "Erg belangrijk"., 2. Wat is uw leeftijd?, 5. Werkt u momenteel in, of heeft u ooit in de landbouwsector gewerkt?, Locatie gebaseerd op PC, 3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice, 1. Wat is uw geslacht?, 6. Kent u mensen (familieleden, vrienden, etc.) die momenteel in de landbouwsector werken? Zo ja, hoeveel?, 7. Wat is uw huidige beeld van de Nederlandse landbouwsector?

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1,507	,707		2,130	,035
	Locatie gebaseerd op PC	,196	,082	,179	2,378	,019

	1. Wat is uw geslacht?	-,346	,132	-,202	-2,622	,010
	2. Wat is uw leeftijd?	,177	,073	,189	2,441	,016
	3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice	,172	,085	,155	2,010	,046
	5. Werkt u momenteel in, of heeft u ooit in de landbouwsector gewerkt?	-,244	,160	-,117	-1,528	,128
	6. Kent u mensen (familieleden, vrienden, etc.) die momenteel in de landbouwsector werken? Zo ja, hoeveel?	-,034	,054	-,050	-,635	,526
	7. Wat is uw huidige beeld van de Nederlandse landbouwsector?	-,080	,088	-,078	-,916	,361
	8. Hoe belangrijk is volgens u de landbouwsector voor de Nederlandse economie? Hier staat 1 voor "Helemaal niet belangrijk" en 10 voor "Erg belangrijk".	,039	,045	,076	,877	,382

a. Dependent Variable: Score

1. Wat is uw geslacht? * Score Crosstabulation

Count

		Score				
		,00	1,00	2,00	3,00	4,00
1. Wat is uw geslacht?	Man	7	25	29	13	1
	Vrouw	11	58	25	4	1
Total		18	83	54	17	2

2. Wat is uw leeftijd? * Score Crosstabulation

			Score					
			,00	1,00	2,00	3,00	4,00	Total
2. Wat is uw leeftijd?	18 - 30 jaar	Count	17	69	41	13	2	142
		% within 2. Wat is uw leeftijd?	12,0%	48,6%	28,9%	9,2%	1,4%	100,0%
		% within Score	94,4%	83,1%	75,9%	76,5%	100,0%	81,6%
		% of Total	9,8%	39,7%	23,6%	7,5%	1,1%	81,6%
	31 - 40 jaar	Count	1	4	4	1	0	10
		% within 2. Wat is uw leeftijd?	10,0%	40,0%	40,0%	10,0%	0,0%	100,0%
		% within Score	5,6%	4,8%	7,4%	5,9%	0,0%	5,7%
		% of Total	0,6%	2,3%	2,3%	0,6%	0,0%	5,7%
	41 - 50 jaar	Count	0	7	4	0	0	11
		% within 2. Wat is uw leeftijd?	0,0%	63,6%	36,4%	0,0%	0,0%	100,0%
		% within Score	0,0%	8,4%	7,4%	0,0%	0,0%	6,3%
		% of Total	0,0%	4,0%	2,3%	0,0%	0,0%	6,3%
	51 - 60 jaar	Count	0	3	4	2	0	9
		% within 2. Wat is uw leeftijd?	0,0%	33,3%	44,4%	22,2%	0,0%	100,0%
		% within Score	0,0%	3,6%	7,4%	11,8%	0,0%	5,2%
		% of Total	0,0%	1,7%	2,3%	1,1%	0,0%	5,2%
	61 - 70 jaar	Count	0	0	1	1	0	2
		% within 2. Wat is uw leeftijd?	0,0%	0,0%	50,0%	50,0%	0,0%	100,0%
		% within Score	0,0%	0,0%	1,9%	5,9%	0,0%	1,1%
		% of Total	0,0%	0,0%	0,6%	0,6%	0,0%	1,1%
Total		Count	18	83	54	17	2	174
		% within 2. Wat is uw leeftijd?	10,3%	47,7%	31,0%	9,8%	1,1%	100,0%
		% within Score	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	10,3%	47,7%	31,0%	9,8%	1,1%	100,0%

3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice * Score Crosstabulation

		Score					
		,00	1,00	2,00	3,00	4,00	Total
VMBO, MBO	Count	3	14	10	0	0	27

		% within 3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice	11,1%	51,9%	37,0%	0,0%	0,0%	100,0 %
	HAVO, VWO	Count	6	10	11	3	1	31
		% within 3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice	19,4%	32,3%	35,5%	9,7%	3,2%	100,0 %
3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice	HBO, WO	Count	9	57	33	14	1	114
		% within 3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice	7,9%	50,0%	28,9%	12,3%	0,9%	100,0 %
	Anders, namelijk:	Count	0	2	0	0	0	2
		% within 3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice	0,0%	100,0 %	0,0%	0,0%	0,0%	100,0 %
Total		Count	18	83	54	17	2	174
		% within 3. Wat is uw hoogst behaalde opleidingsniveau? - Selected Choice	10,3%	47,7%	31,0%	9,8%	1,1%	100,0 %

Locatie gebaseerd op PC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Randstad	59	33,9	33,9	33,9
	Noord-Nederland	69	39,7	39,7	73,6
	Overig	46	26,4	26,4	100,0
	Total	174	100,0	100,0	

Score

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	18	10,3	10,3	10,3
	1,00	83	47,7	47,7	58,0
	2,00	54	31,0	31,0	89,1

	3,00	17	9,8	9,8	98,9
	4,00	2	1,1	1,1	100,0
	Total	174	100,0	100,0	