

Environmental protection in light of Brexit: an assessment of social representations within the agricultural sector

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Author's Declaration

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Abstract

The research aimed to establish the social representations (SRs) of the farming community with regards to environmental protection and Brexit, and whether there was a relationship between the two. It also aimed to assess the connection between bottom-up and top-down approaches in the face of political change, in this case Brexit.

Questionnaires that included open questions and Likert scales were used to assess the SRs of farmers. Interviews were also selected to provide a context and expertise among representatives involved in the agricultural sector. The analysis of these results was carried out using thematic analysis and t-Test/ANOVA tests.

The research found that firstly, the challenges and solutions identified were shared among the farmers. These challenges and solutions were also related to those identified in the context of Brexit, but could not be related to other factors such as the environment.

Secondly, in isolation there was a SR among farmers with regards to the environment. The value of the environment for farmers was high, and a number of environmentally-friendly practices were demonstrated. However, when related to other results, incentives and pressure to adhere to implement such practices played a prominent role in the reasoning for carrying out these practices.

Thirdly, the research found that with regards to Brexit there was no clear SR, with the exception of those farmers who identified themselves as “against Brexit”. This group demonstrated a regularity among their answers, especially concerning the importance of finances.

Finally, the research demonstrated that overall political affiliation could not be linked with environmental protection, with the exception of farmers who identified themselves as “against Brexit”. This political group had higher environmental values than those “for Brexit” or had no political preference.

Further studies could be conducted to assess the structures of SR (central and peripheral) with regards to the natural environment aside from within an agricultural context. Additional structural studies could also assess the acceptance and change of SR after new policies such as the Agriculture Bill 2019-2020.

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1. Introduction

1.1 Contextual Overview

Globally, the agricultural sector occupies 48,632,687 square kilometres of land (World Bank Group, 2019). The sector has more than a billion employees and is the world's largest industry (World Wildlife Fund, 2020). It can also "make a vital contribution to urgent global challenges such as reducing poverty, and ensuring food security" (European Commission, 2012). However, these contributions are dependent on the use, health and abundance of natural resources. Therefore, the sector is also incredibly important when considering environmental protection, for both the sake of environmental health and the survival of populations. However, its practices can have number of negative environmental impacts (Figure 1).

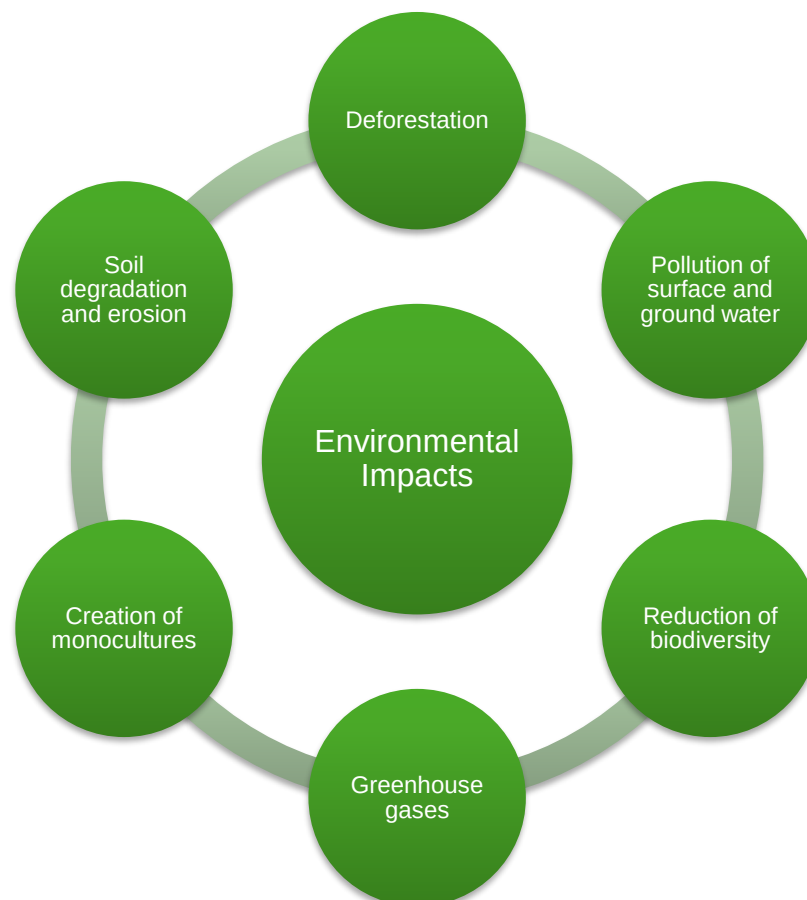


Figure 1: Negative environmental impacts of the agricultural sector (Rohila et al., 2017)

Agriculture is also a vulnerable sector. It falls victim to environmental changes such as climate change. This can prevent crop growth due to extreme changes in weather conditions, and consequently affect livelihoods and local communities who rely on successful production (Fujisawa et al., 2015). Additionally, agriculture also experiences many other stressors such as change in economy, markets and labour availability (Fujisawa et al., 2015)

Alongside these stressors, policies and political aims are also directly linked with the sector (Fujisawa et al., 2015). In Europe the landscape is dominated by agriculture which is managed by the Common Agricultural Policy (CAP) (European Environment Agency, 2020). Since its implementation, the policy has evolved from having a solely economic focus to including agri-environmental schemes. The most recent legal proposal for the CAP is to be enforced after 2020 and includes a greater contribution to environmental targets (European Environment Agency, 2020). Furthermore, the agricultural sector in Europe is subject to other environmental policies such as the Nitrates Directive, Water Framework Directive, and the Biodiversity Strategy (European Environment Agency, 2020).

In the last four years the United Kingdom (UK) has been through political changes in the form of Brexit, where the CAP is to be replaced by the Agriculture Bill 2019-2021. The enabling Bill will encompass the legislation for agricultural support initiatives, and will offer approaches to farm subsidies and land management (House of Commons Library, 2020). Public goods feature heavily in the Bill, as a way to determine subsidies/rewards for farmers, focusing mainly on environmental improvements, animal welfare, and improving supply chains (House of Commons Library, 2020). However, the Bill has been subject to much criticism, including the absence of any promise to uphold production standards within international trade negotiations upon exiting the European Union (Soutar, 2020).

These political changes question whether new legislation will meet or even surpass the level of environmental protection practiced within the agricultural sector in Europe. Aside from a top-down perspective, other factors such as behaviours can determine the success of environmental protection. Aspects of environmental psychology, such as social representations can assist in determining the reasons for behaviours towards factors such as the environment. Therefore, these theories can indicate the likelihood of legislative success and positive behaviours towards the natural environment.

Social representations (SRs) were first established in the 1960s by Serge Moscovici and are said to be formulated through social constructs of reality (Bidjardi, 2011). They are based on knowledge that is shared by a social group (Michel-Guillou & Moser, 2006a), and which consequently form a “collective thinking in a society” (Hojjer, 2011).

With regards to the environment, many studies have assessed SRs as a way to understand behaviours towards climate change at both national and individual level (Lynam, 2016). Climate change is regarded as a global challenge. Similarly to agriculture, it encompasses not only environmental depletion, but also as having detrimental consequences for humanity in terms of health, poverty and hunger (United Nation Framework Convention on Climate Change, 2019). Therefore, it is understandable that such an issue is the focus of much research. However, studies that assess SRs within agriculture have also been conducted by those such as Michel-

Guillou. These studies have explored the reasons behind environmental concerns within agriculture, as well as aiming to understand behaviours towards change among farmers.

1.2 Agriculture in the United Kingdom

In 2018 the Utilised Agricultural Area (UAA) stood at 71% of land. The agricultural sector contributed less than 1% to the national economy, and also showed a decrease in several farming structures namely production and economy (Table 1) (Department for Environment, Food and Rural Affairs, 2019a).

Table 1: Decreases in farming structures in 2018

Sector	Farming structures	Decrease (%)
Arable	Total croppable area	0.8
	Total cereal crop area	2.4
	Total wheat production	8.6
	Total of oilseed rape production	7.1
	Total sugar beet production	15
	Total value of total fruit production	0.6
Livestock	Total sheep and lamb numbers	3.0
	Total value of pig meat	5.7
Economic	Total income from farming	17
	Contribution to Gross Domestic Product	6.1

(Department for Environment, Food and Rural Affairs, 2019a)

However, with regards to trade, positive trends were seen. The value of food, feed and drink (FFD) exports increased by £0.2 billion, imports fell by £0.1 billion and consequently resulted in a decrease in the trade gap (Department for Environment, Food and Rural Affairs, 2019a). Similarly, concerning the environment, positive reductions such as a reduction of nitrogen and phosphate application rates and decreases in nitrous oxide, ammonia and methane emissions were also evident (Department for Environment, Food and Rural Affairs, 2019a). In relation to the SDGs, the trends of these structures can be categorised based on the pillars of sustainability, showing both compliance and areas for improvement (Table 2).

Table 2: Farming structure trends related to pillars of sustainability

Sustainability pillar	Farming Structure	Trend (+/-) %
Social	Employment	+1.8
	Labour force on commercial holdings	+0.6
Economy	Total income from farming	-17.0
	Contribution to Gross Domestic Product	-6.1
	Gross output	+2.2
Environment	Soil nitrogen levels	-19.0
	Soil phosphate levels	-38.0
	Nitrous oxide emissions	-11.0
	Methane emissions	-10.0
	Ammonia emissions	-18.0

(Department for Environment, Food and Rural Affairs, 2019a)

Despite the reductions of harmful substances, the State of the Environment Reports 2018/2019 highlighted that agriculture in the UK has several adverse effects on the natural environment (Table 3).

Table 3: Environmental threats by the agricultural sector in the UK

Environmental Aspect	Threat by Agriculture
Soil	• Intensive arable agriculture has resulted in a loss of 40-60% of the organic carbon found in soils • Reduction in soil biodiversity • Sulphur dioxide, ammonia and nitrogen oxides decrease pH levels in soils • Contaminated soil through the deposits of heavy metals, livestock manure and sewage sludge • Constant crop change causing soil erosion (Environment Agency, 2019)
Air	• Increasing levels of nitrogen oxides through fertilisers • The main source of ammonia as an air pollutant reaching levels of 88% of all emissions resulting in agricultural activities • Emissions of bioaerosols from intensive livestock, releasing bacterial and fungal spores • The use of non-road machinery amounting to 15% of diesel used in the UK (Environment Agency, 2018a)
Water quality	• Nitrate pollution into groundwater and rivers • Phosphorus reaching waterways through sewage effluent and run-off • Pesticide pollution into groundwater and rivers (Environment Agency, 2018b)

Organic farming is said to be a step in the right direction when it comes to meeting the sustainability pillars as it is deemed the more sustainable option that can provide benefits beyond simply food production. It promotes a lack of artificial pesticide and protection, increases crop diversity and in return biodiversity and better soil quality, and minimises pollution from run-off (Varanasi, 2019). In the UK in 2018 a total of 474,000 hectares were dedicated to organic farming, but this constitutes only 2.7% of all farmed area and agricultural holdings (Department for Environment, Food and Rural Affairs, 2019b). In the South West of England, namely Devon and Cornwall, a total of 662 farms were registered as organic in 2016 (Department for Environment, Food and Rural Affairs, 2018).

To support this, the “Attitudes of Europeans Towards Biodiversity Report 2015” demonstrated that many of these issues are within public concern. The study found that 53% of respondents in the UK thought that pollution of air, soil and water were “very much” an environmental issue. 62% of respondents sought ways to improve lifestyle choices to protect nature and biodiversity,

and 63% thought that crop pollination, soil fertility, clean air and water were “very serious” issues (European Commission, 2015).

1.3 The problem and the rationale

Whilst Brexit has provided much uncertainty, it has also provided an opportunity for change. Nevertheless, both will be a result of top-down initiatives. Given this opportunity, the possibility of achieving an agricultural sector that is prosperous in environmental protection can be achieved through new agricultural reform in the United Kingdom. Moreover, the nature of the Agriculture Bill 2019-2021, leaves farmers to gain subsidies through environmental improvement. This suggests support will be gained through farmer initiatives rather than pre-existing stipulations regarding land size. This in turn will require the involvement of farmers and could give way for bottom-up approaches to prevail, for the sake of their own business and meeting legislative requirements.

Aspects of environmental psychology such as SRs can be used to explain the challenges and obstacles that are created by social groups through common psychology or “common sense” (Michel-Guillou et al., 2006a). These self-induced obstacles can therefore prevent or cause particular behaviours that reflect a certain representation. With regards to farming in the UK, shared beliefs regarding Brexit as well as environmental protection may therefore be reflected in their farming methods and their visions for the future. It also can determine groups based on common beliefs, such as those responding in a certain way given their political preference or environmental awareness.

The rationale of the research is to establish the social representations (SRs) of the farming community within the South West of England with regards to environmental protection and Brexit. It will also assess if there is a relationship between political affiliation and environmental protection among farmers in order to decipher if Brexit can benefit or hinder environmental protection in the agricultural sector. It also aims to assess the connection between bottom-up and top-down approaches when considering Brexit.

1.4 The research objectives

The overall aim of the research is to discover if social contexts such as Brexit can influence environmental protection in the agricultural sector in the South West of England. It will also aim to discover what the challenges within agriculture are from a bottom-up perspective and what farmers believe the solutions to these challenges are. The research aims are as follows:

1. To identify the challenges within agriculture given the political situation
2. To evaluate potential solutions to these challenges
3. To assess the social representation of farmers with regards to the environment and agriculture
4. To assess the social representation of farmers with regards to Brexit

1.5 Previous studies

Authors such as Michel-Guillou have aimed to understand social representation within agriculture by conducting multiple studies focusing on environmental commitment and general resistance to change among farmers (Michel-Guillou et al., 2006a; 2006b; 2009; 2012), as well as specific areas of agriculture such as pesticide use (Zouhri et al., 2016) and water management in France (Michel-Guillou et al., 2006a). The studies use the basis of social representation theory to determine the behaviours towards the environment, basing the idea of social representation on social concepts such as “motivations, needs, expectations, values, and experiences” as well as challenges and obstacles among farmers.

Specific to farming in the UK, a study was conducted by Guerrier 2006, that assessed the social representation of farmers in the face of change, namely after the mid-term review of the CAP and after the outbreak of “foot and mouth” disease (Guerrier, 2006). It used a multi-method approach that would discover why farmers found change so difficult. This research will use these established concepts and methodologies to understand the social representation of in the current climate of change faced in the UK with regards to Brexit and the environment.

1.6 The contribution to the literature

A comprehensive literature review expresses how SRs can influence behaviour towards the natural environment. However, there is a gap that exists between the reasons for behaviour and the challenges and solutions provided by the subject. This research will contribute to debates by considering the challenges and solutions of farmers, which can then be related to their SRs of social contexts such as the environment and Brexit, and if these influence their behaviours.

2. Methodological Review

Due to the sociological and psychological nature of the research objectives, the decided methodology was based primarily on qualitative techniques and analysis. The rationale behind the use of each method is outlined below, along with the selected method for each research objective (Table 4).

Table 4: Methodology selected for each research objective and participant involved

Research Objective	Methodology	Participant
1. To identify the challenges within agriculture given the political situation	1a. Questionnaires	Farmers
	1b. Semi-structured interviews	Representatives from organisations directly involved in the agricultural sector
2. To evaluate potential solutions to these challenges	2a. Questionnaires	Farmers
	2b. Semi-structured interviews	Representatives from organisations directly involved in the agricultural sector
3. To assess the social representation of farmers with regards to the environment	Questionnaires	Farmers
4. To assess the social representation of farmers with regards to Brexit	Questionnaires	Farmers

The methodology was altered by a change of question during the research stage. The initial question was based around the social representations (SRs) of farmers in Malta with regards to their occupation and the environment. The data collection consisted of interviews, as well as free associations technique of word associations, and the intended analysis consisted of t-Test results and thematic analysis. The data was to be gathered in collaboration with Friends of the Earth Malta, due to their pre-established relationships with farmers. However, due to unexpected structural and financial changes within Friends of the Earth Malta, the project was no longer possible. An account of the previous research is found in Appendix 1.

Nevertheless, the shift from the agricultural sector in Malta to the United Kingdom has allowed for a broader range of information from literature review due to Brexit being such a relevant topic in the political sphere of the UK.

The research will use a multi-method approach as is encouraged for sociological studies (McNiel & Chapman, 2005). Wagner et al. 1999 highlights the principal methodologies for testing social representation as interviews and questionnaires. Both of these will be included in the methodology for this research (Wagner et al., 1999). Authors such as Lo Monaco et al. 2016 and Michel-Guillou et al. 2006 suggest that word association tests act as the most standard and effective method for uncovering SRs (Lo Monaco et al., 2017; Michel-Guillou et al., 2006). However, without the established relationships that existed in the Maltese study between the farmers and Friends of the Earth, this method was not deemed practical for farmers in the UK. The interviews were substituted by questionnaires. Furthermore, interviews were selected for representatives of organisations directly involved in the agricultural sector.

By its nature, academic research is continually evolving and becoming ever more thorough with new techniques being applied. Understandably, this makes it more challenging to provide innovative techniques but does provide a wealth of knowledge to base research on. Utilising established techniques provides for an informed and previously tested method to ensure current research will be of success (Snyder, 2019). For this reason, the methodologies for all research objectives were informed by Guerrier 2006, Flick et al. 2015, Souza et al. 2019, and Wagner et al. 1999.

2.1 Literature Review

The literature review was used to inform the methodologies and aspects of social representation (SR).

The agricultural sector in the UK was explored and included the new Agriculture Bill which was released in early 2020.

It is suggested that to implement environmental policies, psychology must be included in decision making (Gifford, 2007). Therefore, given this research is based around environmental psychology, the literature review explored top-down versus bottom-up approaches to sustainability in an attempt to relate these theories to the results.

SRs are described as forming part of one's environmental psychology and are used to determine the reasons for behaviours (Rataeu et al., 2012). In this case, it was necessary to look at other studies surrounding environmental psychology and the reasons for behaviours, as opposed to focusing solely on SRs as the principal cause.

However, SRs formed the main part of the literature review. The theories and formation of SRs were explored, as well as the connection between SR and the environment.

These theories were then related to the findings of this research to determine if SRs could be established within the farming community and if other contexts (Brexit and the environment) would affect these representations.

2.2 Data Collection

2.2.1 Interviews

Interviews were conducted among representatives of environmental organisations, a rural councillor, and an academic involved in the agricultural sector in order to provide a background and expertise on the subject. The basis for interview questions can be found in Appendix 2.

Interviews as a methodology for social representation are endorsed by a number of authors including: Lo Monaco et al. 2016, Guerrier 2006 and Wagner et al. 1999. The interviews were semi-structured in order to reflect ideas of Moscovici. He argued that interviews for research purposes should take the form of natural conversations (Guerrier, 2006).

The method allows for conversational style data collection (Blaxter et al., 2010) and provides the freedom to expand on or avoid certain subjects. Guerrier 2006 indicates that despite the natural approach, answers during the interview process are likely to be altered due to the atmosphere of the situation and comfort of participants (Guerrier, 2006). In contrast, it can be argued that some interviewees can find the process “empowering” (Blaxter et al., 2010). Therefore, to reflect these concepts participants were offered the opportunity for telephone or Skype interviews in order to reduce allocated time for interviews, and to provide a level of privacy.

Group interviews can be a time-saving mechanism for research purposes. However, they remove all sense of anonymity and may hinder the expression of honest opinions or aggravate others (Blaxter et al., 2010). Alternatively, it also argued that group interviews relieve the pressure of the situation by introducing a familiar aspect – the other participants (Flick et al., 2015).

However, given that Brexit is a complex issue and the connection between livelihoods and representation can be a delicate matter, all interviews were carried out separately, and did not consider group-style interviews. They were also rejected as coordinating group interviews with representatives would have proved challenging due to locations and travel.

Bias was considered during the analysis stage as the representatives were more likely to uphold values of their organisation, and not necessarily their own views. Whilst this diminishes the assessment of SRs, it did provide a background to the position held by organisations in such political climates and sector changes. Additionally, bias from a researcher perspective was also considered upon completion of the data collection stage, as interpretation of participant answers and underlying meanings can be altered to suit research needs (Guerrier, 2006).

2.2.2 Questionnaires

Questionnaires were selected as a form of data collection for all the research objectives. They reduced time restrictions for the participant given the intense work of the farming community, and provided anonymity and privacy. An example of the questionnaire can be found in Appendix 3.

Methodological Review

The questionnaires were separated into four sections. Firstly, demographics including age, gender and region (questions 1 to 3). Secondly, addressing the farming community (questions 4 to 9) where the questions reflected ideas of Michel-Guillou 2006a by including: motivations, needs, expectations, values, and experiences of their career (Table 5). The research also included other ideas by Michel-Guillou 2006b that challenges and obstacles also demonstrate SRs through common psychology or “common sense” (Michel-Guillou et al., 2006b). However, to adapt these theories, the questionnaires also included the solutions to farmers. This was included to provide the farmers with the opportunity to express the changes they wish to see in the sector, given the changes provided by Brexit.

Thirdly, questions surrounding Brexit (questions 11 to 15). Finally, questions based around the environment (questions 16 to 20).

Table 5: Questions based on social representation concepts by Michel-Guillou 2006a

Question	Concept by Michel-Guillou 2006a
Q4: Duration working in agriculture	Experience
Q5: Motivations in their career	Motivations
Q6: Support networks	Experience and needs
Q7: Challenges	Experience
Q8: Solutions	Needs and experiences
Q9: Agricultural values	Values

Microsoft Forms were used to produce questionnaires to ensure that there were no unnecessary procedures for farmers, for example: receiving and sending responses. The questions were designed to give the participants as much freedom as possible with their responses. A combination of closed and open questions as well as Likert scales were used. The Likert scales were utilised to provide a level of understanding and importance of environmental issues and opinions towards the agricultural sector. The environmental issues were decided based on findings from the Environment Agency and European Commission (Table 6).

Table 6: Environmental concerns within agriculture included in questionnaires

Environmental concern	Source
Reducing water pollution	Environment Agency; State of the environment: water (Environment Agency; 2018b)
Reducing water use	Environment Agency; State of the environment: water (Environment Agency; 2018b)
Soil erosion	Environment Agency; State of the environment: soil (Environment Agency; 2019)
Crop rotation	Environment Agency; State of the environment: soil (Environment Agency; 2019)
Monitoring nitrogen levels	Environment Agency; State of the environment: soil (Environment Agency; 2019)
Reducing greenhouse gases	Environment Agency; State of the environment: air (Environment Agency; 2018a)
Livestock welfare	European Commission; Cross compliance (European Commission, 2020b)
Conserving and preserving biodiversity/wildlife	European Commission; Cross compliance (European Commission, 2020b)

Questionnaires were distributed to farmers using the online Farming Forum, social media and through email. As the online Farming Forum is a national site, questionnaires were tailored not to exclude regions outside of the South West. This did not specifically answer the research questions but provided, similarly to the use of representatives, a context for farming within the UK. Additionally, the questionnaires were also distributed to young members of Farming Youth Clubs within the South West to ensure that the research considered all demographics.

However, it is recognised that this medium of research provides limited amount of information, based on the time in which participants are willing to allocate for the questionnaires, and from which answers cannot be “clarified or guided” (Frey & Oishi, 1995). Additionally, research bias was also considered as is it easier to make assumptions regarding responses and it is more difficult to take them at face value (Mishler, 1991).

Questionnaires in the form of “Q questionnaires” or “questionnaires of characterisation” are deemed the most appropriate for uncovering SRs. They allow the participant to rank items based on their perceptions of an object (Lo Monaco et al., 2016). However, this technique can be difficult to decipher without instruction and be fairly time consuming for the participant. Consequently, this technique was not adopted, but a Likert scale was utilised to understand how important environment themes were to the participant.

2.3 Analysis

2.3.1 Thematic analysis

Thematic analysis was selected to analyse data for all research objectives. Thematic analysis allows the researcher to identify patterns, shared themes and can highlight relationships between objects (Guerrier, 2006). It is also said to highlight the absence of themes (Flick et al., 2015). It qualifies as qualitative analysis and is criticised for removing “scientific” aspects of research. However, the consideration of themes and the relationships that exist among them are said to be essential for deciphering SRs (Flick et al., 2015).

Themes were identified within both the interviews and questionnaires. The themes identified within the interviews were not only compared between each participant but also to see if those ideas were reflected by farmers themselves to see if farmer concerns, challenges, solutions and political opinions were recognised by professionals/experts.

Themes within the questionnaires were established for each question in the corresponding sections (farming community; Brexit and; environment) by grouping similar answers, which would highlight any SRs within the section. This was then repeated by comparing the sections. The “farming community” and “Brexit” sections were compared to the responses given in the “environment” part of the questionnaire in order to discover if SRs had any influence on environmental protection.

Themes were created within the “farming community section” in order to gain a context for the farming situations, which in turn would highlight any SRs within the community, based on the concepts set out by Michel-Guillou 2006. These results were then compared to the “environment” section in order to demonstrate if contexts/challenges and solutions determined environmental opinions/protection.

Thematic analysis was then conducted within the “Brexit” section. This would provide the groupings and reflect SRs by political affiliation. These sections were then compared to themes reflected in the “environment” section of the questionnaire in order to determine if political affiliation had an effect on environmental opinions/protection.

2.3.2 ANOVA test and t-Test

t-Tests have been used in other studies that consider SRs such as that of Souza et al. 2019. The t-Tests are said to provide explanatory results for the statistical differences among groups (Souza et al. 2019). An advantage of t-Tests is that they provide the opportunity to compare results in small scale research to give a significant statistical difference (Denscombe, 2010). Additionally, they can compare results from groups of different sizes (Denscombe, 2010). For these reasons, t-Tests were adopted for this research. There was a variation in the number of respondents who affiliated with a particular political category. Along with this, the sample size was small, and consisted of 20 respondents.

Methodological Review

However, due to having three political groups (for Brexit, against Brexit and no preference), the ANOVA test function on Microsoft Excel was utilised instead of a f-Test, as recommended by Denscombe, 2010. This would determine if the groups resulted in equal or unequal variances, with regards to their responses to environmental concerns (question 20). t-Tests were then performed on each pairing of political group (Figure 2) in order to determine if there was a significant statistical difference between the groups.

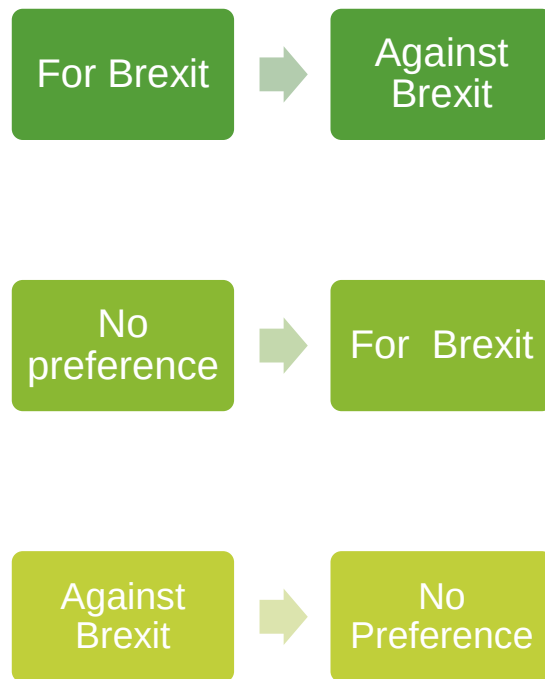


Figure 2: Political group pairings for t-Tests to determine statistical differences

3. Literature Review

The literature review was used to inform the methodologies of this study and to relate these concepts to the results found in this research. An assessment of bottom-up and top-down approaches, environmental psychology, social representation theory and social representations (SRs) regarding the environment provided the foundation for this study.

3.1 Agriculture in the UK

At the start of 2020, a new Agriculture Bill 2019-2021 was introduced to farmers in the United Kingdom, which was allocated a seven-year transition period. The preamble for the Bill included a security net of £3 billion for UK farmers in order to ensure livelihoods throughout 2020 whilst the UK leaves the European Union (EU) (Department for Environment, Food and Rural Affairs, 2020a). The Bill was set to replace the Common Agricultural Policy outlined by the EU and offer a new scheme that would reward farmers for offering “public goods”. It encompasses: the protection and enhancement of biodiversity; initiatives to reduce the causes of climate change and; consider animal welfare (Department for Environment, Food and Rural Affairs, 2020b). Additionally, acting as an “enabling” Bill, the Environment Secretary, Theresa Villiers, stated that the Bill would aim to be moulded by the views and opinions of farmers and land managers to create the most beneficial scheme for them (Department for Environment, Food and Rural Affairs, 2020b). She also suggested that the “Fair Dealing” clause would allow farmers to have more power to negotiate fairer returns for their produce (Pullman, 2020).

However, the Bill has been scrutinised on many levels. Firstly, it is to be challenged by the idea that agriculture is concerned with political devolution, and that ensuring there is a consistent engagement of stakeholders between farmers and policy-makers could be an obstacle to its success (Cavoski, 2019). Similarly, it is also suggested that a “one fits all policy” is not sufficient. A consideration of the different ecology and soil variations across the country are necessary in order to make the Bill achievable for farmers given their environmental limitations (Pullman, 2020).

Measurability was another criticism with regards to public good services, and also a lack of security regarding standards during trade deals (Pullman, 2020). Concerning “public goods”, measures and standards have not been outlined leaving an air of uncertainty on how to meet these requirements and receive the rewards (Pullman, 2020). Whilst, withholding that farmers in the UK aim to achieve a high quality of produce, concerns are voiced regarding whether negotiations between other countries will cause a decrease in the standards of imports and cause the quality of produce in the UK to diminish in order to meet costs and demand (Pullman, 2020).

Moreover, from an environmental perspective, the Bill does not refer to supporting farmers that adopt organic or other agro-ecological initiatives across the whole farm (Harvey, 2020). It is said that this could lead to little incentive for farmers to create complete environmentally-beneficial farms, by performing the absolute minimum. The Bill has also been criticised for not being

“radical” enough in its statement to reduce the effects of pollution and soil degradation. The absence of bans on the use of artificial fertiliser and pesticides, and soil-harming activities that reduce carbon storage capabilities have also been scrutinised (Harvey, 2020).

Alternatively, and to support Villier’s claim that the views of all stakeholders will be listened to, the National Farmer’s Union (NFU) praised the Bill for including regulatory measures with regards to food security. The Bill states that the government are responsible for producing a report every five years that assesses the nation’s food security. They express that this reaps positive benefits not only for compliance but also with regards to international trade and trading partners, as the “liberation of UK food” is likely to increase (Soutar, 2020).

In addition, the NFU have supported the government’s attempt to provide some level of certainty in regards to financial budgeting. The multi-annual financial budget received under the CAP will be replaced by multi-annual financial programmes, which will be in term until 2024 (under the current Parliament) (Soutar, 2020).

Another positive found in the Bill was the inclusion of animal welfare. The National Office of Animal Health (NOAH) praised the Bill for outlining measures to improve not only animal welfare, but animal health and the knock-on effects this will have on “public goods”. NOAH argue that these measures and high standards will raise productivity and the resilience on farms. These measures will also combat diseases and ensure food security due to the improved health of animals around the UK (The National Office of Animal Health, 2020). Like many of the weaknesses previously outlined, NOAH provides improvements for the Bill. They propose that additional specifications are made to ensure collaboration is achieved. They argue that diseases are not boundary-limited, and therefore a unified approach is necessary for the sector (The National Office of Animal Health, 2020).

It could be argued that whilst the new Agriculture Bill 2019-2021 is a top-down initiative, bottom-up approaches will be necessary. Firstly, to ensure that farmer’s needs are met for future progression. Secondly, for farmers to receive the rewards of the Bill. However, there is much debate among the literature as to whether one approach is more beneficial than the other, or if a mixture of the two is necessary to produce the best results.

3.2 Bottom-up versus top-down approaches to agricultural sustainability

In order to achieve overall sustainability, two approaches can be examined, the bottom-up and the top-down approach. These approaches are also argued to be influenced by the inclusion of psychological theories that can determine the success of policy implementation. Whilst concepts of each approach are similar among the literature, what is not clear is which approach will achieve success in every situation. With regards to this research, understanding the impact of these approaches can aim to assess if bottom-up approaches could be beneficial for change in agricultural sector in the UK.

It is argued that policy implementation can be benefited from the study of psychology (Schultes et al., 2019). Psychological theories provide the link between a policy and its effectiveness after implementation. This relationship allows for the development of new interventions that consider

human behaviour and attitudes that may affect its outcome. Schultes et al. 2019 propose that efforts concerning sustainable development should maintain this relationship, along with a combination of bottom-up and top down approaches in order to meet the needs of populations and achieve desired results (Schultes et al., 2019).

To support this, the involvement of citizens and individuals (bottom-up level) is argued to be a vital part of environmental policy making due to the level of grass-roots experience (Gifford, 2007). In this sense environmental psychologists are recommended as the link between the citizens and policy makers (Gifford, 2007). In its own field of study, the psychology of sustainability also indicates that managerial and leadership styles consider the relationships between organisations and individuals that make up the “bottom” level (Di Fabio, 2017).

In the context of this research, the link between understanding the psychology of farmers and political changes such as Brexit is also assessed. These theories can be used to explore the current trends between the top-down and bottom-up levels in the British agricultural sector, as well as provide a foundation for forecasting environmental protection after Brexit. The above theories suggest that the relationship between psychology and a combination of bottom-up and top approaches is deemed to be necessary. However, the success of these approaches in isolation and a balance between the two is discussed by other authors.

Top-down approaches entail the involvement of systems such as governments or policy makers. This approach has a high potential for immediate changes that can happen on a large scale. They are described to be slow in fabrication and can face a strong political opposition. This means that these approaches are only implemented in restricted measures or not at all (Gallup, 2018). Yaylac and Duzgun 2017 argue that the difference between top-down and bottom-up is that the top-down approach consists of ideas and concepts suggested by experts, whereas the bottom-up does not (Yaylac & Duzgun, 2017). However, despite this indicating that communities lack expertise in a subject, it is argued that both approaches should be used in order to achieve the best results for sustainability (Yaylac & Duzgun, 2017).

Bottom-up approaches can be described as “impactful” through the influence of behavioural changes from large groups of people adopting individual actions (Gallup, 2018). Studies such as that of El Asmar et al. 2012, add to this theory. El Asmar argues that a “bottom-up” approach consists of all stakeholders or participatory bodies should have equal opportunities to influence policy making. It suggests that this has more positive effects by facilitating the use of community resources and lack of opposition (El Asmar et al., 2012).

Fraser et al. 2006 also proposes that community involvement and bottom-up initiatives are essential for improving environmental management, in light of numerous failed top-down efforts (Fraser et al., 2006). The research implies that community efforts in themselves are relevant indicators of sustainability, and provide benefits to the environment due to direct action (Fraser et al., 2006). Relating to this research, as farmers directly work with 71% of land in the UK (Department for Environment, Food and Rural Affairs, 2019a), efforts made by large community groups such as these would have substantial environmental benefits. In this case, accepting political change and working towards the “principles” of the Agriculture Bill 2019-2021 and focusing on land protection and enhancement may provide faster results due to incentives.

In terms of agriculture specifically, Spoelstra and Elzen 2010 argue that the connection between the bottom-up and the top-down are weak and limited (Spoelstra & Elzen, 2010). The study expresses that from the perspective of the top, bottom-up initiatives can be described as a risk. They do not usually tackle an overall or widespread problem, but focus on small, local farming issues, and receive little support. They imply that top-down perspectives promote solidifying a system and aim to change issues at large. However, it also emphasises, similarly to Yaylac and Duzgun 2017, that the two approaches ought to be utilised in tandem for maximum results (Spoelstra & Elzen, 2010).

In a similar way, study examples raised by Cina and Di Iacovo 2015 state that different regions of Italy are proving varying successes from both top-down and bottom-up approaches with regards to agricultural parks and urban-agriculture (Cina & Di Iacovo, 2015). They also conclude that there is a disconnection between these two approaches. They highlight that whilst there is a vertical struggle, horizontal connections can also prove to be beneficial by including other sectors that can bridge the gap between these entities (Cina & Di Iacovo, 2015).

Rather than a connection or “intermediate” body, Fujisawa et al. 2015 established that the success of the approaches is dependable on one another within the agricultural sector. The study found that bottom-up or top-down approaches are better understood as drivers for farmers and that the ones that are successful only depend on the characteristics of the farmers themselves. For example, whether or not farmers are dependent on institutions such as cooperatives for sales or independent selling (Fujisawa et al., 2015).

Whilst concepts of each approach are similar among the literature, what is not clear is which approach will produce success in every situation. With regards to this research, understanding the impact of these approaches can aim to determine which approach would be suitable for the environmental protection within agriculture in the United Kingdom.

It is evident that the most beneficial approach to sustainability is dependent on the sector, situation and participants involved. Although as presented, a unified approach also appears to be necessary. From a top-down perspective, it is clear that this issue needs to be addressed with a wide-spread outlook. However, by understanding those directly within the sector, it will become evident what is necessary for those who form the bottom-up entity. This will therefore provide a holistic view of the issue and provide the means to solve the problem with all stakeholders involved and considered. To support theories regarding the relationship between these approaches and psychology, environmental psychology can also be examined in order to determine the reasons for behaviours.

3.3 Environmental psychology

Environmental psychology aims to understand the reasons for how individuals interact with their surroundings, including the natural environment and their behaviour towards it. It also highlights how experiences of the environment influence behaviours (Australian Psychological Society, 2019). Understanding these interactions provides a platform to address issues such as implementing sustainable behaviour, as well as identify reasons and challenges for limited positive interaction with the natural environment (Moser & Uzzell, 2003). Environmental

psychology can be shared among social groups, and can be determined by social factors such as age, economic status and education.

Hall et al. 2018 argues that actors are not always likely to act sustainably despite recognising or believing in environmental issues. The study did not focus on SR or the underlying social causes of scepticism, however, Hall et al. identifies that scepticism can be shared among large groups of people such as nations. Despite being a long-term study to its credit, the results of the research did not prove that those most concerned about climate change were most likely to act sustainably. It found that a shared disbelief of the existence of climate change and a denial of the anthropogenic contributions to this environmental problem, hindered action and sustainable behaviours on a seasonal basis – more specifically being more sceptical during colder months (Hall et al., 2018). This indicates an aspect of experience-driven perceptions, which is mirrored by other studies.

The idea of scepticism with regards to environmental issues and preventing sustainable behaviour is also suggested by Islam et al. 2013. Unlike Hall et al. 2018, the study used scepticism categorisation theories such as that of Rahmstorf's 2004, it also used underlying social causes to understand the scepticism of farmers' attitudes towards climate change (Table 7) (Islam et al., 2013).

Table 7: Rahmstorf's categorisation of scepticism

Category	Definition
Trend	Those who deny the existence of climate change
Attribution	Those who acknowledge climate change, but do not believe that the causes are due to anthropogenic reasons
Impact	Those who agree with that anthropogenic factors are causing climate change, but do not associate significant risks as a consequence of climate change

(Islam et al., 2013)

These categories are derived from social factors such as: age, economic status, education and experience. Younger, more educated farmers are deemed to be more open to environmental ideas, whereas older, less educated farmers seem to believe less in environmental issues. This is due to a lesser understanding, in conjunction with priorities or needs primarily focusing on economic situations (Islam et al., 2013).

Notwithstanding these social constructs, studies illustrate that awareness can change the perceptions of the environment. Pelletier et al. 2008 argue that the link between the environment and human existence must be fully understood to weigh against other factors such as everyday life and societal norms, in order to become an integrated part of a person's thinking (Pelletier et al., 2008). This reflects ideas put forward by Islam et al. 2013, by revealing that

younger generations who are more environmentally aware, become more environmentally responsible. Pelletier et al. 2008 also suggest that if policy makers can install the idea that environmental issues are social issues in to societal thinking then they can have the biggest influence in ensuring environmental protection (Pelletier et al., 2008). The research does identify that the acceptance of new ideas by individuals is challenging, but does not give reasons for this. The openness and agreeable concepts by Hall et al. 2018, and the social constructs by Islam et al., 2013, which were expressed a lot later than the ideas of Pelletier, indicate that awareness is not simply enough to install these ideals. It suggests that national personalities and social backgrounds play a role in its success and constitute reasons for this challenge of installation. However, concerning the Agriculture Bill 2019-2021, an awareness of environmental issues will be provided by the Bill. This supports theories put forward by Pelletier et al. 2008 that issues can be installed into societal thinking by policy makers.

Financial/economic drivers and awareness have a place in determining sustainable behaviours. However, other research has indicated to cultural and emotional factors. Factors such as place attachment and connectedness to nature should also be considered. Gosling and Williams 2010, argue that environmentally responsible behaviour on farms is created by possessing an “emotional association”, a dependence on the land, and agreeing with policies that protect the natural world (Gosling & Williams, 2010). However, it does not consider situational aspects or basic needs such as: yield success and economic status. Relating this to the social factors proposed by Islam et al. 2013, this demonstrates that situational aspects can act as priorities and can be more highly valued than that of emotional factors depending on personal circumstances.

Nationwide perceptions, scepticism and social factors have been identified as reasons behind behaviours. However, theories such as social representation can go beyond this and provide a baseline for these reasons. Social representation contributes to the analysis of environmental psychology as it can be used to explain why negative perceptions, scepticism and social factors all act as causes for behaviour. It implies that society and societal norms provide the basis for specific actions or lack of.

3.4 Social representation theory

Social representation (SR) was first established in the 1960s by Serge Moscovici and has developed into a principal theory in social psychology within continental Europe (Rateau et al., 2012). It encompasses the theory that SRs are formulated through social constructs of reality (Bidjardi, 2011), are based on knowledge conveyed by society and shared by a social group (Michel-Guillou & Moser, 2006a), and which consequently determine feelings, ideologies and form a “collective thinking in a society” (Hoijer, 2011). SRs can be installed at infancy from external factors and communications as a method to explain and make sense of the world and the unfamiliar. They are formed by creating a vision of reality that is shared by those people and objects that shape a person’s surroundings (Rateau et al., 2012).

A number of psychological theories make distinct separations between the psychological and the social, treating both concepts as having their own contexts which prevent relationships between the two (Voelklein & Howarth, 2005). Other, original theories such as collective

representations from Durkheim in the late 1800s, do not include the “social” aspect of analysis. They explain that a sense of common belief exists among different topics such as science, ideology and myths, which are said to be more concise (Voelklein & Howarth, 2005). However, it is argued that Moscovici’s theory deliberately allows for the contradictions among version of reality in the same social circles, as it does not remove the diversity of individuals within a group. This therefore combines the psychological and social (Voelklein & Howarth, 2005).

In contrast, research by Kalampalikis and Haas 2008 suggest that, to its credit, Moscovici’s theory progressed from ideas of Durkheim, and included states of consciousness such as thinking and language. These factors are necessary for social subjects for interaction and communication, ultimately bridging the gap between the social and psychological (Kalampalikis & Haas, 2008). The study argued that the idea of shared knowledge in any form is determined by individuals utilising social thinking that is integrated into value systems, histories and experiences (Kalampalikis & Haas, 2008).

Also in defence of Moscovici’s theory, research by Serrano 2013 advocate that the social representation theory cannot be viewed in one theoretical field. Serrano 2013 suggests that SRs encompass “psychology, sociology and anthropology”, and are socio-cognitive constructs which exist in a cultural context. Serrano 2013 also propose that they go beyond individual mental structures and existing through communication (Serrano, 2013). The study argues that by definition, cognition is social and that culture determines individual experiences (Serrano, 2013). This presents the idea of culture through the behaviour of an individual, underlining that the social aspect cannot be ignored.

As a way to understand how SRs evolve, are moulded and even altered through social constructs, Jean-Claude Abric expressed in the 1970s, that SRs are not simply one concrete entity. He argued that they consist of central and peripheral structures that express a person’s priorities in their opinions and perceptions of social objects (Lo Monaco et al., 2016). The purpose of the central core is to provide a meaning to the SR as well as determine the relationships between the other elements of the SR (including those in the peripheral structure). This is formed by the “collective memory and history of a group, which is stable, consistent and rigid, enabling resistance to change” (Lo Monaco et al., 2016). The peripheral structure provides a level of protection for the central core, by defending against or conditionally accepting contradictory elements (Lo Monaco et al., 2016).

However, a decade later, Claude Flament presented that the peripheral structures are more complex than this. He argued that they enable a “personalisation” of the representation, which in turn can influence behaviours, and provide the capacity of the representation to be applied to differing social contexts (Rateau, et al., 2012).

Polli and Kruhnén 2011 also highlight the importance of the social concept. They suggest that not only are SRs a construction of reality formed by social origins, but are figurative and symbolic in nature, and thus is the reason why the meanings put forward by Abric exist (Polli & Kruhnén, 2011). Additionally, these meanings are formed by a process of turning an abstract concept into a material concept. This is done by making it objective and contextualised. It is then that the objectified and contextualised concept becomes integrated into social thinking (Polli & Kruhnén, 2011).

With a focus on the social aspect of social representation theory, research by Voelklein and Howarth 2005 also highlight that if SRs are created by social constructs then the same constructs can cause changes in the representations (Voelklein & Howarth, 2005). This relates to the structural concept of Abric. They propose that the central structure can be failed by the periphery, consequently causing a change in representation. The study implies that SRs are utilised and exposed in everyday communications. It argues that SRs cannot be separated from a continual challenge or solidification depending on the interaction, and are therefore not concrete concepts (Voelklein & Howarth, 2005).

It appears to be unknown as to whether these SRs can be changed through everyday interaction. However, concerning this research, Voelklein and Howarth, Abric and Flament all emphasise that there is a pre-established SR for social groups. Therefore, this can be used to understand the reasons for the practices of farmers, even if it does not guarantee that an alteration of social representation can change their practices.

Social representations can also be applied to the natural world. Feelings, ideologies and “collective thinking in a society” exist for our environment and can be used to explain the causes for behaviours, whether they are environmentally responsible or otherwise.

3.5 Social representation and the environment

SRs about the natural environment are also constructed in the same way. They can be viewed as a contributing factor to a person’s behaviours and attitudes towards the natural environment (Rataeu et al., 2012) in both large and smaller groups. This also includes the ways in which environments are valued and how environmental change is responded to. Experience and risk factors of environmental issues appear to be major determinants of sustainable behaviour. Although, other evidence suggests that pre-existing perceptions of land use can hinder change.

In the last decade, research in the Netherlands such as that of Buijs et al. 2011 propose that SRs of nature can be conceptualized as comprising of three dimensions: a normative, a cognitive and an expressive dimension (Table 8) (Buijs et al., 2011). These dimensions attempt to explore the causes of representations by encompassing a cultural force. This force is said to influence behaviours as well as respond to issues such as environmental change or the familiar uses of land. The research argues that these dimensions are key to understanding how actors may behave when confronting certain situations and can help to pre-empt potential challenges in the face of change. Additionally, the study suggests that the strength of these dimensions will reflect the strength of the response to change (Buijs et al., 2011).

Table 8: Three dimensions of social representations of nature

Dimension	Definition
Normative	Values and value orientations related to nature
Cognitive	Beliefs about nature and natural processes; what is and what is not considered as nature
Expressive	Emotional responses to nature, and experiences of nature

(Buijs et al., 2011)

To mirror theories by Islam et al. 2013, Michel-Guillou et al. 2006 argue that commitment to environmentally responsible behaviour was based more on social factors rather than environmental awareness, as Pelletier et al. 2008 suggests. Both conventional and pro-environmental farmers were included in this conclusion. The study goes one step further than the concepts of Islam et al. 2013. It identified that representations were based around the following social factors: their “motivations, needs, expectations, values, and experiences”, (Michel-Guillou et al., 2006a). This also reflects the concepts of the SR dimensions highlighted by Buijs et al. 2011, which indicates that the strength of behaviours is influenced by factors such as values, beliefs and experiences in nature.

Furthermore, a separate study by Michel-Guillou 2006, highlighted that elements of SRs within the peripheral structure can evolve over time and can be influenced by other social factors such as policies (Michel-Guillou, 2006b). Considering concepts by Gosling and Williams 2010, an agreement with policies would be necessary to evolve these peripheral elements. However, an additional, long-term study that would assess the behaviours and SR of farmers before and after the implementation of a new policy would be necessary to prove or confirm such a concept. In the context of this research, this theory could be tested in a longitudinal study after the Agriculture Bill 2019-2021 is underway in 2021.

Despite political influence, the study found that SR and common knowledge for farmers are still heavily influential. It suggested that those not involved in environmentally responsible behaviours treat the concept of environment as a “constraint” to fulfilling their needs (Michel-Guillou, 2006b). This stresses that whilst social factors such as policies may contribute to changes in SR or perception, they could be treated as external to the social sphere which influences the SR of social groups. Therefore, policies have little influence over behavioural changes. The severity of social influence is also confirmed in Michel-Guillou 2009, that states whilst farmers may have individual notions about practices or environmental issues, each individual forms part of a “socio-cultural context”. These contexts alter and influence norms and beliefs, and ultimately affect environmental strategies and management (Michel-Guillou, 2009). The situation in the United Kingdom could be contrasted to this. New policies in place after Brexit could remove the restraints from CAP subsidies. Again the Agriculture Bill 2019-2021, may provide an incentive to changing behaviours, as environmental concerns are the drivers for

change and subsidies.

Specific to SRs in agriculture in the United Kingdom, Guerrier 2006 aimed to discover farmer's response to change. The study was based on the premise that farmers were facing political change by the mid-term review of the CAP and immediate changes following the outbreak of "foot and mouth" disease (Guerrier, 2006). It concluded that their representations of themselves as farmers were being challenged. It also found that the psychology of change meant history and understanding of the consequences were essential factors to consider and made up SRs of the issue at hand (Guerrier, 2006). This theory enhances that of Michel-Guillou et al., and Buijs et al. 2011, as social factors are included but rely more on the holistic understanding and appreciation of situations (past and future). With regards to the current situation in the UK, Brexit has provided a level of uncertainty for a number of years. This suggests that doubt and confusion will be evident. The Agriculture Bill is established, and therefore the expectations for the future (as expressed by Michel-Guillou et al., 2006a) are set out, but potentially not agreed with.

Experience was identified by Michel-Guillou et al. 2006a, Buijs et al. 2011, and referred to by Guerrier 2006 (through history) as a social factor that influences SR. This concept is also reflected in research by Lemeé et al. 2019. It demonstrates how experiences and risk factor can influence SR of different social groups in light of environmental changes and natural occurrences such as coastal flooding and erosion. The study concluded that experiences of risks were the determinants of SR and people's attitudes towards the natural environment, as well as their behaviours. Linking this to the UK, soil erosion is deemed an environmental risk. For those farmers who have had negative experiences with such challenges may in turn be encouraged to change behaviour for the benefit of the business as well as the natural environment. However, the research highlighted that there was a difference in SR between management experts and victims/residents. Victims were more likely to be directly affected by coastal disasters. Whereas whilst management representatives possess expertise, their perceptions were less negative than those of the victims (Lemeé et al., 2019). From this point of view, it is clear that the balance between top-down and bottom-up approaches needs to be optimised. This would ensure that firstly, policies are being complied with, and secondly, that stakeholders are also receiving gains and safety (farmers and securing their livelihood).

Alongside risk factor, SR can be formed when an environmental issue does not conform to ideas already established within a community or social group. Anderson et al. 2013, uses examples of opposition to afforestation in areas where social groups have an established perception and idea of the existing land use (Anderson et al., 2013). This can be compared to the respondents in the study by Lemeé who were sceptical of new coastal defences based on their experiences. As both respondents are sceptical, despite the change providing environmental and potential social/economic benefits. This also adheres to the theory of social representation and perceptions formed by social groups around the unfamiliar (Rataeu et al., 2012).

The studies conducted by Lemeé et al. 2019 and Anderson et al. 2013 focused on respondents in one particular area. However, Moloney et al. 2014 identified the experiences and SRs of climate change among different social groups (the general public and those employed within the sector), within and between two nations (United Kingdom and United States) (Moloney et al.,

2014). This also relates to notions put forward by Hall et al. 2018, mentioned in the previous section, with regards to national perception. Moloney et al., highlighted that even within national “representations”, there can be smaller representations among smaller groups such as experts and the general public, advancing on thoughts by Lemeé, and agreeing with Rataeu et al., 2012. This provides another level of analysis that distinguishes differences globally. It also demonstrates the complexity of SRs with regards to solving environmental issues.

The literature review provided the basis for the selected methodologies and provided a foundation to which the results of this study could be applied and compared.

4. Results and Discussion

The results of the research can be contextualised to many of the concepts discussed in the literature review respective of the research objectives.

4.1 The farming community, challenges and solutions

Michel-Guillou et al. 2006a expressed “motivations, needs, expectations, values, experiences and challenges” as contributing factors to SRs (Michel Guillou et al. 2006a). These were explored in the research but did not demonstrate a social representation among farmers surrounding their community, despite showing similarities within each factor. However, concerning research objectives 1 and 2: the challenges and solutions highlighted SRs among farmers.

4.1.1 Farming community

70% of respondents were aged 46 or over (Q1) and 80% of all participants identified as male (Q2). The region with the most respondents (Q3) was the South West of England at 45% (Figure 3).

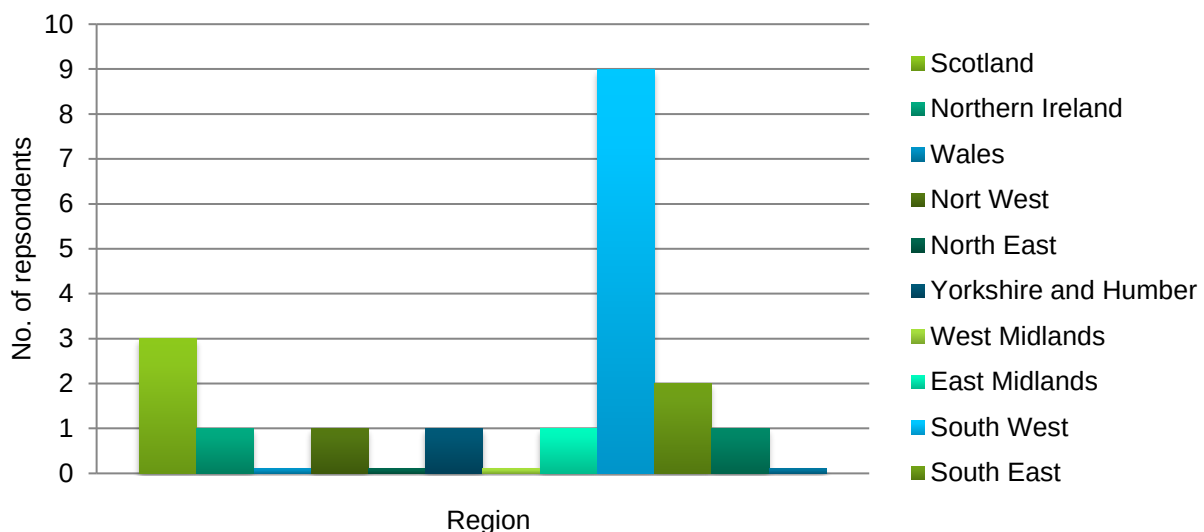


Figure 3: The number of questionnaire respondents per region

No patterns were found between the region in which respondents farm (Q3) and any other question. The amount of time involved in agriculture (Q4) also showed no connection to any other factor, as 95% of respondents had been involved in the sector for over 10 years. The

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motivations (Q5) of farmers could be divided between economic, social and environmental (Table 9).

Table 9: Motivations of farmers

Category	Response	Percentage of respondents (%)
Economic	Make a living	30
Social	Job satisfaction	35
	Feed the country	5
	Leave a legacy	5
	Help others	5
Environmental	To care for animals	10
	Being in nature	10

The needs of the respondents were discovered through the use support networks (Q6). 45% of respondents stated that there was little or no support by the government within the industry, whilst only 10% said that there was. Consumers were also mentioned as not supporting farmers. A further 30% stated that their immediate networks such as friends/family and farming community were their only forms of support.

There was a variation in the levels of value that the farmers held for the agricultural sector (Q9). The respondents demonstrated a high appreciation for the sector in terms of the services it can provide (economic contribution, food security, and exports). Although, in comparison, they presented the “career” as holding limited value (farming being a secure career) (Figure 4).

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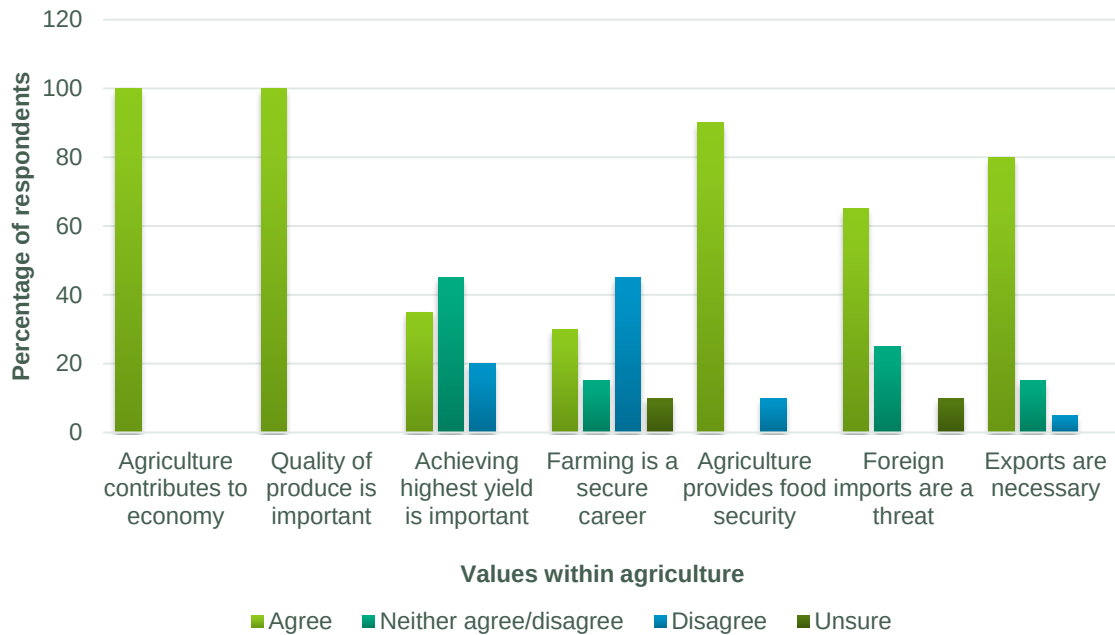


Figure 4: Degree to which respondents agree with values in agriculture

However, connections could not be established across these factors, indicating that these were not dependent upon one another. This was also the case when relating these factors to Brexit and the environment. This suggests that the factors outlined by Michel-Guillou 2006a regarding SRs had little effect on other issues. That said, definitions by Moscovici stated that SR theory allows for contradictions with the same social circles in order to preserve the diversity of individuals within a group (Voelklein & Howarth 2005). This was reflected by the differences among the farming community.

The absence of consistency here implies that SRs may not be as solid as other examples such as the environment, discussed below. The shared responses could be linked to the concept by Flament that the peripheral structures can be personalised, influencing behaviours and allowing the representation to be applied to differing social contexts (Rateau et al., 2010). A further study could use Q questionnaires or word association tests, as endorsed by Lo Monaco et al., 2016, to identify central and peripheral structures with regards to social contexts such as Brexit or the environment.

4.1.2 Challenges and solutions

Concerning research objectives 1 and 2, the challenges (Q7) highlighted by the respondents were on the whole shared and many identified more than one. When participants were asked to

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describe the challenges faced by the agricultural sector five major themes emerged as prominent issues (Table 10).

Table 10: Challenges within agriculture from farmer perspectives

Challenge	Percentage of respondents (%)	Examples given
Market	50	Unfair access to markets; cheap imports; supermarket monopoly
Negative public perception	20	Public antipathy; lack of knowledge of public about rural life
Regulations and compliance	20	Red tape; unfair regulations among different farmers; payment system bias
Weather	20	Wetter winters
Consumer behaviour/advertising	20	Public unaware of high product quality of UK produce; buying cheapest products irrespective of origin; poor marketing of farming

15% of respondents mentioned the environment as challenging aspects such as soil, climate change, as well as public environmental issues such as vegan campaigns and environmentally-charged (“eco”) campaigns.

As for solutions (Q8), 20% mentioned a change in production standards, highlighting that food sold in the UK must be produced to the same legal, environmental and welfare standards (including that of imports). Others suggested a reduction of welfare and quality standards to meet foreign competitors and cheaper prices. Additionally, the refusal of imports that do not meet the same standards as the food produced in the UK was also proposed. Figure 5 demonstrates other solutions that were also identified.

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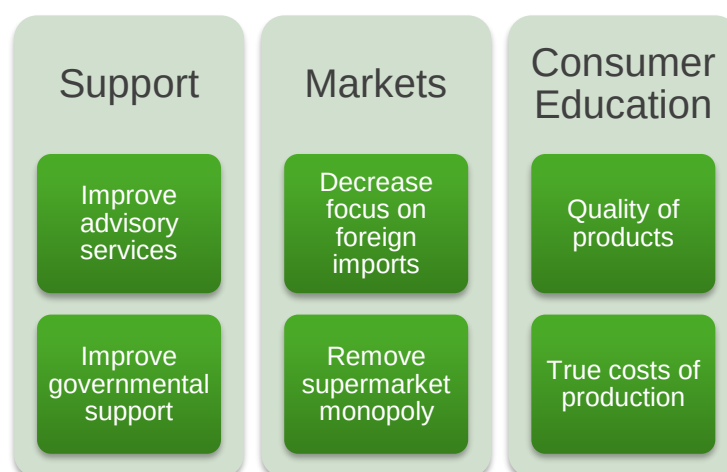


Figure 5: Solutions to challenges provided by farmers

Concerning the environment, 15% of respondents mentioned environmental issues such as improving the soil, regenerative farming and excluding imports from states that use methods that harm the environment. However, only 10% of respondents who mentioned the environment as a challenge stated tackling the environment as a solution to these issues. Interestingly, despite each participant voicing challenges, 15% stated that there were no solutions to these problems, either expressing that they could not offer a solution to the challenges mentioned, or they “just have to live with them”.

With regards to SRs, Michel-Guillou proposes that challenges and obstacles demonstrate a SR through common psychology (Michel-Guillou et al., 2006a). On the whole challenges and solutions were shared among farmers, implying that a SR does exist in this case. When referring to the general challenges and solutions faced by farmers to social contexts such as Brexit or the environment, there was only one example. The general challenges reflected mainly issues regarding markets. This was also a concern for potential challenges after Brexit (Q14). The solutions given by farmers also included that of tackling the markets for both general challenges and with regards to Brexit. Furthermore, with the exception of weather, no other environmental challenge was mentioned. Therefore, these could not be related to differences among general challenges/solutions and social factors.

This indicates that solutions to general concerns were applicable to Brexit and can therefore imply that this social context is connected with the SR, as outlined by Michel-Guillou 2006a, and by Flament regarding structures of SR.

Markets and Brexit were also evident in the context of top-down approaches. The majority of questionnaires were completed before the release of the Agriculture Bill 2019-2021. Nevertheless, the “Fair Dealing” clause highlighted in the document (Pullman, 2020) is a positive step towards addressing these challenges. It demonstrated a connection/reflection between the top and bottom levels (farmers and policy makers). However, on the other hand, this connection is lost concerning criticisms of the Bill in the way of trade negotiations resulting in a decrease in quality standards (Pullman, 2020). This was also a concern of the

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questionnaire respondents, who named ensuring UK standards should be met by imports as a solution to the challenges they faced.

Additionally, a lack of support between the top and bottom levels is also a hindrance to environmental protection within agriculture (Spoelstra & Elzen, 2010). To affirm this, support was listed as both a challenge and solution for farmers. That said, the research reflected other theories that suggest within this vertical struggle, horizontal connections can be made with other entities to bridge this gap (Cina & Di Iavoco, 2015). A third of respondents believed that farming communities and immediate support networks, as well as collaboration with agencies were beneficial to them to achieve these goals. This implies that at this stage, the solutions and challenges of farmers are heavily related to the top-down approach, suggesting that they are dependent on it.

Other arguments against an achievable balance between top and bottom levels state that expertise and ideas only come from the top (Yaylac & Duzgan, 2017). Interview participants affirm this statement by suggesting that information is rarely filtered down to lower levels and that policies often do not consider the opinions of those who are directly involved. This was also highlighted by the Agriculture Bill 2019-2021 that stated farmers would have a direct role in consultancy (Department for Environment, Food and Rural Affairs, 2020b). This signifies that if the Bill is successful, this balance could be achieved.

In spite of this, other participants propose that a wealth of knowledge is held by farmers. The solutions identified by farmers imply that while bottom-up ideas may not be included in policy at this stage, they do in fact exist. Other solutions identified by interview participants was that of management being location-specific. For example, more intensive conservation techniques in certain areas, and considering location-specific environmental challenges. This could address location specific challenges in the South West, by including farmer knowledge. As mentioned, the Agriculture Bill 2019-2021 has been criticised for neglecting strategies by location. However, by including the wealth of knowledge of bottom-up levels, this could be addressed, again emphasising this concept of a balance of levels. Despite the current situation not reflecting this, such thoughts were also agreed by El Asmar et al. 2012 who confirm that equal opportunities should influence policy making by utilising community resources (El Asmar et al., 2012).

This research has demonstrated that SRs could not be deduced when considering the farming community, but could when exploring challenges and solutions. Other theories such as Moscovici and Flament regarding the structures of SRs can be applied to this research as an explanation that individuality exists among social groups and representations, but this is to be further assessed.

Additionally, the relationship between the top-down and bottom-up approaches was explored and reveals that given the current situation, the top down is both the challenge and the solution. This highlights the importance of this relationship for the agricultural sector, as SRs reflected shared opinions among the farmers.

4.2 Social representation of the environment

Regarding research objective 3, 100% of respondents said that the natural environment was “important to protect” (Q16). 35% stated this for reasons such as environmental concerns, for example, climate change, biodiversity protection, reducing carbon footprint, habitat diversity, and soil health. Another 35% gave reasons that related back to farming (food production, trade from environmentally damaging states, crop health and regenerative farming).

In addition, 85% said that agriculture can help to improve the state of the natural environment (Q17). They gave reasons such as having the capacity to improve habitat growth, and to carry out carbon sequestration. Whilst 15% of all respondents stated that help was needed in the form of incentives (financial, rewards, compensation).

95% of respondents stated that their practices were environmentally-friendly, with 60% offering one or more initiative/practice (Figure 6).

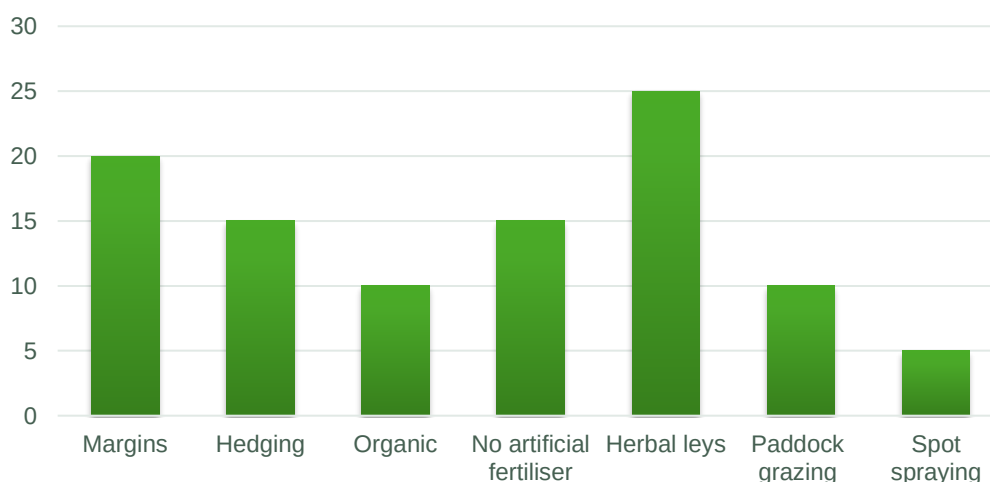


Figure 6: Percentage of farmers using environmentally-friendly practices

However, despite this, 65% of respondents said they had experienced pressure or incentives to be environmentally friendly (Q19). 35% suggested the incentives were all financial: stewardship schemes, greening payments through Agri-Environment Climate Scheme, Basic Payment Scheme, and private company subsidies (such as water companies). And the other 30% stated that many of the pressures mentioned included compliance through cross compliance, pollution, and Nitrate Vulnerable Zones.

With regards to respondent values of environmental concerns (Q20), 75% of responses were categorised as “extremely important” or “important” (Figure 7).

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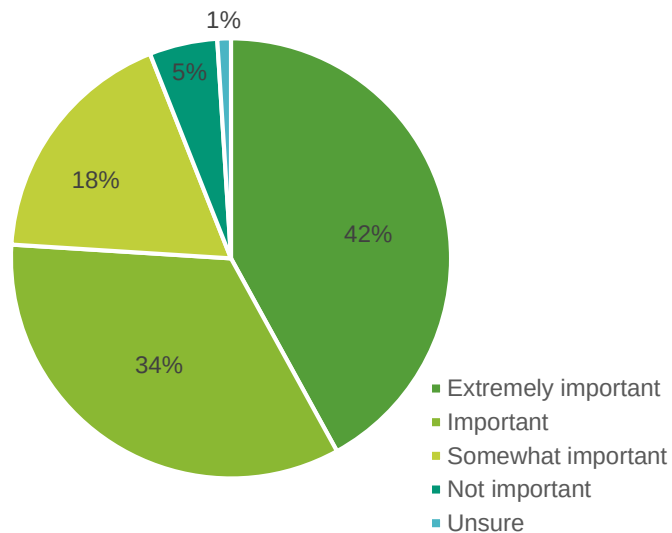


Figure 7: Percentage of responses to environmental values among all respondents

Livestock welfare was the most valued environmental concern with all but one response stating this as “extremely important” or “important”. The environmental concern with the least value on average was reducing water use, where 55% stated this was “somewhat important” or less (Figure 8).

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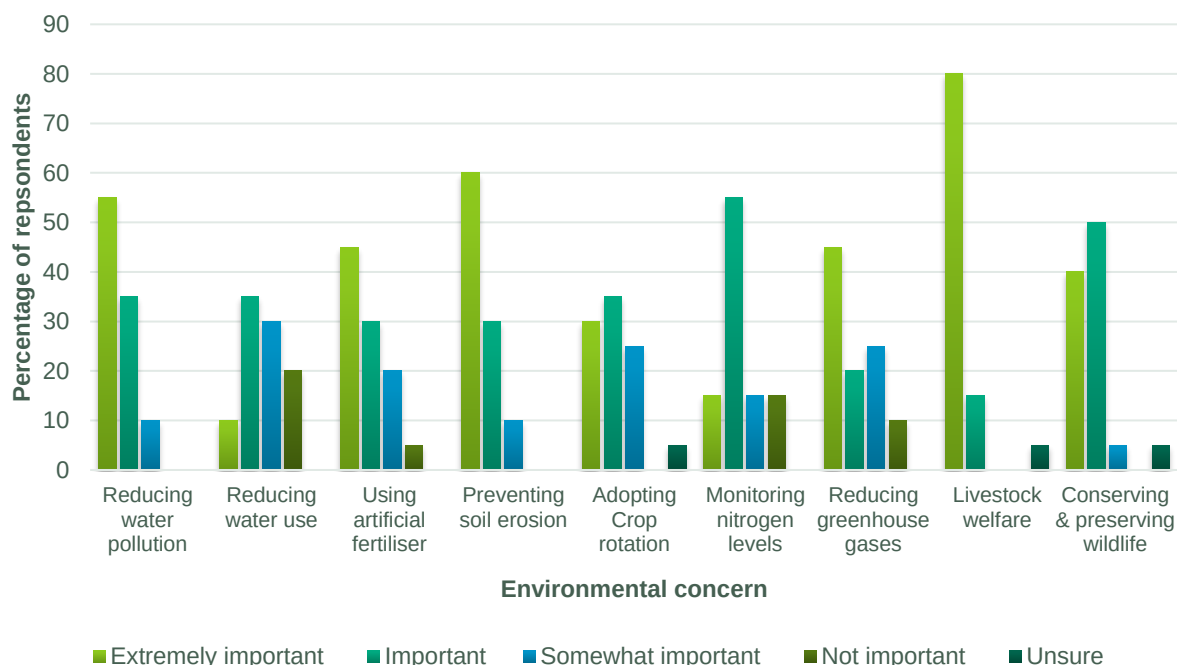


Figure 8: Degree of importance of environmental concerns for all respondents

SRs are described as being formulated through social constructs of reality (Bidjardi, 2011), based on knowledge conveyed within a society (Michel-Guillou & Moser, 2006a), and can determine a collective thinking (Hoijer, 2011). The results have supported these definitions, as farmers demonstrated a collective thinking regarding the environment, which was also based on shared knowledge regarding practices. This demonstrates the idea that SR is formulated through the social constructs of reality of the farming community. However, when considering other factors such as incentives (as previously mentioned), aspects of environmental protection could be challenged by finances or legislation.

That said, more profound definitions signal that SRs derive from culture and that culture determines experiences and socio-cognitive constructs (Serrano, 2013). Two interview participants alluded to this theory that farmers belong to a very ingrained culture and play a vital part in the local community from which their opinions and perceptions of issues are developed. It was stated that Britain has a specific farming culture, and that farmers are in tune with their natural environment. It was also stated that culturally, farmers are more likely to recognise the importance of environmental protection as well as advocate for it. The questionnaire responses support this theory, and therefore address the idea that culture plays a part in forming SRs.

In contrast, other theories relating to culture demonstrate that SR of the environment for farmers was more negative. It is argued that SR of the environment can be ingrained in culture through three dimensions: the normative, cognitive and expressive (Buijs et al., 2011). Relating to the normative dimensions (values of nature), farmers expressed a relatively high value of

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environmental concerns, but it is necessary to mention that these concerns were related to the agricultural sector, not to the natural environment in general. The cognitive dimension (the beliefs about nature and natural processes) was not examined in this research. However, many questionnaire respondents mentioned natural processes such as climate change, soil erosion and weather incidents as a challenge to their occupation. Additionally, on two occasions respondents mentioned environmental campaigns (namely, veganism and climate change) as social influences that negatively affected the sector. In terms of the expressive dimension (emotional response to nature), it could be said that these examples demonstrate negative emotional responses as this is directly linked with their livelihood. What is unclear is the values, beliefs and emotional responses to nature aside from its connection to agriculture, and whether their occupation influences their responses.

A further study could be conducted in order to explore these dimensions set out by Buijs et al., 2011 to compare the relationships between agriculture and the environment, and the natural environment in its own context. This would provide a more profound assessment of the influence of SRs of farmers and decipher if the natural environment can be separated from the occupation. Additionally, relating to the focus on the South West in this research, the dimensions set out by Buijs et al., 2011 could also be utilised to discover if SRs differ among regions with the United Kingdom. An assessment of farmers working different areas of the UK could be conducted to determine if some regions are more likely to undertake environmentally-friendly practices based on their culture and SRs. This consequently could be used to advise countryside management bodies.

With regards to top-down and bottom-up approaches, environmental protection from farmers seemed to rely, in the majority of cases (60%), solely on incentives. This highlights the idea of aspects of environmental protection being challenged by finances or legislation. As stated, the Agriculture Bill 2019-2021 does not support agro-environmental initiatives across the whole farm (Harvey, 2020). Therefore, this could lead to farmers performing a minimum of requirements in order to receive the benefits/rewards. If farmers are relying on incentives to implement such practices, the criticisms of the Bill are in fact valid and ought to be addressed. As argued by a number of authors mentioned in the literature review and reflected in this research, the gap between the top and bottom levels is clearly evident as the focus on the environment is not shared by both levels.

This also questions concepts that community efforts are sustainability indicators as direct action provides faster results (Fraser et al., 2006). Whilst this argument is possible, the results indicate that the situation in the UK is not at a point where bottom-up approaches will provide environmental protection. This is due to a necessity of incentives from the top-down, and does imply that there is an absence of personal will, or is stressed by practicalities in the form of finances.

This also relates to theories that policy factors are better understood as drivers for farmers (Fujisawa et al., 2015). This research identified that the incentives were the drivers for farmers and that by having this top-down approach, farmers were dependable upon the top level in order to provide environmental protection. Again, indicating that environmental focus is not shared on both levels and requires a community will.

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On the other hand, regarding animal welfare, this was an environmental value that both top-down and bottom-up levels considered to be important for the sector. 95% of farmers stated that livestock welfare was “extremely important” or “important”. The Agriculture Bill 2019-2021 seems to reflect these ideas by outlining measures to improve welfare standards, animal health and by considering both environmental and human aspects through the consequential effects on these may have on “public goods” (The National Office of Animal Health, 2020). Arguments presented in the literature review recommend that a balance between the levels is necessary. With this mind, it could be suggested that high standards of animal welfare will be a section of environmental protection that will be successful due to the connection between top and bottom.

Whilst the majority of instances highlight a clear gap between the top and bottom levels, one example does imply that coherences can occur between them (animal welfare). What can be concluded is that, the ideas of the bottom are evident and while the top needs to recognise these ideas in order to provide this sense of harmony. At this stage, incentives are drivers for farmers, suggesting that a top-down approach may be more successful for environmental protection.

Concerning theories regarding environmental psychology, it could be said that believing in sustainability ensures sustainable behaviour. However, Hall et al. 2018 found that this was not the case (Hall et al., 2018). Considering the environmental practices suggested by the farmers (refer to Figure 6), it would seem that their actions are working towards sustainable farming. This alongside their beliefs about protecting the environment and expressing the importance of environmental concerns within agriculture indicate that they hold a belief in the environment, essentially contrasting thoughts by Hall et al. 2018. However, declarations that their farming practices are sustainable were outlined by themselves or due to compliance with current “greening” initiatives outlined by the EU. An assessment of each individual farm therefore may have proved that their practices were only environmentally-friendly in part and did not extend across the whole farm – to reflect criticisms regarding the Agriculture Bill 2019-2021.

Additionally, Hall et al. 2018 identified that scepticism regarding the existence of environmental issues can determine an absence of action to prevent concerns (Hall et al. 2018). This research however, identified that weather and other issues such as climate change and soil erosion did in fact exist and created direct concerns for farmers. That said, as previously mentioned, farmers recognise that incentive or pressure through compliance has determined their practices. This illustrates that while the awareness of environmental concerns exists, other factors ensure environmental protection rather than a belief or personal desire.

It has been argued that an awareness of the natural environment and its connection with human existence can determine environmentally-responsible behaviour (Pelletier et al., 2008). The interview participants imply that farmers have a strong awareness of the dependency of agriculture on the environment, and they understand their local environment better than most. This was also reflected by the farmers in that 90% believed that agriculture can improve the state of the environment, and their values regarding environmental concerns were high (refer to Figure 8). In isolation, this point can suggest that the environmentally-friendly initiatives practiced by farmers are a result of awareness. However, other interview participants reflected similar ideas with regards to incentives. They expressed that the demands of the occupation

mean that finances would determine environmental enhancement rather than a willingness, and regardless of their perceptions of the environment.

Overall farmers showed a sense of shared belief and knowledge regarding the environment. By definition, it could be said that there the social representation of farmers regarding the environment was positive and protective. However, both in the context of top-down approaches and environmental psychology, it seems other factors, namely incentives and policy, play a prominent role in determining farming practices.

4.3 Social representation and Brexit

Regarding research objective 4, social contexts such as Brexit, draw attention to the theory of collective thinking.

Those who identified themselves as being “against Brexit” made up 35% of all respondents (Q10), and showed a regularity among their answers.

As mentioned, with regards to the farming community section of the questionnaire, no connection could be made with any other factor. However, there was a clear trend seen in the Brexit section of the questionnaire that highlighted the importance of finances for “against Brexit” respondents (Table 11). All questions in this section reached a majority.

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Table 11: Financial responses of “against Brexit” respondents

Question	Response related to finances	Percentage of “against Brexit” respondents (%)
Q11: In your opinion, has being part of the European Union determined your farming practices? Can you give reasons for your answers?	EU has offered subsidies and profitability for businesses	50
Q12: Would you say the European Union has been beneficial to the agricultural sector in the UK? Can you give reasons for your answer?	EU has been financially beneficial	75
Q13: Do you believe your farming practices are likely to change once Britain leaves the European Union? Can you give examples/reasons for your answer?	Losing money, lower production, inability to remain in business	65
Q14: Do you believe BREXIT will create more challenges for the agricultural sector? Can you give reasons for your answer?	Limited funding; increased competition leading to lower prices	75
Q15: Do you believe BREXIT will provide an opportunity for the UK to adopt farming practices that will consider the health of the natural environment?	Incentives through financial schemes	50

Shared results were also evident when comparing political affiliation to environmental protection, which is explained in the section below.

Unified responses were not expressed for those who identified themselves as “for Brexit” (45% of all respondents). Many of the answers demonstrated a divide between the respondents and a balance of responses, with question 15 as an exception.

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With regards to whether the EU had been beneficial to agriculture (Q12), 60% stated that it had not. This group gave reasons such as industrialisation, limited market opportunities or competition, disagreeing with payment systems/subsidies, or limited support. The remaining 40% had more balanced views providing both positive and negative examples (Figure 9).

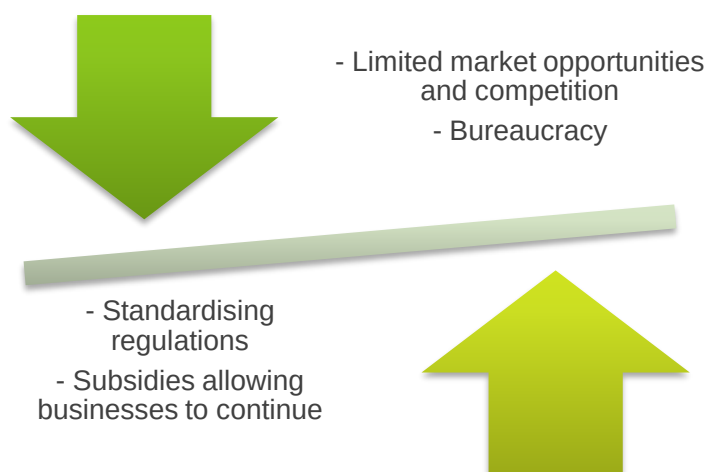


Figure 9: Balanced views of EU effect on agriculture from pro-Brexit farmers

The respondents were split when referring to whether their practices would change after Brexit (Q13). 50% stated yes and had a positive outlook on this, naming better prices for food, increased sustainability, the ability to diversify and bring new entrants into the sector. The remaining respondents believed that their practices would stay the same or were unsure about the outcomes of Brexit.

Again, respondents were split with regards to Brexit bringing additional challenges (Q14). 50% stated that challenges would increase relating to new regulations, but highlighted opportunities going forward. The other 50% were either unsure or suggested that nothing would change.

Concerning question 15, all but one proposed that Brexit would offer the opportunity to adopt environmentally-friendly practices. However, 20% mentioned that this would only succeed with financial incentive.

Only 3 respondents identified as having no political preference with regards to Brexit. For each question, respondents provided varying answers, with two exceptions (Table 12). Firstly, all 3 confirmed that the EU had determined farming practices (Q11), mainly through regulation compliance and subsidies. Secondly, the three respondents believed their farming practices would change after Brexit (Q13), but with different reasons.

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Table 12: Varying responses from respondents with no political preference

Question	Respondent	Response
11. In your opinion, has being part of the European Union determined your farming practices? Can you give reasons for your answer?	1	Yes, there is a financial buffer
	2	Yes, driven to a large extent by payments
	3	Yes, measure and regulation
12. Would you say the European Union has been beneficial to the agricultural sector in the UK? Can you give reasons for your answer?	1	No
	2	Yes, a larger market
	3	Yes, due to subsidies
13. Do you believe your farming practices are likely to change once Britain leaves the European Union? Can you give examples/reasons for your answer?	1	Yes, greater emphasis on diversification
	2	Yes, low input means low output
	3	Yes, production will be closer linked to actually markets
14. Do you believe BREXIT will create more challenges for the agricultural sector? Can you give reasons for your answer?	1	Yes, no government support. A lack of subsidy means people will not stay in business.
	2	Yes, a more uneven playing field
	3	No more than the EU would create
15. Do you believe BREXIT will provide an opportunity for the UK to adopt farming practices that will consider the health of the natural environment?	1	Yes, but government need to back farmers
	2	Maybe
	3	Yes, it is vital that the natural environment is at the heart of farming practices

Similarly to the farming community, this lack of consistency among the responses could relate to theories by Abric and Flament that suggest social concepts sit in the peripheral structures of SR. The central core is defined as consisting of histories and collective memory, but the peripheral structures are deemed to be less resistant to change but still provide a level of protection of central beliefs (Lo Monaco et al., 2016). Given the nature of the political situation

and surrounding uncertainty, it is not surprising that opinions were divided in this category. The unknown aspect of the situation could lead to peripheral structures within SRs to be challenged or altered.

Additionally, the negative opinions towards Brexit presented within all groups could also relate to theories by Anderson et al., 2013. The idea that pre-conceived ideas of land use can prevent an acceptance of change (Anderson et al. 2013), could be demonstrated by the results in this research. Pre-existing land use in this context would be the status quo before Brexit went underway in January 2020, which is now being challenged. For those respondents who selected “against Brexit”, their concerns regarding finances could be a reflection of this uncertainty of land use changes.

Those who identified as “against Brexit” could be regarded as having a “collective thinking” due to unified responses. This suggests that a social representation of farmers was evident with regards to political affiliation. Although, other theories regarding social representation structures also play a part in determining the importance of politics to farmers.

4.4 The connection between Brexit and the environment

With regards to the environment, those “against Brexit” had on average more consistent and higher environmental values, and demonstrated less need for incentives to protect the environment and felt less pressure to do so. This indicates that those “against Brexit” were more likely to protect environment, and as a group held a SR due to the collective thinking with respect to the environment.

For the majority of environmental questions, political affiliation had little influence on responses. As stated, 100% of respondents believed that the environment is “important to protect”, and on the whole, environmental values were high (refer to Figure 8). Based on these findings, “collective thinking” is evident and the environment is an important factor to farmers regardless of political preference.

When dividing the results for environmental concerns (Q20) based on political preference, ANOVA results determined that the variances were equal. The following three separate t-Tests compared the environmental values between each political category (for Brexit, against Brexit, no preference). The results highlighted that there was no significant statistical difference between the variances, as the P-value was less than 0 in three our tests (Figure 10).

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Anova: Single Factor: "For", "Against" and "No Preference"
Respondents

SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Column 1	5	90	18	254
Column 2	5	61	12.2	112.2
Column 3	5	27	5.4	36.3

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	397.733	2	198.866	1.482	0.265	3.885
Within Groups	1610	12	134.166			
Total	2007.733	14				

t-Test: Two-Sample Assuming Equal Variances "For Brexit" and
"Against Brexit"

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	18	12.2
Variance	254	112.2
Observations	5	5
Pooled Variance	183.1	
Hypothesized Mean Difference	0	
df	8	
t Stat	0.677	
P(T<=t) one-tail	0.258	
t Critical one-tail	1.859	
P(T<=t) two-tail	0.517	
t Critical two-tail	2.306	

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t-Test: Two-Sample Assuming Equal Variances "For Brexit" and "No Preference"

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	18	5.4
Variance	254	36.3
Observations	5	5
Pooled Variance	145.15	
Hypothesized Mean Difference	0	
df	8	
t Stat	1.653	
P(T<=t) one-tail	0.068	
t Critical one-tail	1.859	
P(T<=t) two-tail	0.136	
t Critical two-tail	2.306	

t-Test: Two-Sample Assuming Equal Variances for "Against Brexit" and "No Preference"

	<i>Variable 1</i>	<i>Variable 2</i>
Mean	12.2	5.4
Variance	112.2	36.3
Observations	5	5
Pooled Variance	74.25	
Hypothesized Mean Difference	0	
df	8	
t Stat	1.247	
P(T<=t) one-tail	0.123	
t Critical one-tail	1.859	
P(T<=t) two-tail	0.247	
t Critical two-tail	2.306	

Figure 10: ANOVA and t-Test results for environmental concerns for three political categories

This was also reflected when averaging total percentages within each group (for Brexit, against Brexit and no preference) in each Likert scale category in question 20 (Table 13). That said, the lower number of respondents in the "no preference" group subsequently caused percentages to be respectively higher.

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Table 13: Total percentage within each political group based on environmental values

Likert scale category	For Brexit (%)	Against Brexit (%)	No Preference (%)
Extremely important	37	44	52
Important	40	27	35
Somewhat important	17	16	13
Not important	5	8	0
Unsure	1	3	0

However, the results broken down into individual values demonstrated that, as mentioned, those who had a political preference “against Brexit” had higher environmental values for five categories (Figures 11, 12, 13).

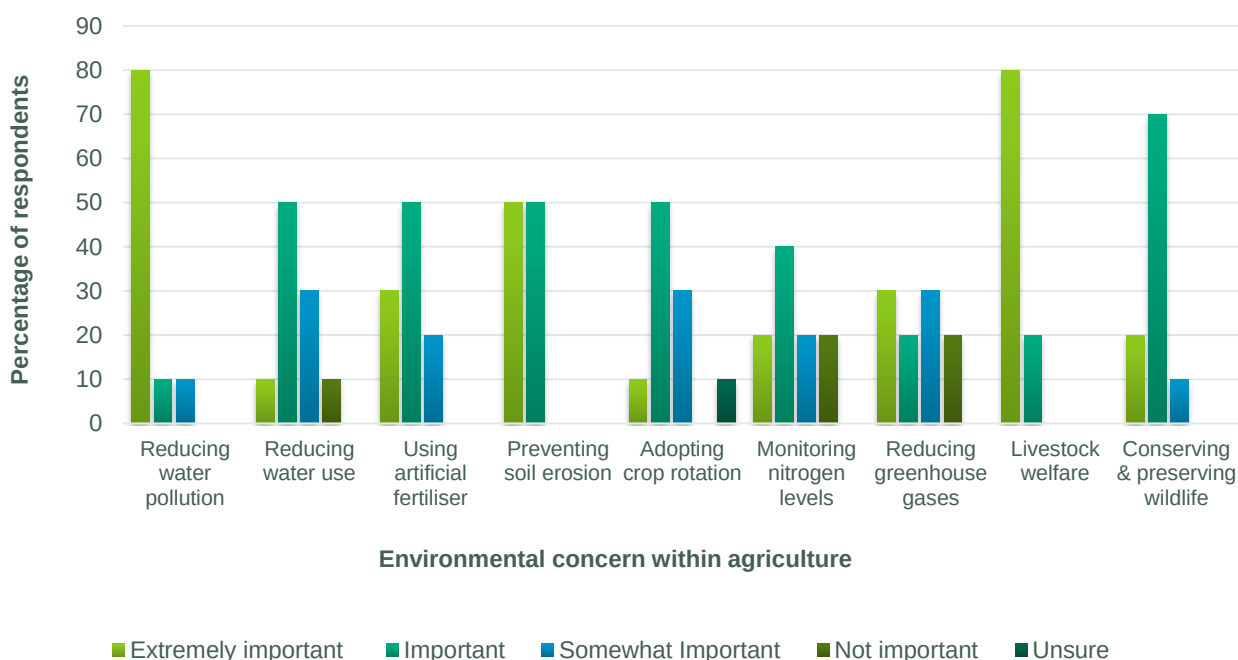


Figure 11: Environmental values of “for Brexit” respondents

Results and Discussion

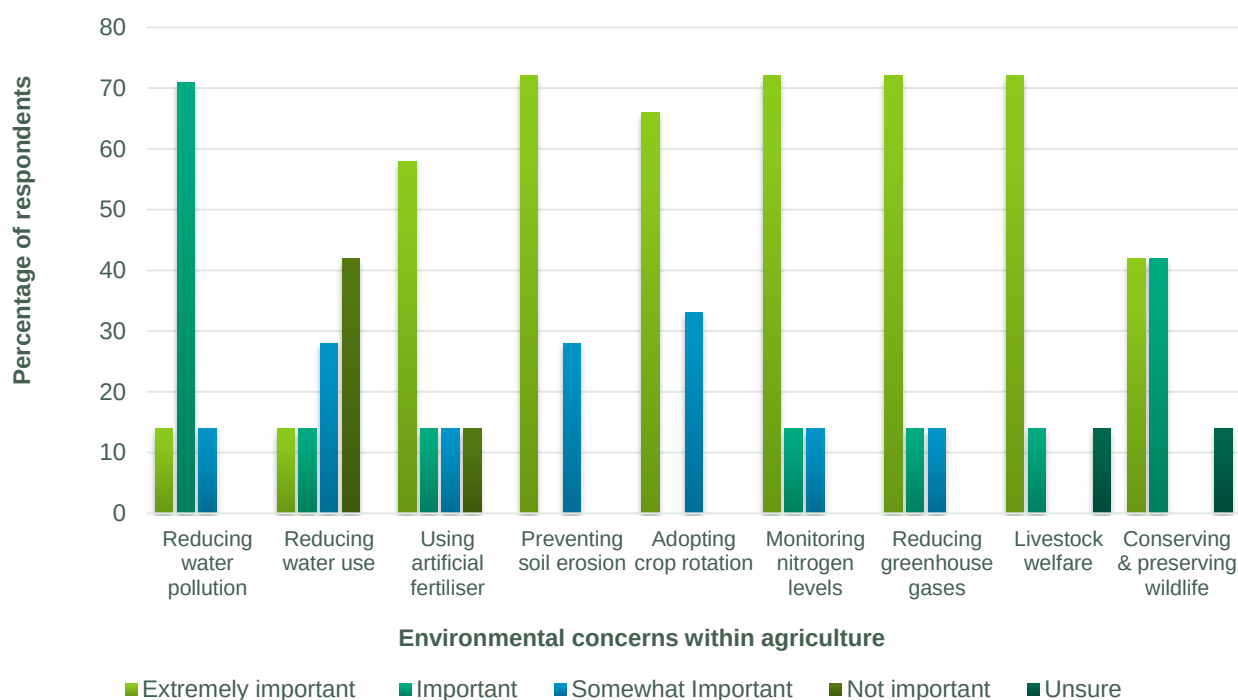


Figure 12: Environmental values of “against Brexit” respondents

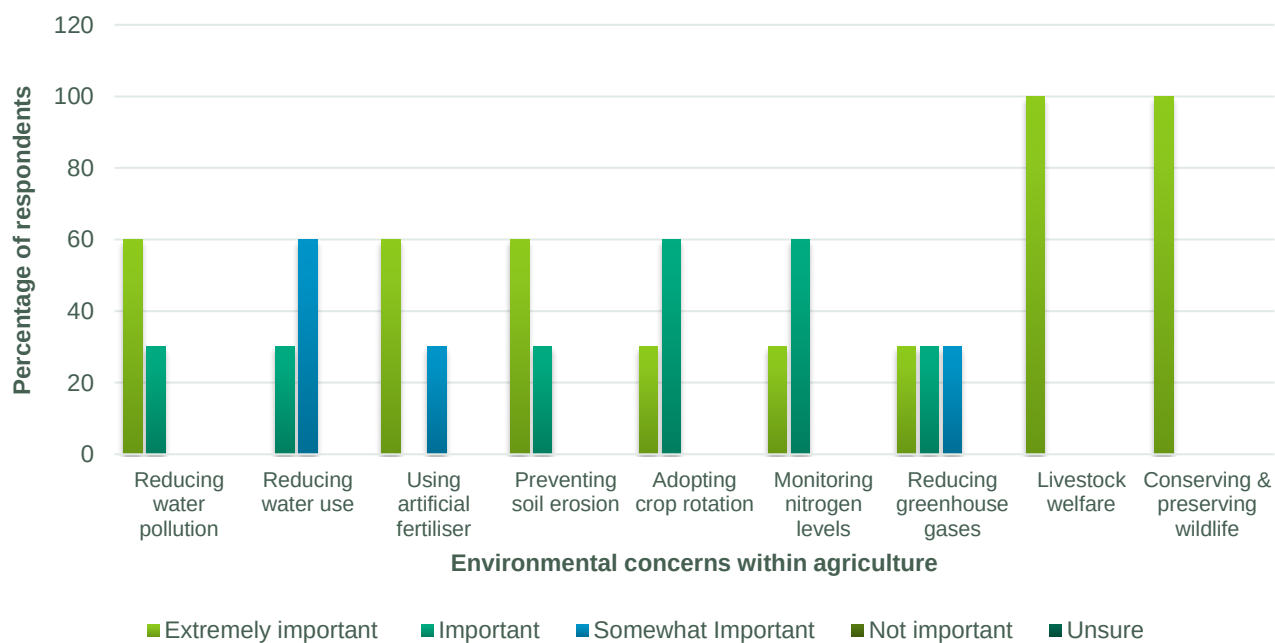


Figure 13: Environmental values of respondents with no political preference

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However, in relation to the effect of politics, policies have been argued to affect SRs of the environment over time. Michel-Guillou 2006b proposes that policies only affect the peripheral sphere of SRs and pose little influence to behavioural changes (Michel-Guillou, 2006b). To disagree with this argument, previously it was stated that policies would be necessary for farmers to improve their environmental behaviours due to the focus on incentives. The research supported this through the following examples: 1) 75% believed the EU had determined their farming practices and; 2) 75% of farmers believed that their farming practices were likely to change as a result of Brexit. These examples indicate that policy is incredibly influential with regards to behaviours for the majority of farmers, despite being described as forming part of the peripheral sphere by Michel-Guillou 2006b. However, there was no apparent connection between these responses and political affiliation or values of the environment. This suggests that while policies may have an effect on behaviours, it could be possible that they alter the peripheral structures of SR as proposed by Flament (Rateau, et al., 2012). A further study would be necessary to decipher if policy sits in the peripheral structure of SRs, in order to prove this point by Flament. Furthermore, a long-term study would be necessary to determine if practices changed when new policies such as the Agriculture Bill 2019-2021 are underway. It would also be beneficial to understand if this policy influences representations of the environment or political standpoint over time.

Furthermore, to assess the success of policies, arguments such as that of Gosling and Williams 2010 can be explored. It is proposed that the acceptance of policy ensuring environmental protection (Gosling & Williams, 2010). However, the results could neither prove or disprove this theory, as the respondents were divided. Among the 75% of farmers who believed that farming practices were likely to change after Brexit (Q13), 35% had a positive outlook. They gave positive reasons such as the ability to adopt diversification on the farm, enabling new entrants into the sector and an opportunity to be more sustainable again showing an acceptance of changes. That said, 40% had a negative outlook for this change.

A SR was not evident regarding policy and political affiliation or environmental value. This could therefore, be related back to top-down/bottom-up approaches. It implies that policy is necessary for some farmers, but despite an absence of acceptance, policy will alter practices. What is unclear is the acceptance of the Agriculture Bill 2019-2021, which was not mentioned in the majority of questionnaires. However, the interview participants expressed that the Agriculture Bill 2019-2021 would be successful and conveyed a sense of hope for its aims. A study would be beneficial in exploring the acceptance of the Bill, to determine if an acceptance of policies ensures environmental protection (Gosling & Williams, 2010).

Also concerning political change, Guerrier 2006 offers that understanding the consequences of change are essential factors to consider when determining SRs of specific issues (Guerrier, 2006). This was reflected in the results. Despite having positive and negative outlooks in question 13, 20% of respondents stated that the uncertainty around Brexit made their opinions inconclusive. A further 10% simply stated that they were unsure. Additionally, with regards to question 15, 30% stated uncertainty about the potential of Brexit to include environmentally-friendly practices. This could be related back to the criticisms and uncertainty surrounding the Agricultural Bill. In this case, it is difficult to determine the fate of the environment when considering Brexit as the consequences of the political change are still unknown.

Changes in the form of environmental initiatives can also form a SR among a group, where a change opposes perceptions of existing land uses (Anderson et al., 2013). This is supported by the results in that all those who suggested the EU had been beneficial to the agriculture sector, unsurprisingly stated that they were “against Brexit”. Additionally, again referring to question 15, there was no clear consensus to suggest Brexit would provide the opportunity for the agricultural sector to adopt practices that considered the health of the environment. In this case, it could be argued that perceptions of pre-existing land uses are evident through this divide. To support Anderson et al., 2013, this divide could suggest that SRs have been formed through an absence of positivity towards environmental practices after Brexit. This also draws attention to other theories such as Michel-Guillou and Guerrier which present history as a prominent factor in forming SRs.

Whilst it is clear that those who identified themselves as “against Brexit” demonstrated a higher value for the environment, overall it seems that political affiliation had little influence on environmental protection. The theories regarding policies highlight that an acceptance could be necessary for environmental protection, and that the top-down approach still is incredibly influential in this sector.

4.5 Summary

To summarise, regarding research objectives 1 and 2, the top-down levels provide both the challenges and solutions for the agricultural sector. To reflect ideas of Michel-Guillou 2006b, challenges and solutions were shared among the farming community, highlighting social representations (SRs) in this instance.

Concerning research objective 3, the thematic analysis demonstrated that by definition, SRs of farmers regarding the environment are evident. However, other social factors such as that of policy and incentives played a prominent role in determining farming behaviours and establishing this connection between the top-down and bottom-up approach.

In terms of research objective 4, among those who identified as “against Brexit” showed more shared beliefs than either those who selected “for Brexit” or “no preference”. This suggested that a social representation could be identified for some, but also highlighted that structural theories of social representation can be influenced by political affiliation.

A connection between Brexit and the environment was only established among those who identified themselves as “against Brexit”. This group demonstrated a higher value for the environment. However, when relating to theories of environmental psychology and top-down, bottom-up approaches, other factors such as policy were influential in farming practices and environmental protection.

5. Conclusion

To conclude, challenges and solutions of the farming community were identified and social representations were evident among farmers with regards to the environment. However, social representations were not identified with regards to political affiliation, with the exception of those farmers who identified themselves as “against Brexit”. This group also demonstrated the connection between Brexit and the environment as they had higher environmental values than any other political group.

Concerning research objectives 1 and 2, the research identified challenges and solutions of farmers, and reflected theories by Michel-Guillou et al., 2006b that these challenges form part of social representation through collective thinking. It was evident that the general challenges faced by farmers, namely markets, were similar to the challenges associated with Brexit. The solutions mirrored this with regards to markets, but also highlighted support networks and consumer education. Connections were also not evident between factors that form social representations set out by Michel-Guillou et al., 2006a (motivations, needs, expectations, values, and experiences), or for farmers within the South West. Furthermore, no connection was evident between these factors and social contexts: Brexit or the environment.

With regards to research objective 3, the formation of social representations concerning political affiliation was unclear. Those farmers who identified themselves as “against Brexit” had demonstrated strong majorities in the political section of the questionnaire. However, social representations were not evident for those who identified as “for Brexit” or had no political preference.

To reference research objective 4, the environment was of concern for the majority of farmers and this was supported by interview participants. However, incentives were identified as playing a prominent role for farmers with regards to environmental protection. That said, those “against Brexit” had higher environmental values than the other two political groups. This research demonstrated that factors influencing social representations can be related to theories outlined in the literature review surrounding: traditional farming cultures in the UK, policy acceptance and also a rooted history of land use perceptions.

Other factors such as approaches to sustainable behaviour and environmental psychology were also evident in this research. The balance between top-down and bottom-up approaches was argued by the majority of authors within the literature review. However, the research suggests that there is a clear gap between the two levels. It identified that at this point in the evolution of agriculture in the UK, a top-down approach consisting of incentives is necessary for environmental protection within the sector. In relation to environmental psychology, the behaviours of farmers were determined by incentives, policy and financial capacity, despite their awareness of environmental concerns.

Conclusion

This research has provided the basis for establishing social representations among farmers with regards to political change and environmental protection. Additional studies could be conducted in order to assess the social representation of the natural environment for farmers aside from the connection with their occupation. Furthermore, additional studies could also be conducted to assess potential changes in social representations and farming practices given new policies such as that of the Agriculture Bill 2019-2021.

This research has been conducted to highlight the effect the agricultural sector has on the environment. In a global situation where food security is challenged, and the environment is under threat, political changes such as Brexit, provide an uncertainty and an opportunity to address such issues. With the agricultural sector occupying 71% of land mass in the UK, environmental protection within the sector is of the utmost importance.

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Appendices

Appendix 1: Previous study: social representations among Maltese farmers

During the research process, the research question was changed. The initial question was formed in collaboration with Friends of the Earth Malta. It was based around the social representations (SRs) of farmers in Malta with regards to their occupation and the environment. However, due to unexpected structural and financial changes within Friends of the Earth Malta, the project was no longer possible. The question was then changed to assess social representations in the United Kingdom in the agricultural sector. The rationale and methodologies for the previous question are outlined below.

Social representations among Maltese Farmers

1. Introduction

1.1 Contextual Overview

Sustainable agriculture

Agriculture is deemed an incredibly important factor to consider in the face of environmental change and the current state of the global environment. Sustainable agriculture can facilitate progress in all three of the pillars of sustainability (economy, environment and society), “by making a vital contribution to urgent challenges such as reducing poverty, ensuring food security and protecting biodiversity” (European Commission, 2012). At its core sustainable agriculture reflects the idea of the Sustainable Development Goals, in meeting the needs of the present and ensuring a better world for future generations, through socially and environmentally responsible behaviour (Rainforest Alliance, 2019).

That said, agriculture is also one a vulnerable sector. It falls victim to environmental changes such as climate change, which can prevent crop growth due to extreme changes in weather conditions, and therefore having a knock-on effect on livelihoods and local communities who rely on such produce (Fujisawa et al., 2015). Additionally, agriculture also experiences many other stressors such as change in economic, markets, labour availability, national policies (Fujisawa et al., 2015), and a change in market demand from consumers (Friends of the Earth Malta, 2017).

Agriculture in Malta

Agriculture in the Maltese Islands consists of land farmers (arable and irrigated farming) and livestock breeding made-up of small-land holdings (Atriga Consulting Services, 2018), but like many other islands, faces issues of land constraints and a lack of varying natural environment that can provide a variation of crops (Galdies et al., 2016). Additionally, globalisation can cause a high demand for products that are not locally grown, making market demand another challenge for such a small island (Galdies et al., 2016).

With regards to the environment, the State of the Environment Report 2018 highlighted that agriculture in Malta has a number of adverse effects on the natural environment (Table 14).

Table 14: Environmental threats by the agricultural sector in Malta

Environmental Aspect	Threat by Agriculture
Land	• Soil erosion: 19.3% of Malta at risk of moderate to severe soil erosion • Replacing eroded soils and maintain soil quality incurs costs of over 65% of the average yearly revenue from Maltese Utilised Agricultural Areas • Soil erosion poses threats to the sustainability of agriculture as a sector • 51.3% of land cover is consumed by agricultural activity
Water	• High levels of nitrate concentrations in inland surface water • Agriculture is one of two sectors that have the highest demand for groundwater • A polluter of coastal waters (run-off)
Air	• Agriculture is one of two sectors that are described as main contributor to methane emissions, 19.8% • 72.3% of nitrous oxide emissions stem from agriculture (fermentation, manure management, soils)
Natural Resources	• Agriculture is one of five sectors associated with the highest resource consumption.

(Environment & Resources Authority, 2018)

However, the Attitudes of Europeans Towards Biodiversity Report 2015 found that Maltese people considered environmental issues as being a serious issue within their state, and over half of the respondents recognise that land use changes can have negative economic impacts, especially within the agricultural sector. That said, 11% of respondents consider that economic development should be more of a priority than nature preservation (Environment & Resources Authority, 2018).

From an economic perspective, agriculture constitutes 1.3% of total Gross Added Value, highlighting a low economic contribution. In 2014, 1.5% of the employed population undertook work in the agricultural sector, including 19,065 employees who were “actively engaged” in production. However, it is also forms part of the food production, culinary tradition and supports the tourism industry (Atriga Consulting Services, 2018).

Socially, Maltese agriculture has strong roots. Traditional “family farm units” make up the majority of situations in farming, where land can be collectively owned by family, is passed on to the next of kin and provides the family with their own food, making a living purely from the profit after their own means have been considered (Atriga Consulting Services, 2018). Recent constraints include an aging population, lack of interest from younger generations and

With regards to policies, for the period between 2014 and 2020, the Common Agricultural Policy (CAP) allocated €134 million was split between CAP and Rural Development Programme (RDP). The CAP consisting of €37 million, prioritised increasing job prospects, sustainability and modernisation, and increase in the sizes of land holding, whilst the RDP, consisting of €97 million, prioritised environmentally-friendly farming and improving biodiversity, water and social quality and reducing the effects of climate change (Atriga Consulting Services, 2018).

1.2 Previous studies

Authors such as Michel-Guillou have aimed to understand SR within agriculture by conducting multiple studies focusing on environmental commitment and general resistance to change among farmers (Michel-Guillou et al., 2006a; 2006b; 2009; 2011; 2012), as well as specific areas of agriculture such as pesticide use (Zouhri et al., 2016) or water management in France (Michel-Guillou et al., 2006a). The studies use the basis of social representation theory to determine the behaviours towards the environment, basing the idea of social representation on social concepts such as “motivations, needs, expectations, values, and experiences”. Similarities exist between these studies and research put forward by Buijs et al. 2011, which suggest that cultural aspects such as values, beliefs and experiences form the structure of social representations (Buijs et al., 2011). This research will use these concepts to understand the social representation of farmers and as reasons for their behaviour towards the environment, as well as their perception of the environment.

Specific to Malta, a study was conducted by Galdies et al. 2016, that assessed the perceptions and beliefs of climate change for both crop and livestock farmers in order to measure their willingness to adapt to this environmental change (Galdies et al., 2016). Whilst this study focused on perceptions and beliefs, it did not consider social representation, and underlying causes of this willingness or reasons for these perceptions. This research will aim to understand the socio-psychological causes for perceptions and highlight whether there is link between the socio-psychological factors such as social representation and behaviours/willingness to adopt new practices.

1.3 The problem and the rationale

In Malta, the National Agricultural Policy for the Maltese Islands 2018-2028, was established to implement more sustainable practices in Malta and build on previous strategies initiated in 2013. It stated seventy policies measures that would assist in improving sustainability, by addressing the three pillars of sustainability: economy, society and environment (Atriga Consulting Services, 2018). However, the report outlined the current agricultural situation and a number of challenges that are preventing development such as: 1) increased market competition after European Union Accession; 2) an aging population of farmers that maintain traditional farming methods and; 3) water scarcity, increasing land prices due to urbanisation and soil erosion (Atriga Consulting Services, 2018). Additionally, the report highlighted more constraints that fell

under the social sustainability pillar in comparison to economic and environmental challenges.

The number of organic farms in Malta, deemed to be the “sustainable option”, is very low. In 2017 the number of certified organic farmers within Malta consist of fourteen, and among 11,689 hectares of utilised agricultural area, only 21 hectares are registered as organic (Atriga Consulting Services, 2018). Whilst that does not constitute those farmers who may use more sustainable practices, the demand and awareness of sustainable options is outgrowing the number of farmers responding to this change, and there is a divide between those concerned with the quality and the quantity of products (Friends of the Earth Malta, 2017).

These challenges could be described as being induced by institutions such as historical and current politics/governments, the wider political sphere such as the European Union, but also farmers as a social group acting as an institution based on their shared beliefs. Aspects of environmental psychology such as social representations can be used to explain the challenges and obstacles that are created by social groups through common psychology or “common sense” (Michel-Guillou et al., 2006a). These self-induced obstacles can therefore prevent or cause particulars behaviours that reflect a certain representation.

The rationale of the research is to provide a holistic view of the obstacles of sustainable development implementation from a bottom-up perspective, rather than focusing on market or governmental efforts, whilst identifying what farmers perceive to be the solution to these obstacles. It will build on previous research that explores the influence of social representations on behaviours towards the environment, and will aim to address if social representations are a contributing factor to the limited sustainable agricultural efforts in Malta, and whether these will have an influence on the proposed solutions.

1.4 The research objectives

The overall aim of the research is to discover if social representation contributes to the reason for particular farming behaviours among Maltese farmers, and to discover what farmers believe to be the solutions to the challenges. Additionally, the research includes more concise aims:

- 1) Assess if there is a difference in social representation of the environment between conventional farmers and farmers who use more sustainable practices.
- 2) Assess the environmental values of farmers
- 3) Discover what the challenges and solutions for farmers are

1.5 The hypothesis

The hypothesis for the research suggests that there will be a difference between the social representation of the environment for conventional farmers and those farmers who use more sustainable practices.

The research will hypothesise that for conventional farmers, the social representation of the environment will be that it represents a platform for employment, income, whilst focusing on the quantity of products, as well as suggest that solutions to their challenges will reflect the social hardships within Malta.

Moreover, it will also hypothesise that for farmers using more sustainable methods, their social representation of the environment will be that of protection, whilst the solutions to their

challenges will relate to quality of products and more efforts to promote the health of the environment.

1.6 The contribution to literature

A set of comprehensive literature expresses how social representations can influence behaviour towards the natural environment. However, there is a gap that exists between the reasons for behaviour and the solutions to challenges provided by the subject. This research will contribute to debates by considering the solutions to agricultural challenges by farmers, which can then be related to their social representation on the basis that these are formed by experiences, values, histories and other social factors, as explained in the literature review in the following chapter.

2. Methodological Review

The methodology for this study will principally include qualitative approaches due to the nature of assessing social factors (such as opinions, beliefs), (Table 15).

Table 15: Selected methodologies for each research objective for Maltese Study

Research Objective	Methodology
1) Assess if there is a difference in social representation of the environment between conventional farmers and farmers who use more sustainable practices.	✓ Interview ✓ t-Test
2) Assess the environmental values of farmers	✓ Interview ✓ Word Association test ✓ t-Test
3) Discover what the challenges and solutions for farmers are	✓ Interview

2.1 Interviews

In order to achieve all of the research objectives, it is important to understand the reasons behind the current farming practices and beliefs/opinions of farmers with regards to best (most effective/fruitful) practices and the environment, as well as their values based on social representation measures named by Guillou-Michel & Moser (values experience, motivations, values, expectations and needs). It is also important to understand the systems already in place, and potentially systematic boundaries for farmers.

Questionnaires could be utilised; however, interviews will provide for a more insightful response. Questionnaires only provide limited amount of information, from which answered cannot be clarified or guided (Frey & Oishi, 1995). Additionally, is it more difficult to make assumptions regarding responses and it is more difficult to take them at face value (unlike interviews) due to the lack of personal response (attitudes, behaviours during interview) (Mishler, 1991).

Semi-structured interviews as well as the use of narrative interviews will be run in conjunction with Friends of the Earth Malta, who have already established connections with farmers across Malta, in order to provide a sense of familiarity and to remove all sense of suspicion from farmers regarding the research. These styles of interview will be utilised in order to allow farmers to fully express their meanings and to provide the opportunity to ask question in a more conversation style interview (Guerrier, 2006). Interviews could be conducted as group interviews for farming cooperatives in order to save time for them and for research purposes as the personnel involved are likely to be in cooperation and have the same goals. However, coordinating a group interview would be challenging as devising a time and place for each participant to meet may be difficult due to availability. In this case individual interviews will be the chosen method, as this can be achieved during the data collection phase and will not negatively affect results in terms of time. Upon completion of the interviews, bias will be considered based on the participants' occupation and their responsibility to prevent jeopardising their position through speaking on a personal basis, potentially influencing the results. For example, the participants could defend previous initiatives, be passionate about current ones and be overly optimistic about future plans.

2.2 Word Association Test

Word association tests are endorsed by authors such as Lo Monaco et al., 2016 and Michel-Guillou et al., 2006, as an approach to identify whether or not a subject values certain objects due to the spontaneous nature of the test identifying their immediate associations (Lo Monaco et al., 2017; Michel-Guillou et al., 2006). These tests will be used in order to decipher farmers' ideas behind the natural environment, including some the challenges presented by the Environment & Resources Authority in 2018.

2.3 Pilot Study

A pilot study will be included to clarify questions and sequences, in order to allow for adjustments and improvements, (e.g. additional questions) before the interviews will take place. It will be used to develop and assess the interviews in order to ensure they are suitable for the research, to demonstrate as well as help to determine the feasibility of the study, and whether the results can be easily analysed (Connelly, 2008). The pilot study will be conducted using a sample size of 10% of the total of intended respondents, as recommended for social research (Connelly, 2008).

2.4 Analysing Results

Thematic analysis will be used to analyse interview responses, due to the nature of the research. By "searching, reviewing and defining themes" (Blaxter et al., 2010), the research will aim to discover the representations and perceptions of two distinct groups by finding comparing trends in opinions and affiliations.

As the hypothesis suggests, a t-Test will be used in order to compare the differences in these results between conventional and more sustainable farmers with regards to: firstly, their social representations around their occupation; and secondly, their interpretations of the natural environment. The t-Test will provide the study with whether or not a significant statistical difference can be found between the two groups, in order to imply how different these social representations are.

Appendix 2: Interview questions used in methodology



Interview Questions for Representatives

Purpose of Interview:

The research aims to understand the social representation of farmers with regards to the environment and BREXIT. It will use **8 questions** to understand the ideas of Brexit and the natural environment, as well as challenges within agriculture, and the solutions to these from an organisational perspective.

Disclaimer: Responses will remain anonymous and will not be linked back to the organisation of which you represent. Every participant has the right to:

- 1) Ask questions about the research and have these sufficiently answered.
- 2) Withdraw their information from use at any time.

Which organisation are you representing?

Questions

1. Do you think being part of the European Union has determined farming practices? Can you give reasons for your answer?

2. Do you think the EU has been beneficial to the agricultural sector? Can you give reasons for your answer?

3. Do you believe practice methods among farmers are likely to change now we have left the European Union? Can you give examples for your answer?

4. Do you believe BREXIT will provide an opportunity for farmers to adopt farming practices that will consider the health of the natural environment?

5. What do you consider to be the challenges for farmers?

6. In your opinion what are the solutions to these challenges?

7. Do you think the new Agriculture Bill will be successful in this?

8. What are the gaps in the new Agriculture Bill?

END

Thank you for taking time to complete this survey. Your responses are greatly appreciated.

Appendix 3: Questionnaire used in methodology

Social Representation of Farmers: Brexit and the Environment

The research aims to:

1. Assess the social representation of farmers with regards to BREXIT
2. Assess the social representation of farmers with regards to the environment
3. Understand the values of farmers, motivations, support networks and challenges of agriculture
4. Discover the solutions to these challenges from a farmer's perspective

Social representations are a set of values/motivations/opinions that are shared by a group with a common interest.

The research will aim to provide a platform for farmers to express their opinions on Brexit, the natural environment as well as what they perceive to be the challenges and solutions within the agricultural sector.

Disclaimer:

The research will be conducted completely anonymously, and will not ask for personal details. Every participant has the right to:

- 1) Ask questions about the research and have these sufficiently answered.
- 2) Withdraw their information from use at any time.
- 3) Refuse to answer any of the questions. To do this, please write N/A in the box.

1. What is your age?

- ☐ -18
- ☐ 18-25
- ☐ 26-35
- ☐ 36-45
- ☐ 46-55
- ☐ 56-65
- ☐ 66+

2. What is your gender?

Enter your answer

3. In which region of the UK do you farm?

- ☐ Scotland
- ☐ Northern Ireland
- ☐ Wales
- ☐ North West
- ☐ North East
- ☐ Yorkshire and the Humber
- ☐ West Midlands
- ☐ East Midlands
- ☐ South West
- ☐ South East
- ☐ East of England
- ☐ Greater London

4. How long have you been involved in agriculture?

- ☐ Less than 1 year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ More than 10 years

5. What motivates you in your career?

Enter your answer

6. Do you feel supported in your occupation? Can you give reasons for your answer?

Enter your answer

7. What do you consider to be the challenges of farming in the UK?

Enter your answer

8. In your opinion what are the solutions to these challenges?

Enter your answer

9. Please tick the box that indicates the degree to which you agree with the following statements:

	Disagree	Neither agree or disagree	Agree	Unsure
Agriculture contributes to the economy of the UK	☐	☐	☐	☐
The quality of produce is important	☐	☐	☐	☐
Achieving the highest yield/quantity of produce is important	☐	☐	☐	☐
Farming is a secure career	☐	☐	☐	☐
Agriculture can provide food security for the UK	☐	☐	☐	☐
Foreign imports are a threat to agriculture in the UK	☐	☐	☐	☐
UK exports are necessary for agriculture in the UK	☐	☐	☐	☐

10. Which best describes your political preference?

- ☐ For BREXIT
- ☐ Against BREXIT
- ☐ No preference

11. In your opinion, has being part of the European Union determined your farming practices? Can you give reasons for your answers?

Enter your answer

12. Would you say the European Union has been beneficial to the agricultural sector in the UK? Can you give reasons for your answer?

Enter your answer

13. Do you believe your farming practices are likely to change once Britain leaves the European Union? Can you give examples/reasons for your answer?

Enter your answer

14. Do you believe BREXIT will create more challenges for the agricultural sector? Can you give reasons for your answer?

Enter your answer

15. Do you believe BREXIT will provide an opportunity for the UK to adopt farming practices that will consider the health of the natural environment?

Enter your answer

16. Do you consider the environment to be important to protect? If YES, in what way?

Enter your answer

17. Do you think the agricultural sector can improve the state of the environment? Can you give reasons for your answer?

Enter your answer

18. Do you consider your current practices to be environmentally friendly? Can you give reasons for your answer?

Enter your answer

19. In your opinion, has there been any incentive or pressure to alter your practices to become more environmentally friendly? Can you explain further?

Enter your answer

20. Please tick the box that indicates how important you think the following topics are

	Not important	Somewhat important	Important	Extremely important	Unsure
Reducing water pollution	☐	☐	☐	☐	☐
Reducing water use	☐	☐	☐	☐	☐
Using artificial fertiliser	☐	☐	☐	☐	☐
Preventing soil erosion	☐	☐	☐	☐	☐
Adopting crop rotation	☐	☐	☐	☐	☐
Monitoring nitrogen levels	☐	☐	☐	☐	☐
Reducing greenhouse gases	☐	☐	☐	☐	☐
Livestock welfare	☐	☐	☐	☐	☐
Conserving and promoting wildlife on the farm	☐	☐	☐	☐	☐