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# **Brexit, Beef, and Beans: A Sustainable Food-system Approach for the UK**

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Declaration

I, Emily Jayne Holmes, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Signature.....

Date.....



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## **Abstract**

Humans have become the leading cause of planetary changes, threatening the very earth systems that life depends on. Scientists have identified the global food-system as pivotal in both causing and addressing environmental challenges, highlighting a need to reduce global meat consumption and increase plant-based diets. Yet by fixating on dietary recommendations, much of the focus remains at an individual rather than a food-system level. However, Britain could shift the responsibility from the consumer by reshaping Britain's agricultural production once released from European Union rules. The proposed post-Brexit Agricultural Bill (2017-2019) recommends providing financial support to farmers who promote "environmental enhancement, protection and enjoyment" (Defra, 2018b, para 20), presenting an opportunity to support environmentally friendly farming while reducing Britain's livestock-centred farming approach. Thus, the purpose of this thesis is to address two objectives. Firstly, a literature review reveals how reducing livestock and increasing pulses would support the British government's sustainable food-system goals by reducing emissions and fresh water use, supporting biodiversity, promoting UK citizens' health, and furthermore would come at a time when UK consumers are increasingly ethically motivated to shift to plant-based diets. Secondly, a case study interviewing farmers in Shropshire identified potential challenges and leverage-points for this transition to take place. Discussing the past, present and future of farming with farmers provided insight on the interweaving roles that the British government, the market, and farmers' identity play in influencing agricultural trajectory. This study found that while farmers were adaptable to changing circumstances, to encourage a shift they would need to view changes as both possible and profitable. Government has the potential to increase farmers' confidence in pulse's possibility and profitability by funding research on pulse-cultivation in the UK, providing financial incentives through public goods payments, and stimulating a market by serving pulses in all public canteens. Furthermore, by aligning recommendations with farmers' appreciation of biodiversity, the government could harness farmers' support to re-shape Britain's agricultural trajectory. Finally, as the majority of British farmers are nearing retirement, government should encourage a new generation of pulse farmers to enter the farming profession.

## Foreword

I first considered researching sustainable agricultural transformations after reading the Vegan Society's 'Go Green' campaign report (The Vegan Society, n.d.a), which promotes a shift from livestock to increased protein-crop cultivation in the UK. Since reading the report, I have witnessed growing momentum not only from animal rights organizations, but also from respected researchers warning that the global food-system needs drastic changes, with a focus on reducing meat consumption (Godfray et al., 2018; Springmann et al., 2018; IAP, 2018). These appeals come at a pivotal time for the UK, when politicians and public are debating what post-Brexit Britain could look like. Although Brexit has polarized opinions casting doubts over the nation, the silver-lining is a unique opportunity to re-shape Britain's agricultural model once released from EU rules. Thus, this thesis's premise is for the UK to embrace an opportunity to shift from livestock-based agriculture to pulses, in order to secure a sustainable future for Britain's food-production.

Although this premise is backed with research, it is a perspective still deemed by some as radical, thus making it vital to present my findings as objectively as possible. Although personal values and biases are often present within research, meaning research can never be value free, it is important to be reflexive by acknowledging one's positioning, and not allowing personal values to enter unchecked into the research process (Bryman, 2016). As an environmental studies student I have personal standpoints to consider when interpreting this study's findings. Firstly, I am personally connected to livestock farming through my family. Contrastingly, for the past 14 years I have followed a vegan lifestyle. Therefore, although I acknowledge my perceptions as a vegan environmental studies student, I also feel connected to farming, and value both farmers' livelihoods and their perspectives. Both potentially conflictual aspects of my past and present history may influence my interpretations and therefore I present my positioning, whilst attempting to clearly convey my research and analysis process to the reader. Considering reflexivity, I believe it also necessary to explain my terminology choices regarding the animals referred to as livestock. Oxford living dictionaries (n.d.) describe livestock as "farm animals regarded as an asset". While from a moral standpoint I do not view animals as assets, the term livestock has been used throughout this thesis to aid the reader's understanding.

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# 1. Introduction

Humans have become the leading cause of planetary changes, entering the Anthropocene epoch. Studies warn that the Anthropocene is placing pressure on the environment, threatening the very earth systems that life depends on (Rockström et al., 2009). Scientists have identified the global food system as pivotal in both causing and addressing these environmental challenges (Springmann et al., 2018; IAP, 2018; Lang & Heasman, 2015). Moreover, without drastic food-system change, projected global population and income growth is predicted to further intensify food-related environmental pressures by 50 to 92 % over the next 30 years (Springmann et al., 2018).

To mitigate these pressures, more sustainable food systems must develop. As a leading contributor to climate change (EPA, 2017), biodiversity loss (Steinfeld et al., 2006) and nitrogen pollution (Bouwman et al., 2013), meat is at the heart of this challenge. Yet despite livestock contributing 72-78% of all food-related greenhouse gas (GHG) emissions (Springmann et al., 2018, p. 520), meat consumption is rising globally, and is projected to continue doing so (OECD/FAO, 2016). In a call to reverse this trend, scientists and governments alike are increasingly promoting flexitarian and plant-based diets for their significantly smaller ecological footprint (Springmann et al., 2018; Tilman & Clark, 2014; Chaudhary, Gustafson, & Mathys, 2018) and their dietary health benefits (Mudryj, Yu & Aukema, 2014; Schepers & Annemans, 2018). Thus, by integrating the environment and human health, plant-based *diets* have become a central food-system focus, gaining momentum in scientific and governmental spheres.

However, by fixating on dietary recommendations, much of the focus remains at an individual rather than a food-system level. This is an issue when food production and not food consumption creates most environmental damage. Thus, criticising dietary choices rather than the food produced creates a gap that will need filling for food system transformation to take place. As livestock emissions are “to a large extent, inherent characteristics of the animals themselves” (Springmann et al., 2018, p. 521), the only way to significantly lower these emissions is to reduce and replace meat production. As a healthy and nutritious protein and iron source, pulses present an appealing alternative to meat. Despite centuries of providing a primary food source for cultures around the globe, pulses nutritional content has been largely undervalued (FAO, 2016). Consequently, the United Nations (UN) took steps to reinvigorate pulses’ profile by naming 2016 *International Year of Pulses*. In addition to health properties, pulses advance food security at all levels, contribute

to climate change mitigation and adaptation, and enhance biodiversity, among other benefits (FAO, 2017).

Although Brexit polarized opinions in the UK creating political, economic, and social challenges, it has also presented Britain with a unique opportunity to change its agricultural model at a time when scientists are calling for critical food system change. In 2017, 72% of the UK's land was used for agriculture, totalling at 17.5 million hectares (Defra, 2018a). This land is predominantly utilized for livestock farming (Eurostat, 2017) and producing livestock fodder. However, livestock farming may be intensifying Britain's struggles to meet legally binding GHG emission targets (CCC, n.d.), contributing to high biodiversity loss (Hayhow et al., 2016) and adding to nitrogen pollution. With Brexit releasing Britain from European Union agricultural rules, Britain will be positioned to restructure its agricultural system. Speeches by Michael Gove, the British Secretary of State for Environment, Food and Rural Affairs, focus on Britain producing environmentally friendly healthy food, which is predicted to result in Britain's biggest agricultural changes over the last 70 years (Coe, 2018). The proposed post-Brexit Agricultural Bill (2017-2019) recommends dismantling the Basic Payment Scheme (BPS) which provides farmers with subsidies determined by farm-size, and replacing it with public payments for public goods. This translates as paying farmers who promote "environmental enhancement, protection and enjoyment; better animal health and welfare; healthy crops, trees, plants and bees; and preserving rural resilience and traditional farming landscapes in the uplands" (Defra, 2018b, para 20). Thus, the proposed agricultural changes present an opportunity to support environmentally friendly farming, while reducing Britain's livestock-centred farming approach.

Increased pulse cultivation would be a sensible replacement for livestock. UK citizens are increasingly turning to plant-based diets, with one recent report finding that a third of Britons had either a "meat-free or meat-reduced diet" (Waitrose & Partners, 2018, p.6), thus heightening national demand for meat alternatives. Furthermore, most parts of Britain are well suited to growing pulses, and Britain is already the world's top marrowfat and third largest fava bean exporter (The Andersons Centre, 2015). Research also indicates that if Britain's pulse production were to double, a market already exists to absorb the increase (The Andersons Centre, 2015). Therefore, taking advantage of Brexit, the British government could both reduce and mitigate the negative environmental impacts of meat production by focussing on encouraging pulse production as a healthy food and farming alternative.

Despite strong environmental and health motives, it would entail big changes to transition agriculture from livestock to pulses. Britain's current agricultural model is

predominantly subsidy-supported livestock farming, with only a small percentage of farms dedicated to pulses (Eurostat, 2017), and therefore a shift would present challenges. As the main agents of food production, farmers are positioned to support or reject an agricultural transition to pulses. Listening to farmers' perspectives on farming in the UK can therefore bring insight on what motivates or deters farmers from making changes on their farms. Thus, after first presenting a literature review to illustrate why shifting from livestock to pulses would promote a sustainable food-system in the UK, interviews with livestock farmers discussing the past, present and future of farming provide insight on how the government, the market, and farmers' identity shape farmers' agricultural decisions. Through this exploration, this thesis aims to identify both potential challenges and leverage-points for livestock farmers to transition to pulses.

## **1.1 Objectives & Research Questions**

**Objective 1:** To review the sustainability benefits of transitioning from livestock to pulses.

*RQ 1: Why would transitioning from livestock to pulses benefit a sustainable food-system in the UK?*

**Objective 2:** To explore challenges and leverage-points for livestock farmers to transition to pulses.

*RQ 1: What shapes farmers' agricultural decisions?*

*RQ 2: What are the challenges and leverage-points for livestock farmers to transition to pulses?*

## **2. Methods**

The purpose of this thesis is meet two objectives. Firstly, to illustrate why transitioning from livestock to pulses would promote sustainable agriculture, and secondly, to identify potential challenges and/or leverage points for livestock farmers to make this transition. Both objectives entailed different approaches. Thus, my first objective was addressed by presenting a literature review, using secondary sources including peer-reviewed journals, government reports and data sets, and newspaper articles. Whereas to explore my second objective, I chose a qualitative approach conducting semi-structured interviews with five British livestock farmers to form a case-study. The aim of the interviews was not to produce generalizable findings, but to gain insight from a farmer's perspective. I used a flexible design (Nygaard, 2017, p. 25) adapting theory and main themes as the data was collected and analysed, rather than commencing the process with a fixed theoretical framework. However, to aid the readers understanding of my findings, an agricultural framework (section 4) is introduced prior to presenting and discussing interviews with farmers (sections 5 & 6). The agricultural framework provides background and theory for the three central categories which emerged from the interviews: the government, the market, and farmers' identity. Furthermore, using in-depth exploration of the interviews I followed an interpretive approach to "generate propositions about social phenomenon" (Nygaard, 2017, p. 27).

### **2.1 Sampling**

The five interviewed farmers were selected using convenience sampling. A family member helped locate five farmers willing to be interviewed; all farmed cattle, however three farmers also kept sheep, and three grew crops predominantly as fodder for their animals. The farm sizes were 40.5, 44.5, 48.6, 728.5, and 890 hectares (ha), thus the three smallest are of comparable size to 12.8% of farms in the UK, and the two largest are among the top 22.4% (European Commission, 2018). All sampled farms were in Shropshire. I chose not to disclose the gender and age of the sampled farmers, so as not to reveal their individual identities.

### **2.2 Sampling limitations**

Only five interviews were conducted which limits the findings applicability. While there is no definitive acceptable quantity of interviews, Warren (2002) suggests

approximately 20 as the minimum amount required for publishing qualitative interview-based research. However, the aim of this research is not to create generalizations, but to offer insight which may be built upon by gaining a deeper understanding of what shapes farmers' decisions, and delving "more deeply into the nuanced layers of meaning in each interview" (Nygaard, 2017, p. 145). Furthermore, when a population is relatively homogenous, like English livestock farmers from a rural community, Bryman (2012) states that this allows for a smaller sample size. Therefore, the interview questions may illicit similar responses from farmers in other rural communities in England. However, as the purpose is not to generalize findings nor to publish a paper, the small sample size still offers insight into farmers' perspectives on agriculture in the UK.

### **2.3 Interviews**

Prior to conducting interviews, I researched the UK's agricultural model and agricultural transitions to help formulate interview questions. Furthermore, the Vegan Society provided me with a list of questions they had created to ask farmers as part of their Grow Green campaign (The Vegan Society, n.d.a) which I adapted to fit my preliminary research questions. After I had created a preliminary list of interview questions, I colour coded the questions to ensure I was addressing my areas of interest: identity, environment, animals, adaptability and livelihood security. Colour-coding the interview guide into themes enabled me to check the relevance of each question as well as to re-order the questions so that they were more appropriately grouped, allowing for a better flow during the interviews. The interview questions were predominantly open-ended to allow for deeper discussion, and were designed to explore the past, present and future of farming from the interviewee's perspective.

To help prepare for the interviews I watched Gibbs (2013) video clip which showed how to conduct a research interview and provided a clear example of how to approach ethics with the interviewee. Following Gibbs's recommendations, before each interview I first explained that I was an environmental studies master's student conducting research for my thesis. I informed interviewees that for my research, I was looking into the future of British livestock farming post-Brexit and that I was interested to hear farmers' perspectives on farming in general, and how they thought agricultural changes may affect them. I then reconfirmed with the interviewees that they consented to being interviewed. I told them that they could refrain from answering any of the questions, and that the interviews would be

anonymous. I then asked if they were happy for the interview to be recorded. All interviewees consented for the interview to take place and to be recorded. Finally, following the interviews I gave the interviewees the opportunity to ask me any questions.

Prior to the interviews I considered which information I should provide the interviewees, for example, that I was informally discussing my research ideas with the Vegan Society, or that I was looking at challenges for reducing livestock farming and increasing pulse farming. These questions were challenging and required striking a balance between giving full honest information and creating a defensiveness or divide between the interviewee and myself. During the interview “a certain degree of social manipulation is necessary, as is being flexible & sympathetic” (Ehn & Lofgren as cited in Syse, 2009, p. 26). I decided it was vital to inform interviewees that I was an environmental studies master’s student collecting data for my thesis, and to explain that I was looking at the future of British farming as this encapsulates my study topic. Furthermore, as I was still developing the exact direction my thesis would take, I opted to convey the broad theme of my topic rather than presenting the details. Thus, I went into the interviews with an open mind, wanting to hear and learn from the farmers to guide my own thought process.

The decision to obtain verbal and not written consent from the interviewees was deliberate. According to a US study, 13% of respondents were only willing to participate in a survey if they did not have to sign a consent form (Singer as cited in Bryman, 2012). I wanted to create a comfortable environment for the interviewees to speak freely and was concerned that they may not feel at ease if the interview was made more formal by including a consent form, particularly as the sample was acquired via a family contact. Therefore, I chose to obtain verbal confirmation instead.

The interviews took place over a week and were held in locations of the informants choosing. I had considered that the farmers may be busy, and that I may find myself interviewing them whilst following them around a field with a tape recorder; however wet weather during the week of interviews meant farmers had more time and were inside catching up on paperwork. Two farmers from large farms chose to have the interviews held in their office spaces. These two farmers were also mainly responsible for the farm’s office work. The other three interviews took place in the interviewees’ homes. Following one interview, the farmer also took me round their farm, showing me the wildflowers to illustrate the importance of biodiversity to them. I presented interviewees with either liquorice or chocolate to choose from as a thank you token.

As the interviews were semi-structured, I found that all deviated from the interview guide. Although I was concerned interviewees would not want to say much, the opposite occurred with most having a lot to say. Therefore, I had the challenge of ‘guiding’ the conversation without accidentally stifling what was interesting and perhaps relevant information. With limited previous interview experience, I found when transcribing that I had missed certain opportunities to delve further into certain topics.

Although the interview topic was not sensitive in nature, I chose to maintain the interviewees’ anonymity as there would be no great gains for the research from declaring the interviewees personal name, and I believed anonymity would enable the interviewees to speak more freely. I numbered the recordings 1-5, and when transcribing I saved the transcriptions as interviewee 1, interviewee 2 etc. Furthermore, I have not disclosed the interviewees’ ages nor gender. Therefore, I have striven to maintain my claim to the interviewees that their interview would remain anonymous.

## **2.4 Data Collection, Analysis and Trustworthiness**

According to Nowell, Norris, White and Moules (2017), “Trustworthiness is one way researchers can persuade themselves and readers that their research findings are worthy of attention” (p.3). Following Lincoln and Guba’s (1985) four main trustworthiness criteria; **credibility, transferability, dependability and confirmability**, as presented in Bryman (2016) and Nowell et al., (2017), I relate how I analysed my data using thematic analysis, the assumptions that informed my analysis, as well as the methodological challenges I faced, so that the reader has the ability to evaluate the research’s trustworthiness.

Thematic analysis is “a method for identifying, analysing, organizing, describing, and reporting themes found within a data set” (Nowell et al., 2017, p.2) and is an accessible and useful approach for examining research participants perspectives. As described by Bryman (2012), I analysed the interview transcripts sentence by sentence, creating a table with themes and subthemes in the process. For example, I established identity as a core theme, with the sub-themes: *environmental values* and *animal values*. Throughout the data-analysis I adapted the themes, for example, although livelihood security and adaptability were initially my core themes, I found there was a lot of overlap within their sub-themes. Therefore, I created a mind map to see how the sub-themes interacted and found that my data fit better into ‘the government’, ‘the market’ and ‘farmers’ identity as core categories.

Where possible, I triangulated my findings with that of other researchers when discussing the data to improve **credibility**. To further strengthen credibility, I could have presented my findings to the interviewees to check that they agree with my interpretations, however due to the scope of this thesis, cross-checking with farmers was not possible, as it would have required an extra layer of data collection. According to Bryman (2012), the research's **transferability** can be aided with thick description so that others can judge if the findings are transferable in other settings. While I have described the agricultural context, I have not provided a rich description of the research setting so as to maintain the interviewees' anonymity. Furthermore, the aim is to draw insight without claiming that the results are transferable. Another methodological challenge was to achieve dependability. One way to test the research **dependability** is to maintain complete records of the entire research process that peers can scrutinize (Bryman, 2016) however, as limited by the scope of a 30-credit master thesis, it was unmanageable to have my research scrutinized by peers during the process and therefore the research dependability could be improved. Nevertheless, being transparent by detailing my research process should increase the dependability. Finally, to address **confirmability** I presented my values and motivations prior to the introduction (see foreword), so the reader can assess if my values have interfered in the research and findings.

## **2.5 Research limitations**

To clarify the scope of my research, the following paragraph details my two central study limitations. Firstly, I focussed on transitioning from livestock to pulses, although other sustainable food-system options exist. For example, numerous researchers have explored how livestock farming could be sustainable (Kaufmann, 2015; Mark et al., 2014; Pullar, Allen, Sloyan, 2011) and the role pulses could provide as a sustainable fodder (Lüscher, Mueller-Harvey, Soussana & Peyraud, 2014). While demand for meat remains, it could be argued that livestock farming should continue but on a smaller scale. Many would reason that it is better to consume animals raised under higher welfare standards than import animal products from countries with lower welfare standards, and that therefore livestock farming in the UK should be supported. Furthermore, promoting pulses as animal fodder may support sustainable food-systems by reducing dependency on soy-imports which cause environmental degradation in South America (Nordic Council of Ministers, 2016). Although acknowledging that other arguments exist, I chose to focus on an option for a sustainable food-system which considers environment, health and animal ethics simultaneously (see section 3.2) leading me to explore



alternatives to animals as a human food-source. My second major limitation came from choosing to discuss Brexit, as the way Brexit will affect Britain's agriculture remains unknown. Therefore, discussions around Brexit are highly speculative. Despite this, Brexit has opened the possibility for Britain's agriculture to change trajectory, and therefore *now* forms an interesting moment to discuss Britain's agricultural options. Furthermore, independent of Brexit scenario and outcomes, this thesis aims to shed light on what circumstances may inhibit or promote a transition to pulses.

### **3. The sustainable food-system benefits of transitioning from livestock to pulses**

#### **3.1 What is a sustainable food system?**

Food production and consumption choices affect both ourselves and our environment. Put simply, which food, and how food is produced and consumed could on the one hand lead to “a diet related disease and a damaged environment [or alternatively], sustain nature through sustainable food systems” (Pretty, 2002, p.11). Creating sustainable food systems requires moving past the productivist model which guided food supply and policy for the past two centuries. Productivism re-fashioned nature to increase food output, by applying “industrial thinking [...] to control what is essentially biological processes of plants, growth, water, photosynthesis, land and nutrient flows (Lang & Heasman, 2015, p. 26). By applying industrial thinking to food production, productivism successfully met its primary goal of increasing food supply to feed the world’s growing population. However, the environmental costs of industrializing food production, as well as the food’s quality and nutritional value were overlooked resulting in global environmental degradation and diet related poor-health. Thus, the contemporary food system has reached what Lang and Heasman (2015) refer to as a critical juncture, necessitating the creation of sustainable food system models.

Moving away from the productivist model, a sustainable food system requires addressing both health and the environment when making food production choices (Lang & Heasman, 2015, p.1). Although there is largely consensus that a new, sustainable approach to food production is required to address environmental and health challenges, there is debate over how this should be achieved. Two alternative food system paradigms fall at the centre of this debate; the Life-Sciences Integrated paradigm and the Ecologically Integrated paradigm. While the Life-Sciences Integrated paradigm seeks to control nature, the Ecologically Integrated paradigm aims to work with nature (Lang & Heasman, 2015), thus resulting in contrasting perspectives for how sustainable agricultural systems should be developed.

The Life-Sciences Integrated Paradigm is largely known for promoting genetically modified (GM) crops. Since GM crops were introduced in the mid-1990s, they have expanded to cover 170 million hectares of agricultural land (Lang & Heasman, 2015, p. 32) representing 10.6% of the world’s crop land<sup>1</sup>. GM crops claim to increase crop yield and bring environmental benefits through reduced pesticide use, among other benefits (ISAAA,

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<sup>1</sup> Globally crop-land covers 1.6 billion hectares (Dubois, 2011)

2018). However, GM crops continue to be heavily debated in both the public and private spheres partly because the long-term consequences of using GM crops are unknown from a social, environmental and a human health perspective. Despite debate, the Life-Sciences Integrated Paradigm is dominant within research and development, and favoured by many large food companies, therefore presenting a powerful narrative (Lang & Heasman, 2015)

Notwithstanding the Life-Sciences Integrated Paradigm dominance, the Ecologically Integrated paradigm is gaining traction throughout the food-chain, from consumers to producers and businesses. The Ecologically Integrated paradigm seeks connections and collaborations, attempting a move away from the hierarchical structure used by the Life-Sciences Integrated Paradigm (Lang & Heasman, 2015). Thus, the approach is associated with grass-roots and community-based food initiatives and utilizing local knowledge in food production process rather than promoting a blanket policy for all farms. The approach aims to include social, environmental, and economic criteria, acknowledging indigenous knowledge as well as scientific research (Lang & Heasman, 2015, p. 35). Speeches and policy documents released by the British government indicate that the UK will promote a model more akin to the Ecologically Integrated Paradigm following Brexit by providing payments for public goods including ecosystem services, and giving farmers the freedom and flexibility to decide which public goods they will provide.

### **3.2 Why promote livestock to Pulses?**

While there are many ways the British government could encourage sustainable agriculture, a reduction in livestock farming is advisable from an environmental, health and ethics perspective, for which pulses provide an excellent alternative. Livestock farming is increasingly problematized, as the high usage of fresh water, land, and energy for meat production makes meat an “inefficient utilization of plant protein into animal protein” (Kumar et al., 2015, p.923). Furthermore, a recent study by Poore and Nemecek (2018) comprising data from 38,700 farms revealed that even the “lowest-impact animal products” (p. 987) generally carried higher environmental costs than vegetable counterparts.

Shifting from livestock to pulses would be challenging, as livestock is the main farming type for 58.5% of the UK’s farm holdings (Eurostat, 2017). Furthermore, the past few decades saw the scale of livestock farming increase considerably, with approximately a billion farm animals reared each year (Wathes, Buller, Maggs, & Campbell, 2013, p.576). Between 2015 and 2016, the largest increases in farm animals were poultry, which increased

3% to approximately 173 million birds, followed by pigs which increased 2.7% to 4.9 million (Zayed, 2016). Contrastingly, since 1974 the number of cattle has been steadily decreasing (Zayed, 2016), however cattle remain the major livestock species for most UK farm holdings, followed by sheep, poultry and then pigs (Eurostat, 2017). Today there are approximately 10 million heads of cattle in the UK (Defra, 2017, p.14).

Although today livestock is dominant, pulses were also commonly grown prior to WWII (The New Economics Foundation, 2017), yet the introduction of cheap nitrogen fertilizers meant they were no longer required as a nitrogen fixer in crop-rotations, leading to their decline (Saskatchewan, n.d.). Not only pulses, but all arable land has decreased. At just over 6 million hectares, arable land is approximately 1 million hectares lower today than when the UK's agricultural census began in 1875 (Zayed, 2016). Of the crops grown in the UK today, 38% are grown as fodder. Therefore, combining crop for fodder and land for livestock, 85% of the UK's utilized agricultural area (UAA) is associated with meat and dairy production (de Ruiter et al., 2017, p.72).

However, the trajectory may be changing, as in recent years cattle numbers declined and pulse production notably increased. Between 2012 and 2016 pea production rose dramatically by 296% for human consumption and 153% for fodder. Furthermore, the area of field beans harvested increased by 84% to 177 thousand hectares (Defra et al., 2017). A 2017 Defra report states this increase in pulse crops is "due to on-going greening requirements of the Common Agricultural Policy" (p. 49). The UK's most commonly grown pulses include marrowfat peas, large blue peas, yellow peas and fava beans, while other lesser-grown pulses include soybeans and lupins (The Andersons Centre, 2015). Furthermore, the UK is the world's top marrowfat and third largest fava bean exporter (The Andersons Centre, 2015).

Although cattle numbers are decreasing and pulse production is increasing, overall livestock numbers continue to rise, and pulse production remains at a small scale. Therefore, further action is required to accelerate an agricultural shift from livestock to pulses. The following literature review presents environmental, health and ethical arguments to solidify both how this shift would promote a sustainable food system and why urgency is required.

### **3.2.1 Environment**

In 2008, the UK set a historical precedent becoming the first country to set legally binding greenhouse gas emissions (GHG) reduction targets via the Climate Change Act 2008. The act commits to reducing GHG emissions at least 80% by 2050[1]. The government

created the Committee on Climate Change (CCC) to both assess the best ways for the UK to achieve emissions reductions, and to measure the UK's progress in meeting targets (Committee on Climate Change, n.d.). The latest CCC report indicates that despite progress in reducing emissions, the UK is struggling to meet ambitious targets (Committee on Climate Change, n.d.). While the CCC declared substantial emission reductions of 42%, their 2017 report warns the UK is still not on target to meet the 2023-2027 carbon budget (Committee on Climate Change, n.d.) which requires reducing domestic emissions by 3% or more per year.

The agricultural sector is responsible for 10% of the UK's GHG emissions. These agricultural emissions are predominantly composed of methane (57%) followed by nitrous oxide (32%). Methane emissions are mainly released by cattle, while nitrous oxide is predominantly from fertilizer use (BEIS, 2018). The agricultural sector achieved 16% GHG emission reductions between 1990 and 2016, connected to a decrease in livestock numbers (BEIS, 2018). Although most agricultural emissions continue to be released by livestock, the UK's 2008 Climate Change Act focuses on efficiency of management methods to reduce agricultural emissions, and not agricultural type. Reducing livestock farming could help the UK to meet these targets.

Although estimates vary on how much livestock contributes to total GHG emissions globally <sup>2</sup> (Herrero et. al, 2015), livestock remains the leading source of the world's methane and nitrous oxide emissions (Harwatt, Sabate, Eshel, Soret & Ripple, 2017). Additionally, some research suggests livestock produces more emissions than the world's entire transportation sector (EPA, 2017; Harwatt et al., 2017). One reason for livestock's high emissions is their fodder, creating more emissions than crop proteins for human consumption, while also causing 67% of deforestation (Poole & Nemecek, 2018). Furthermore, as animal products are 'prone to spoilage', they have high wastage (Poole & Nemecek, 2018, p. 991). Thus, discussing meat production and consumption is vital in the context of tackling climate change.

Contrastingly, pulses produce vastly lower emissions. Based on 52 studies, Nijdam, Rood and Westhoek (2012) concluded that while a kilo of beef releases an average 25.5 kg CO<sub>2</sub>e, beans release an average of 1.1 kg CO<sub>2</sub>e. Furthermore, pulse's carbon footprint can be up to 150 times lower than meat's (Nijdam, Rood & Westhoek, 2012). A revelatory study by Harwatt et al., (2017) calculated that if beef consumption was substituted with bean

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<sup>2</sup> Estimates range from 8-18% depending on the methodology used (Herrero et. al, 2015)

consumption in the United States, CO<sub>2</sub>e emissions would reduce by 334 mmt, which would achieve 75% of the US's GHG reduction target for 2020 (Harwatt et al, 2017).

Not only avoiding climate change, but adapting to climate change presents a challenge for the future of food production globally. While weather fluctuations have challenged farmers throughout history, climate change is enhancing the severity and uncertainty of weather patterns, which can result in both flooding and drought. Fresh water is particularly concerning in various parts of the UK, where London is one of the world's driest capitals comparable to Israel in terms of water availability per capita (London Climate Change Partnership, 2002). Research suggests the UK will experience widespread water scarcity by 2050, with a predicted deficit of between 5 - 16% of the total water demand (Holmes, 2017). Thus, when making sustainable agriculture choices, the effects of climate change need to be considered.

Globally, agriculture accounts for 92% of anthropogenic freshwater use (Gerbens-Leenes, Mekonnen, & Hoekstra, 2013), with livestock requiring far higher water inputs per calorie than their plant-based counterparts. For example, beef, which is the most water intensive farm animal, requires almost ten times more water per calorie than pulses and 112 litres of water per gram of protein produced compared to 19 litres for pulses (Mekonnen & Hoekstra, 2012). Not only does farming livestock consume more water than crops for human consumption, farm animals also need more water in hotter weather. Therefore, in times of drought livestock place further strain on limited resources, negatively affecting food security. Pulses on the other hand present an excellent crop to mitigate the effects of climate change, thus enhancing food security. Not only do they require less water than other crops, they are also 'hardier' in general, 'withstanding severe weather like droughts and floods [...] thus acting as an unflinching David to the Goliath ravages of climate change' (FAO, 2017, p. 39). Pulses also enhance carbon sequestration in the soil which further contributes to counteracting climate change (FAO, 2017).

Biodiversity is also an urgent concern when considering environmental sustainability of food systems. Biodiverse environments are important for ensuring healthy eco-systems and also crop pollination, yet biodiversity loss has far surpassed its safe planetary boundary (Rockström et al., 2009). Combatting biodiversity loss is an especially crucial challenge for the UK as one of the world's 'most nature depleted countries' (Hayhow et al., 2016, p. 5). Data from a global biodiversity index indicates the UK's trend for species loss continues (Hayhow et al., 2016). Government data on farmland birds is particularly concerning, showing a population decrease of more than 50% since 1970 (Defra, 2017). Bird populations

are referred to as an indicator for the UK's general wildlife status because birds 'occupy a wide range of habitats and respond to environmental pressures that also operate on other groups of wildlife' (Defra, 2017 p. 39) and thus the sharp decline in birds is troubling for biodiversity as a whole. Insect populations have also decreased dramatically, with habitat specialist butterflies declining 74% since 1976 and butterflies in the countryside by 57% (Defra, 2017, p. 40). Agricultural intensification is attributed as the greatest cause for biodiversity loss in the UK. A collaborative study conducted by research and nature conservation organizations indicated that intensified grazing regimes and increased fertiliser, pesticide and herbicide use were among the primary drivers for nature loss (Hayhow et. al, 2016, p. 16).

Arable crops can provide both food and valuable nesting habitats for farmland birds (RSPB, n.d.). Furthermore, pulses provide added benefits being excellent for soil health largely due to their nitrogen fixing ability. Each hectare of pulses adds between 30-40 kg of nitrogen to the soil, requiring little to no nitrogen fertilizer (FAO, 2016) and thus reducing need for harmful artificial fertilizers. By improving soil health, pulses can also improve future yields in crop rotations and also improve ecosystem resilience by heightening crops' ability to 'deal with' disturbances, disease and diseases (FAO, 2017).

Thus, meat production should be reduced and replaced with increased with pulse production to support the environmental sustainability of Britain's food-system, also helping Britain prepare for the effects of climate change. A reduction would reduce GHG emissions helping the UK to meet legally binding emission targets. Furthermore, it would reduce agricultural fresh-water use and promote biodiversity at a time when wildlife is disappearing at an exponential rate.

### **3.2.2 Health**

A sustainable food-system also requires acknowledging the nutritional value of food once consumed. Although productivism achieved its goal by producing more food, it also contributed to global ill health by focussing on output rather than nutrition and food distribution. Despite enough crops for all people, 40% of the world's crops are used as fodder while over 10% of the world population still experiences hunger (FAO, 2012). Furthermore, globally the top causes of death are dietary related (WHO, 2017). Meat is a leading course of dietary related ill-health, associated with increased cancer risks, obesity, and increased mortality (Genkinger & Koushik, 2007; Wang & Beydoun, 2009, Bouvard et al., 2015; Wang

et al., 2016). Thus, there is an imbalance between those who cannot access food, and those who can access food yet have unhealthy diets.

Governments are taking notice of the connection between meat rich diets and common non-communicable diseases, consequently producing dietary guidelines which recommend eating less meat and eating more pulses (Netherlands Nutrition Centre, 2017; ANSES, 2017; Buttriss, 2017). China provides a striking example of addressing meat consumption by announcing ambitious plans in 2016 to curb meat consumption 50% by 2030 (Milman & Leavenworth, 2016). The UK government's 2016 health guidelines are also in line with changing perceptions on meat and pulses. The official guideline's food segment which was previously labelled "meat, fish, eggs, beans and other non-dairy sources of protein" has been replaced with "beans, pulses, fish, eggs, meat and other proteins" (British Nutrition Foundation, 2016). This new positioning illustrates how pulses have moved to the forefront.

Pulses are gaining attention as a valuable health source as they not only provide a rich source of protein, fibre, vitamins and minerals, but they also contain antioxidants and anti-carcinogens (Mudryj, Yu & Aukema, 2014). Accordingly, the United Nations (UN) named 2016 International Year of Pulses based on both their health and environmental benefits. Thus, pulse production should be increased to provide a national food source that corresponds with the UK's dietary guidelines.

### **3.2.3 Ethics**

Although animal ethics are not prevalent in the sustainable food-system debate, animal welfare is the British public's central agricultural concern, and therefore should be acknowledged when making sustainable agriculture choices. When asked in a 2015 European Commission poll what farmers main responsibilities should be, 55% of Britons responded it should be animal welfare (European Commission, 2016). Thus Britons differed from other European countries polled by prioritising animal welfare over food production. However, concern for animal's wellbeing is not limited to the UK. Across Europe numerous governments, including France, Switzerland, Austria and Germany, formally acknowledged animals as sentient beings revealing an increased awareness over animal welfare (Cardoso & Pereira, 2017). Although the British government does not have legislation stating animals are sentient, it has stated that legislation will be introduced after Brexit acknowledging animal sentience and providing stronger sentences for animal cruelty (Ares, 2018).



However not only animal welfare, but debates over using animals as resources are gaining visibility (Erdős, 2015), which question the very use of animals as food in societies where healthy alternatives are readily available. One visible example is the steep increase in vegans<sup>3</sup>, with veganism becoming the UK's fastest growing lifestyle movement (The Vegan Society, 2016). In a recent poll, animal welfare was the primary motive for following a vegetarian or vegan diet (Waitrose & Partners, 2018), which has also been found in other studies on motivations for following vegetarian and or vegan diets (Janssen, Busch, Rödiger, & Hamm, 2016; Jones, 2018)

A reduction in livestock farming to be replaced by pulses would support the British government's sustainable farming goals by reducing emissions, fresh water use and supporting biodiversity. Additionally it would promote UK citizens' health providing a nutritious protein source which corresponds with official food guidelines. Furthermore, if acted upon, this shift would come at a time when UK consumers are increasingly ethically motivated to shift to plant-based diets, and thus pulses would provide a healthy, sustainable, domestic protein food-source.

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<sup>3</sup> The Vegan Society definition for Veganism – *"A philosophy and way of living which seeks to exclude—as far as is possible and practicable—all forms of exploitation of, and cruelty to, animals for food, clothing or any other purpose; and by extension, promotes the development and use of animal-free alternatives for the benefit of humans, animals and the environment. In dietary terms it denotes the practice of dispensing with all products derived wholly or partly from animals."* (The Vegan Society, n.d.b)

## 4. Agricultural Framework

To explore potential challenges and leverage-points for livestock farmers to shift to pulses requires an understanding of key food-system actors which influence farmers' decisions. While farmers referred to multiple actors during the interviews including the National Farmers Union (NFU), **the government** and **the market** appeared most prominently. This corresponds with previous research, for example, Lang & Heasman (2015) describe today's food economy as largely deriving from state and corporate decisions, with the "power off the land frequently [shaping] what happens on the land" (p. 19). In Britain, approximately half of farmers' income comes from government subsidies, grants and schemes, and thus the government holds an influential role. However, as argued by Jack (2007) "supermarket supply chains and [...] corporate agribusinesses" (p. 908) are gaining power in the UK. The British government also recognizes that both government and market will continue to be pivotal for farmers, as farmers' income is obtained both by selling products, and "providing environmental services and benefits that society relies upon, which will be supported by government funds" (Defra, 2018b, para 28). Thus, the government and increasingly the market are key in shaping UK farming decisions. However, in line with previous research (Convery, Robson, Ottitsch & Long, 2012; Burton, 2004) I also found that **farmers' identity** shaped farmers decisions. Accordingly, the government, the market, and farmers' identity emerged from the interviews as three central categories through which interviews with farmers were interpreted. To provide a framework to discuss the interviews in sections 5 and 6, this section gives a background on the government and the markets role in Britain's agriculture, as well as exploring identity theory as connected to farmers.

### 4.1 The Government

The government have held an influential role in Britain's agriculture since the middle ages, when 12th century Corn Laws sought to protect domestic food production by regulating grain imports (Encyclopædia Britannica, n.d.). From the sixteenth century Britain embraced mercantilism; encouraging national production, promoting exports, and creating barriers on imports (Frieden & Lake, 2002). This ensured Britain's power and control over international trade at the expense of other nations, in what has been described as a "zero-sum conflict" (Frieden & Lake, 2002, p. 69). After eight centuries, the Corn Laws were repealed in 1846 paving the way for free trade, taking a brief step away from Britain's protectionist traditions.

From 1850 - 1875 Britain's agriculture grew rapidly, thus entering what has been described as a 'golden age', however this golden age collapsed when advancing technology in transport and refrigeration in the late 19th century allowed for international imports to replace domestic production (Harvey, n.d.). This led to a low period in domestic food production, which sparked a return towards protectionist policies. Following WWII, Britain prioritised food security by boosting domestic food production to enhance self-sufficiency. Enhancing livelihood security for farmers, the Agriculture Act introduced in 1947 provided farmers with guaranteed produce prices, committing the government to supplement any differences between the government-established *guaranteed-price* and the market price for agricultural goods. Mirroring global agricultural trends of that time, Britain followed a productivist model whereby the aim was to produce as much food as possible.

#### **4.1.1. Entering the EEC**

A productivist model remained in place when the UK entered the European Economic Community (EEC) in 1973, which integrated Britain into the EEC's Common Agricultural Policy (CAP). The CAP was conceived in 1962, with agriculture initially using 80% of the EU's budget (Institute for Government, 2017) illustrating the importance of food self-sufficiency in post-war Europe. The CAP's main aims were to increase production, while also providing affordable food and raising farmers' incomes (Wilkie, 2010). While the CAP was highly successful at increasing agricultural output, food surpluses became an unintended consequence due to overproduction. These food surpluses led to the *dumping* of food in 'third world' markets, which disrupted these countries' local agricultural production (Institute for Government, 2017). Furthermore, the intensified farming methods implemented to boost production had degraded the environment (Wilkie, 2010). Following criticisms over the CAP's high-production centred model, the CAP was modified in 1984 to balance production levels (European Commission, n.d.a). Also, by the 1990's farmers were encouraged through their direct-aid payments to be more 'environmentally friendly' (European Commission, n.d.a). Although entering the EEC gave financial support to farmers, Thatcher's governance (1875-1990) promoted a path of free-market support and privatization (Empson, 1998) which moved Britain's agriculture away from centuries of largely protectionist policies, and increased market dominance.

Despite Britain's move away from protectionism, EU membership meant continued financial support. Since 2005, CAP has provided two *pillars* of agricultural payments. Pillar 1

payments known as single farm payments (SFP), provide farmers with subsidies. All farmers receive SFPs which is a sum calculated based on the size of their farm, thus the larger the farm the larger the sum. Additionally, farmers can opt to apply for grants, for example, for planting trees or improving farm productivity.

To receive direct income-support from the government, farmers must “meet certain standards on environmental management, animal welfare standards and traceability [...] known as ‘cross-compliance’” (Institute for Government, 2017). The CAP’s pillar 1 payments encourage farmers to follow certain *greening* rules which apply to 30% of farmers’ direct income-support. This direct income-support is paid providing farmers practice crop diversification, maintain permanent grassland and dedicate 5% of arable land to ecological focus areas (European Commission, n.d.b).

In addition to the direct income support farmers receive from pillar 1 payments, pillar 2 has a more diverse focus, centred on rural development. For the 2014-2020 period the UK has dedicated €8.5 billion for pillar 2’s rural development, using €3.3 billion from public funds and €5.2 billion from the EU budget. Pillar 2 payments represent a smaller part of the CAP budget than farmers’ direct income support (Institute for Government, 2017). These government schemes, grants and direct subsidy payments currently provide approximately 55% of farmers’ income, via single farm payments (Institute for Government, 2017). This leads farmers to feel dependent on the government (Jack, 2007) making the government an influential force in Britain’s agricultural trajectory.

#### **4.1.2. Post-Brexit agricultural policy**

The British government has criticised the European Union’s agricultural model for damaging the environment, holding back productivity, and for compromising public health, and therefore plan to gradually replace this system (Defra, 2018c). The UK government and stakeholders described BREXIT and subsequent removal from the CAP programme, as “a historic opportunity to radically reshape domestic agricultural policy” through the new Agricultural Bill (Coe, 2018, p. 4). The Agriculture Bill (2017-2019) will determine how Britain’s agriculture will transform, yet still must pass through all parliamentary stages before becoming an official parliamentary act. However, the Bill’s briefing paper released on 9 October 2018 sets a framework for UK farming that is very distinct from that of today. The new Bill is designed to “allow government policy to “evolve” in response to “changing environmental priorities and changing social and economic circumstances”, reduce the

bureaucracy of farm support and regulation and to enable the government to respond to the outcomes of EU withdrawal negotiations” (The UK Government as cited in Coe, 2018, p. 5). While Britain has yet to ratify the post-Brexit agricultural policy, speeches by British Secretary of State for Environment, Food and Rural Affairs, Michael Gove, point towards an ecologically integrated approach focussed on producing environmentally friendly, healthy food with diversified farm activities. Furthermore, a government briefing paper (House of Commons Library, 2018) discussing post-Brexit agricultural policy stated a move away from the subsidies which currently formulate approximately 55% of farmers income (Institute for Government, 2017), instead focussing on financial support for ecosystem services provision which they describe as ‘*natural capital thinking*’. Gove has repeatedly enforced “the most important public good we should pay for is environmental protection and enhancement” (Defra & the Rt Hon Michael Gove MP, 2018, para. 66). He further emphasized that independent of Brexit, “[p]opulation growth, technological innovation, environmental pressures and evolving social attitudes” are challenges which “require us all to adapt” (Defra & the Rt Hon Michael Gove MP, 2018, para. 32). Adapting to these challenges requires a re-think in what and how the UK farms, with the government placed in a key position to encourage any changes.

## **4.2 The Market**

Although agriculture is heavily regulated and financed by the government, farmers are also required to sell their goods on the market to supplement their income. Herzog (2003) refers to the market as “the complex system in which people buy and sell, offering money, goods, labour, time, and abilities” (p. 1). Thus, the market entails what farmers need to buy in order to farm, for example fodder, and the products they sell, for example livestock. The market is extremely competitive, with many farmers struggling to make a profit in the UK. In 2017, 20% of farms failed to achieve a positive farm business income (Defra, 2018a) illustrating the challenges farmers face. One contributing factor may be higher fodder costs which increased by 11% in 2017 (Defra, 2018a). Thus, if farmers were reliant on the market alone to receive an income, it is likely many farms would not survive.

While farming is heavily funded by the government, agriculture’s economic contribution to the UK is relatively low. According to a Defra (2018a) report, although the UK uses 72% of land for agriculture, agriculture contributes to less than 1% of the economy and only 1.48% of employment. Additionally, the value of food, fodder and drink imports to

the UK is 6.2% higher than exports, costing the UK £24.2 billion in 2017 (Defra, 2018a). Brexit could create further barriers to trade resulting in loss of income, which may deepen the costs for the government to maintain farming.

#### **4.2.1. Post-Brexit trade**

The UK's agri-food sector will likely "be one of the sectors most seriously affected by Brexit" (Hubbard et al., 2018). With the government proposing to dismantle direct subsidies, markets will become increasingly important for farmers. Post-Brexit predictions suggest beef and sheep sales will be particularly vulnerable to different trade scenarios (Feng, Patton, Binfield & Davis, 2017; Hubbard et al., 2018). According to a study conducted by Feng et al., (2017) beef could experience a 17% price increase or a 45% price decrease depending on potential post-Brexit trade scenarios. Both outcomes would impact cattle farmers, with a price decrease potentially forcing smaller farmers out the market, and a price-increase lessening demand for British beef. The research also suggests that the price variance will be less severe for crops, independent of each trade scenario, and thus arable farmers may be less vulnerable to trade changes (Feng et al., 2017).

Pulses may fare better than livestock under different Brexit scenarios, propelled by national demand. Research conducted by The Andersons Centre (2015) indicates that if UK pulse production were to double, a market already exists to absorb increased supply. However, while there may be "good long-term domestic demand" for pulses as animal and fish feed, farmers should aim to supply pulses for human consumption to gain a higher premium (Jones, 2018). Following steep increases in low or no-meat diets in the UK (Waitrose & Partners, 2018; The Vegan Society, 2016) domestic demand for pulses may further increase providing farmers with new markets.

#### **4.3. Farmers**

While the government and the market influence agricultural trajectory, as food producers, farmers are the main agents for any agricultural transformation. They both physically implement changes to agricultural models and are in-turn affected by agricultural changes. Thus, the United Nations hailed farmers as "the largest group of natural resource managers in the world [who have the potential to] become critical agents of change in the transformation of current consumption and production systems" (UNEP, 2016, p. 14). Furthermore, as those who *live* food production, farmers have valuable insight. Thus,

listening to farmers “who have first-hand knowledge” (Syse, 2009, p. 19) is important to gain deeper understanding. Accordingly, farmers are arguably those best positioned to understand possible challenges and leverage points for any agricultural transformations to occur. One way to interpret farmers’ perspectives, is through the theory of identity.

#### **4.3.1. Identity theory**

As a somewhat abstract concept, identity is difficult to define and narrow, understood and used in multiple ways (Deaux, 2001). Therefore, to clarify how identity is understood within this thesis, identity will be limited to exploring life-modes, motivations, constraints and values as connected to time (farmers past, present, and future) and space (their connection to their land and animals). These concepts will be introduced together with previous literature exploring farmers’ identity, to provide a framework for interpreting interviews.

Identity can be split into two main categories; social identity and personal identity (Nario-Redmond, Biernat, Eidelman, & Palenske, 2004; Hitlin, 2003; Deaux, 2001). A social identity is comprised of the groups one belongs to, for example occupation and age group, whilst a personal identity is connected to an individual’s beliefs and values. Social and personal identity overlap and influence one another without a clear line splitting the two, however generally within social identity group(s), individuals “assume some commonalities” with others (Deaux, 2001 p. 1). This makes it possible to explore identities through social groups, in this case, that of livestock farmers. However, personal values also inform identity, which may be shared or differ from an individual’s social group. Combining aspects of both social and individual identity, Burton (2004) developed the concept of a farmer’s identity (McGuire, Morton, Arbuckle, & Cast, 2015) as being connected to both the land, livestock, family, and family history as tied to the farm. McGuire et al., (2015) expanded on Burton’s farmer identity concept, describing farmers as influenced by “internal beliefs, values, knowledge [,] past experiences [and] iterative interactions with their social and bio physical environments” (p. 146). Following these definitions, one can explore a farmer’s social identity by seeing how they are connected to their livelihood through their farm’s past, present and future, and their personal identity through their personal motivations, concerns, and how they interact and identify with their land and animals. Exploring these elements may draw insight on farmers’ responses to new agricultural practices (Warren, Burton, Buchanan, Birnie, 2016).

*Life-modes* provide a useful starting point to investigate how farmers connect to their livelihood, and thus as a means to explore their social identity. The concept of life-modes was first introduced by Thomas Højrup in 1989, who describes three main life-modes: career professionals, wage-earning workers and self-employed workers (Højrup as cited in Syse, 2009). The first two life-modes, career professionals and wage-earning workers, are the most common. Career-professionals are highly-qualified workers paid in accordance with their skills and/or knowledge. They are ‘invested’ in their profession and want to develop their career, while wage-earning workers are paid according to time worked rather than for their ability, hence, they work to live rather than live to work. Farmers come into the third category; self-employed workers. In the self-employed life-mode workers have the independence and freedom to determine how and when they work each day. Thus, life and work become integrated with no clear separation between two.

The blurry line between life and work can lead farming to be viewed as a “way of life with a deeper meaning than simply a form of employment” (Groth & Curtis, 2017 p. 366). My interviews with farmers echoed these previous findings on the self-employed workers life-mode, referring to their profession as a *lifestyle* with a *sense of freedom*. However, although life-modes can be a useful starting point, it should not be used to define a singular farmer’s identity. With increased diversity in employment, farmers may relate to multiple identities and not solely their farming profession (Groth & Curtis, 2017). For example, farmers may have taken on extra employment to sustain their primary life-mode as farmers (Christensen, 1984 in Syse, 2009, p. 61-63) which I also found to be the case in my interviews. Although farmers may relate to multiple identities and consequently life-modes, identifying these life-modes can aid with understanding how farmers relate to their livelihood(s).

Previous research into how farmer’s identity can play a role in their willingness to accept government schemes has focussed on farmers’ *motivations* and *concerns*. When researching why farmers were unwilling to participate in a voluntary community forest scheme, Burton (2004) found that “farmers may [...] resist change on the basis of an anticipated loss of identity or social/cultural rewards” (p. 196). His research illustrated how identity can form a barrier to implementing government policies focused solely on financial rewards. A recent study by Warren et al., (2016) also found that a promise of financial reward was not a strong motivation for changing farm type, as stronger concerns existed including perceived risk or perceived land unsuitability. These results were similar to Convery et al., (2012), who found that profit was not a driving force for many land-owners. However,



multiple identities (both social and personal) can make it challenging to analyse farmers' motivations for what and how they farm. For example, a study by McGuire et al., (2015) looking at farmer responses to the social–biophysical environment argued that multiple-identities make it challenging to determine what might activate farmers “concern for agro-ecosystem well-being while assuring their livelihoods” (p. 146). Although multiple-identities may result in some differing motivations and concerns among farmers, a farmer's life-mode as a *way of life* occupation could lead to identity commonalities which reveal insight into what may encourage farmers to either accept or reject agricultural changes.

Connecting social to personal identity by exploring farmers' values can bring insight. Hitlin (2003) expresses an individual's values as “deeply personal but socially patterned and communicated [...] essential for understanding personal identity and [offering] us the ability to identify empirical links between self and social structure” (p. 119). Therefore, by connecting livestock farmers values associated to the environment and farm animals with the contextual setting, may also deepen an understanding of how farmers might respond to agricultural changes which support or contradict these values.

Despite revealing insights, using identity as a theory brings challenges due to its broad definitions and scope. Therefore, narrowing identity to exploring life-modes, motivations, concerns and values as connected to time (farmers past, present, and future) and space (their connection to their land and animals) helps create a workable framework. Secondly, Burton (2004) problematizes exploring farmers' individual identities as farms are often managed by multiple family members. Although this thesis acknowledges that farmers interviewed were often part of family units, the scope of this thesis only permits a focus on the farmers interviewed. And finally, as with many previous studies on farmer identity, this research is qualitative, and therefore it difficult to generalize results outside of each particular case study (McGuire et al., 2015). However, although not generalizable, “social identities are developed and defined within a social world” and thus they likely share similar cognitive aspects (Deaux, 2001, p. 4). Therefore, although not generalizable, in-depth case-studies may still bring insight, using identity as a tool to better understand farmers' reactions, or predict potential reactions, to changes in agricultural policy.

## **5. Interviews with livestock farmers: what shapes farmers' decisions?**

To uncover potential challenges and leverage-points for livestock farmers to transition to pulses first required a better understanding of RQ 1: '*what shapes farmers' decisions?*' From the interviews, I identified three core categories shaping farmers' decisions: the government, the market, and farmers' identity. Thus, the interview results are presented within these categories, and triangulated with other data and research. The results then form a discussion (see section 6) which aims to draw insight on how the government, the market and farmer's identity may present challenges and/or leverage-points for livestock farmers to transition to pulses.

### **5.1. The government**

Governmental financial support is essential for farmers in the UK, so much so that “a lot of farmers wouldn't be able to exist without it” (f1). Although interviewed farmers believed that government subsidies ensure many farmers' survival, they remained critical of the way the government provides support. Talking with farmers about the past, present and future implied how policy and government subsidies may influence agricultural progression, and yet also why farmers cannot depend entirely on the government when making farming decisions.

Interviews portrayed how past agricultural acts have sparked drastic changes in what farmers' farm. After asking farmers to talk about their farm's history, four revealed they had previously been dairy farms. All cited shrinking profits as a reason compelling them to leave dairy behind. Farmer 2 attributed the dwindling dairy profits to the closure of the milk-marketing board. The government established the producer-ran milk-marketing board in 1933 via the 1931 Agricultural Marketing Act, seeking to bring farmers financial security by guarantying a minimum milk price (The National Archives, n.d.). For many years the board was successful, however, following a path of free-market support and privatization, Thatcher's Conservative government revoked the board in 1994 (Empson, 1998). Farmer 2 claimed that when the board ended, supermarkets “got control of the dairy industry” causing profits for small dairy farmers to plunge. Indeed, between 1994 and 2010 milk prices dropped by 28% (Perry, 2015). Thus, while creating the milk-marketing board initially gave stability

to dairy farmers, by dismantling the board the government removed farmers' price-security, leaving farmers vulnerable to market forces.

### **5.1.1. Subsidies**

Although low market prices can challenge farmers, the government still maintained a vital role for interviewed farmers by providing them with SFPs, independent of what their farm produces. Since 2003, SFPs have been determined by farm-size (Institute for Government, 2017), and thus the subsidies form an incentive for farms to grow. Discussions about the farms' histories revealed that four out of five farmers had expanded their land size. As more land equals more subsidies, this may be why farms throughout the UK have also expanded, altering Britain's farming landscape. The increase in average farm size has been accompanied by a decrease in the total number of farm holdings, meaning bigger farms and less farms. Between 2000 and 2010 the number of farms reduced by 11,540, while the average farm size increased by 14 hectares (Eurostat, 2017; Eurostat, 2018). Many farms may have expanded to enable them to receive increased benefits from government subsidies, implying that the way subsidies are distributed can influence agricultural development.

Although most interviewed farmers had themselves expanded, they remained critical of how subsidies are distributed based on land size. Farmers 2 and 3 argued this left the smaller farmers who needed extra support with less; "the bigger area you've got, the more money you get [...] you know, it's the small producer that could really do with the extra money" (f2). Farmer 3 argued rather than a flat rate, the government subsidies would be fairer if capped and tiered. However, despite farmers 2 and 3s' criticisms of SFP distribution, farmers 1, 3 and 4 still felt they were essential to provide a necessary income for smaller farmers. Farmer 4 discussed how although larger farms may survive without subsidies by relying on an income from the market alone, without the government financial support, smaller farmers "will disappear, so it won't be farming, it'll be an industry" (f4). Thus, although farmers criticized subsidies for advantaging the larger farmers who they felt did not need government support, they themselves had expanded their own farms thus increasing their land-based subsidies, while also believing the subsidies provide essential support for small farms.

Although farmers receive SFPs based on their farms' land-size, farmers do not receive them automatically. To qualify, farmers must adhere to "certain standards on environmental management, animal welfare standards and traceability" (Institute for Government, 2017),

referred to as **cross-compliance**. In some cases, farmers have needed to adapt their practices to meet these standards. Farmer 1 was the most critical about cross-compliance requirements, complaining of hedge cutting restrictions, and explaining that although they owned a sprayer, environmental regulations meant that without a qualification and an “expensive” MOT they were no longer able to use it. This obliged farmer 1 to hire someone external to spray their fields, when they felt they could do the job themselves. Farmer 1 was therefore critical of the restrictions they felt the government placed on them in order to receive financial support.

However, not all farmers criticised cross-compliance. Farmers 3 and 4 vocally supported the SFPs for helping to maintain farming standards by providing farmers with a financial motivation to meet environmental and animal welfare standards;

You can't take the incentive away from farmers [...] there has to be some checks and balances, because if you do, they will just go for it. I don't care what NFU says. If they have no subsidies, then they will abuse all things to do with it. We'll be back to pulling out the hedgerows, [...] and it'll be just about production (f3)

Furthermore, while supporting cross-compliance, farmers 3 and 4 advocated that the government should take the standards even further (See section 5.3.4.). For example, farmer 3 believed farmers with an environmental focus should be given a subsidy premium. Thus, although one farmer begrudgingly referred to the SFP cross-compliance requirements, two actively felt that they were advantageous; supporting the government's role in maintaining Britain's farming standards through subsidies.

Yet even when supporting subsidies and their requirements, farmers felt the government systems were over-complicated. Farmer 3 described the rural payment agency distributing the SFPs as a bureaucratic “nightmare”. Therefore, although farmers may support cross-compliance regulations if they are in-line with their values, they would still prefer that government processes were simpler. Thus, although most farmers felt the SFPs should change, becoming simpler (f3) (f4), offering more support to smaller farmers (f2, f3, f4), and with a stricter environmental focus (f3, f4), they also found them indispensable to maintain farming standards (f3, f4), and to keep smaller farmers afloat (f3, f4).

### **5.1.2. Grants**

In addition to the payments for land size, two interviewed farmers had applied for additional support from government schemes and grants. When farmers enter a government scheme, they enter an agreement with the government in which the government pays the

farmer according to how they manage their land. Farmer 3 had participated in environmental stewardship (ES) schemes for the past 15/20 years, with their farm registered as Higher-Level Stewardship (HLS). HLS is an ES scheme that encompasses “more complex types of [environmental] management and agreements tailored to local circumstances” (RPA, Defra & NE, 2012). Farmer 3 remarked how it is a “huge cost, being concerned about animal welfare and environmental issues”. Therefore, due to the costs involved for farmers to employ an environmental approach to farming, additional financial support from the government is essential.

Farmer 5 preferred to apply for grants rather than enter a government scheme. They explained that they had opted not to participate in an ES scheme as they found them “restrictive in terms of some of the things [they] couldn’t do” (f5). Although farmer 5 also clarified that despite not entering an ES scheme, they were still “interested in certain environmental benefits,” rather, they had found it more appealing to apply for one-off grants for planting trees instead. In addition to grants for environmental improvements, they were also applying for farm productivity grants.

However, three farmers (f1, f2, f4) interviewed had chosen not to apply for neither grants nor government schemes. Farmer 1 avoided support outside the SFPs as they found it restrictive in terms of what they could get grants for, for example, they stated it would be cheaper for them to buy second hand machinery than to get a grant to help purchase something new. However, bureaucracy deterred farmer 4; “there’s that many hoops to go through and you just think, no, I can’t do that”. Thus, although additional support through government schemes and grants is available, not all farmers felt it was useful or accessible to them.

### **5.1.3. Brexit uncertainties**

Brexit is predicted to have a big impact on Britain’s agriculture, re-orchestrating the support farmers receive in terms of subsidies and grants, while shifting farming’s focus. On the 9<sup>th</sup> of October 2018, the government released a briefing for the new Agricultural Bill (2017-2019) outlining the agricultural changes they want to implement. However, I asked farmers how they thought Brexit would affect Britain’s agriculture before the briefing was released, and therefore their responses came prior to the latest government information. Some of their predictions referred to the government, while others focussed on the market (see section 5.2.2.). Farmers largely chose to discuss how subsidies might be managed when the

UK leaves the CAP agreement, and how they viewed the government's proposed future environmental commitments.

Although the new Agricultural Bill has declared otherwise, farmers assumed subsidies would continue as they felt they were necessary to protect Britain's farming livelihoods. Farmer 3 believed the subsidies would continue because farmers would not be able to compete with cheap imports; "they will never get rid of the subsidies [...] unless they stop those imports coming in". Farmer 4 predicted subsidies would continue due to pressure from the farming community, "I don't think it's gonna alter at all. I honestly don't". They further argued that if the government *did* try to remove subsidy payments it would result in many farmers going bankrupt, leading to an "outcry".

While farmers predicted subsidies would continue, they gave differing interpretations for how the government may or may not apply their environmental rhetoric. Taking a positive stance, farmer 5 was curious about the changing legislations on pesticides, crop management, and antibiotic resistance "I suppose, technically, it is a challenge, but [...] I'm just interested to see how it develops". Although farmer 3 was also hopeful that the government was promoting a stronger environmental emphasis for the future, they remained sceptical of how the rhetoric would be delivered in reality. Farmer 3 said they felt optimistic when they heard politicians discussing the environment, yet predicted that in practice, larger farms would still get more financial support at the expense of smaller farmers with an environmental focus; "so I would like to think, that say, there would be a huge commitment, but I don't believe politicians" (f3).

Independent of farmers post-Brexit speculations, one commonality was that farmers declared they had no *definite* sense of what was coming (f1; f2; f3; f5). Farmers' guesswork for what the future might hold may result from lack of clear governmental communication. Farmer 3 criticized this uncertainty,

There's not a lot of information comes from the government to be honest with you [...] why don't they issue you a nice information pack, about, what the future holds? Supposedly, they should know, [...] What I'm trying to say, I suppose, is, if the subsidies or whatever you're going to call them change, into some sort of environmental subsidy to maintain the countryside and everything else, surely they should be educating us down that route before we get to that route, rather than just, oh, now you're gonna do that.

So, farmers' mistaken assumptions that subsidies would continue much as they are, scepticism and curiosity regarding the government's environmental plans, and farmers''

*uncertainty* concerning how the government may alter Britain's agricultural trajectory post-Brexit, reveal poor communication from the government to the farmers.

## **5.2. The market**

Not only the government, but also the market informed interviewed farmer's options and decisions, prompting changes on the farms in the past, and influencing farms in the present. Furthermore, farmers shared their predictions for how the livestock market may alter in the future, regarding both Brexit and consumer trends.

While subsidies provide farmers with a fixed and guaranteed income, and will do so at least until 2021, farmers are also reliant on selling produce to a perpetually fluctuating market. Market fluctuations mean farmer's total income is unstable and unknown, leaving farmers financially vulnerable. Four of the five farmers stated they had experienced or were experiencing financial difficulties, which they accepted as part of their livelihood; "it's just the nature of farming" (f1)/ "I guess it's always been the same really" (f2). However, it appeared financial insecurity was increasing, due to changing product prices. Three farmers complained the profit margin was decreasing for cattle (f1; f3; f4), because fodder costs had been increasing (f1; f4), with farmer 1 summarizing that farming is "about the only industry 'makes something that you don't know how much you're gonna get for it; our inputs are going up, but we don't know what the final product is worth." Thus, farmers lived with income uncertainty.

Perhaps as a means to mediate market instability, interviewed farmers often relied on other income sources as well as diversifying their livelihoods. For example, farmer 1 also relied on their partner's income; "my wife works, so we don't have to worry too much", while farmer 3 was also dependent on their second job; "if I didn't have my full time job [...] this farm wouldn't exist. Period". Farmers 4 and 5 had diversified their farm operations running more as businesses. Diversifications included rearing different animals, cultivating multiple crops and selling machinery; "I mean, obviously we don't totally rely on farming, it's impossible to live on farming [...] we've got to diversify to survive" (f4). Diversification is a tactic employed by farmers throughout the UK. Defra described this as "a possible and rational response to the changing position of agriculture in the UK economy" (Defra, 2017, p. 18), with diversified farm enterprises providing "29 percent of total farm business income in 2016/17" (p. 17). Thus, presented with an unpredictable market, farmers increased their livelihood security with second employment incomes, or by diversifying their farm activities.

Experimenting and exploring potential new ways of farming was characteristic to all interviewed farmers to remain competitive on the market and retain an income. As trying out new ways of farming entails risk, the interviews revealed what had given farmers the confidence to implement changes. Farmers 5 said they were open to trying new approaches to livestock and crop management, if they were research-based, and not derived from hearsay. They explained how they constantly adapt their farming methods by keeping track of new research, which they implemented into their strategy, “we need to know exactly where we want to get to, why we are doing it, and what evidence there is to support that” (f5). For example, they invested in new machinery shown to improve productivity, lower input costs and improve animal welfare. They clarified;

we don't like to farm without scientific justification for what we're doing. We like to run it as a business, and it's got to be viable in its own right, and the decisions that we make are based on research and evidence (f5)

Witnessing first-hand what had worked for other farmers had also encouraged farmer 2 to try something new. They started farming sheep after observing the success of their peers “everybody seems to have got sheep everywhere and they were making good money, and I thought I might have a go at it” (f2). Farmers also seemed willing to try new things if not requiring large investment or infrastructural changes. For example, moving from ‘dairy’ cows to ‘beef’ cows; “we’ve always had cows, and calves like, so it was just like a different breed sort of thing [...] It’s been a slow process, all the investment was in the dairy side” (f2). Thus, farmers were more likely to make changes requiring less investment or infrastructural changes, which were scientific-research based, or which had resulted in other farmers’ success.

Interviews also hinted towards what deterred farmers from trying new things. The farmers seemed to judge the perceived gamble of any given change based on the size of the investment, and the uncertainty of returns. When I asked farmer 1 if they would consider farming pulses, they were put-off because they would need to ‘go in big’ in order to make selling their product viable,

I'd have to invest too heavily. And I know what I do works, going in to something new is a big gamble, and you've got to go into it big to get the sales i.e. supermarkets, shops, to buy your products. So, it is something I'd never consider now because it's too much of an investment.

Farmer 2 followed similar reasoning when I asked if they would consider pulses, believing that if they took the gamble, their farm would be swallowed up by larger farms;



We've only got a small acreage, and, you know, it wouldn't pay [...] those sort of things have to be on large areas [...] by the time they get the machine in there, no, I think, we would be got rid of. We'd be amalgamated with some other farm.

Lacking certainty that the change would bring profit was also a deterrent. Farmer 4 declared they would not grow pulses for this reason "yeah, you could grow beans, but there's not a lot of profit in beans". Farmer 5 *had* experimented with pulses, successfully growing them as fodder, however found it was cheaper to buy imported soy. Thus, seeing what has not been profitable for other local farmers may also serve as a discouragement.

To discover if dietary trends may also influence farmers' agricultural decisions, I asked interviewees if they thought people eating less meat could affect the livestock market. Farmer 2 brought up the topic before I had an opportunity to ask, revealing it was something they had already considered. They thought people eating less meat could decrease prices; "you never actually know what you're gonna get for your animals at the end of the day [...] and with people going off meat slowly, it could get worse" (f2). Farmer 3 however believed that consumers would continue wanting cheap meat; rather they were concerned that an increase in flexitarians would mean that the same consumers who would have purchased higher welfare meat would reduce their demand, effectively lowering welfare standards by only having consumer demand for cheap meat. Therefore, farmers 2 and 3 were concerned both that prices and welfare standards might lower as a result of dietary trends.

Farmers 1, however, described recent dietary trends as fleeting, while farmers 4 and 5 saw benefits. For farmer 1, constantly altering dietary recommendations led them not to take red meat health warnings too seriously; "red meat causes this, red meat causes that, then you hear 'oh fish, you're not supposed to eat fish [...] so make your own mind up and do it how you like.'" Farmer 4, however, thought that dietary trends would have an impact. Whilst still believing that "people are never gonna stop eating meat", they predicted consumers would demand different kinds of meat with higher welfare standards, for example, that consumers would avoid purchasing veal. Farmer 5 also shared this perspective, welcoming an increased awareness over how farmers rear animals, and seeing this not as a barrier but as a business opportunity. As farmer 5 felt they maintained high welfare standards, they were confident that a market for their products would grow. Furthermore, they acknowledged that although UK meat consumption may decrease, globally beef and lamb consumption rates are increasing and therefore they were not concerned about a declining market. Rather, they were interested to see how their businesses could adapt to food trends. Farmers varying

perspectives on how meat consumption trends could affect livestock production, hint at the challenges for farmers to speculate about how consumption patterns may affect them.

### 5.2.1. Natural Environment

Dependency on their ability to create and sell produce means that farmers must consider the environmental conditions that can affect production. Farmers discussed the weather, soil type and disease, revealing how these elements can affect their options, decisions and farming outcomes. Two farmers explained how the weather challenges agriculture in the UK, particularly because of its changeability. Farmer 3 said this placed extra pressure on farmers, stating that this year had been “the worst year ever”. Farmer 4 also felt that the unpredictability of the weather presented one of their biggest challenges as a farmer. Although they believed they were managing climatic changes by “getting smarter with it”, they explained that bad weather had still caused financial loss (f4). Intense rain had washed away their crop or meant bringing livestock off the fields thus increasing fodder expenses. When the weather leads to either extra expenses or financial loss, this lowers farmers’ income, “you know, you don’t get a visit that goes ‘oh I see you’ve had a lot of rain, here’s an extra payment because you’ve lost half your crop” (f4). Thus, to adapt to climate change, farmers must consider the weather when making agricultural choices.

Farmer 3 also referred to soil type as a limitation to what they can grow. When I asked if they had ever considered growing crops, they referred to their farm’s clay and sandstone soil as a barrier; “this soil round here, is not Grade A basically, so you’d have to put a lot of stuff into it, to basically make it work, [...] you know, it’s really, it’s very difficult to farm” (f3). However, they had succeeded in growing herb-based grass and therefore had discovered what *did* work for their soil type. Other farmers interviewed (f1, f4 and f5) had had more success growing a diversity of crops on their farms, including wheat, barley, oats, beans and oil seed rape. Thus, farmers’ capacity to grow different crop varieties in the same area differed, which is influenced by different inputs in the soil, differing soil types, or different knowledge or experience. Whether possible or not for farmers to grow new crops, soil quality can provide a deterrent if they do not believe the investment would be successful.

Another natural occurrence affecting interviewed livestock farmers was the possibility of disease. Farmer 1 referred to their ‘cash flow’ difficulties when both BSE, and Foot and Mouth disease meant they could not sell their stock. Disease is hard for farmers to control

and could affect them at any time. One way farmers attack illness is through antibiotics, however farmer 5 discussed how antibiotic resistance is posing a great challenge that farmers should consider. The farmer was attempting to substantially reduce antibiotic use, however they mentioned that animals on organic farms without antibiotic application experience more illnesses, which they felt was detrimental to the animals' wellbeing. The challenges both disease and antibiotic resistance present could make rearing animals increasingly difficult in the future.

### **5.2.2. Post-Brexit trade**

When I asked interviewees how they thought Brexit might affect them, they contemplated potential changes in trade and how these changes could bring positive or negative consequences for Britain's agriculture. While farmer 1 was concerned that exports might be hit, farmers 4 and 5 thought that Brexit could bring new trade opportunities. Farmer 1 was mostly concerned about Britain's beef and lamb exports "if we cannot get the exports for meat, lamb especially, it might hit the industry", although, they predicted that it would take some time before changes took place. However, farmers 4 and 5 were more optimistic about future markets. Farmer 5 said that although others were worried about Brexit, they were not concerned, instead finding the future interesting, exciting and with great opportunities "I think that market forces will come into play really, and I think it will all sort of balance itself out" (f5). They predicted cheap imports would come from America, however, they favourably viewed America's lower environmental and welfare standards as an opportunity to offer a better product;

If we do face any challenges, with, for example, American Beef imports, there's a lot of people worried that if there's free trade between the UK and America, the UK beef on the supermarket shelves could be flooded by cheap American imports. I don't see that a challenge at all. Like if that's the case and our beef cattle become worth very little to sell conventionally, I'm very confident of our own, in our abilities to sell it ourselves and create a market because we know that our standards are a lot higher than everyone else's really (f5)

Farmer 4 was also confident about trade opportunities after Brexit, "I don't think it's gonna restrict any, I just think it'll gain more markets". So, although one farmer worried that Brexit would cause trade restrictions, two farmers felt the markets would open in a way beneficial to livestock farmers.

### 5.3. Farmers' identity

Although the government and the market affected farmers' choices, interviews revealed how identity and particularly values could influence farmers' decisions. I asked the interviewees about their experiences of being a farmer, as well as specific questions to see how they relate to the environment and farm animals, from which I identified five main themes: motivations to farm, livelihood constraints, age, and environmental and animal values.

#### 5.3.1. Motivations to farm

All farmers interviewed came from farming families, and thus had been "born into it" (f2). Three of the farmers had taken over their parent's farms while farmers 4 and 5 co-ran farms as part of a family business. Farmer 5 distinguished between being a family farm and a family business, affirming they fell into the latter. Family was the only common denominator among all farmers, and thus arguably family background presented a central motivator to farm.

Perhaps unsurprisingly, as many British farmers experience financial insecurity, money was not a big motivator to farm. Farmers 1, 2, 3 and 4 had all experienced financial difficulties at some point, and farmers 2, 3 and 4 commented how there was not much money in farming. Farmer 4 specifically stated they were "not in it for the money", and farmer 5 explained how they were more concerned with how the farm "looks and feels" rather than whether it makes them money.

Job satisfaction thus came from livelihood traits aside from income. Farmers 1, 2 and 4 described how each day was different, giving them a sense of diversity in their daily activities, while farmer 5 valued the sense of reward they found in providing people with food. Farmers also spoke with a sense of pride connected to their livestock welfare standards, and their protection of local biodiversity (see section 5.3.4. & 5.3.5.). Furthermore, connecting farming to life-mode theory, farmers 1, 2 and 4 described farming as a *way of life*, which gives them a sense of freedom; "make your own mind up and do it how your like" (farmer 1).

### **5.3.2. Livelihood Constraints**

Criticisms of government regulations can perhaps be explained by their farmers' appreciation of the freedom that their livelihood awards them. For example, farmer 1 said they found following regulations most challenging about farming, forcing them to "do things perhaps the way [they] wouldn't want to". Echoing this, farmer 4 described how if farmers feel like they are pushed into something "most of em will reject it and do what they want", however, if farmers don't feel coerced, and are "slowly [cosied] into a corner", they will accept.

Although three out of the five farmers said they were happy with being farmers, all five questioned their livelihood satisfaction. For example, farmer 1 said farming was stressful, and they didn't "know if they would do it in another life". Farmer 2 stated that they were "born into it, and it carries on" however that they "wouldn't want to be starting now". Farmer 3 referred to farming as "the cruel mistress." While farmer 4, when asked if they preferred the paperwork or the physical labour, joked "what do I prefer? I don't prefer any of it really". Farmer 5, who was younger than the majority of UK farmers said although they were content "for the time-being" with being a farmer, they foresaw a future with more challenges, in a faster paced "bigger company", and therefore was drawn towards the 'career professional' mode. Therefore, it was not as simple as feeling motivated or dissatisfied with being a farmer; interviewees had complex understandings of their livelihoods.

### **5.3.3. Age**

Aside from farmers' motivations, age impacted farmers' livelihood decisions. Interviews revealed that when approaching retirement, farmers willingness to make changes on their farms may decrease, as they feared they would not see the results of their effort; "I wouldn't even think of it, because I might never get the repayments off the expense of putting out" (f1). Most farmers in the UK are over 65 (Defra et al., 2017) and therefore age may be a barrier discouraging many farmers from making infrastructural changes. Age-group may also impact young farmers farming decisions, for example, farmer 5, who was younger than the other respondents said although they were content "for the time-being" with their position on their family farm, they foresaw a future with more challenges, in a faster paced "bigger company", and therefore was drawn towards the 'career professional' mode.

### 5.3.4. Environment

To better understand farmers' perspectives on the environment, I first asked how they thought farming impacted the environment, then asked if protecting the environment was important to them. Although I only asked two specific questions relating to the environment, the farmers also discussed the environment in response to other questions. Therefore, environmental issues, and particularly biodiversity, featured heavily in the interviews.

With tight environmental regulations governing farming, interviewed farmers were versed in environmental topics. All had at least some knowledge of both livestock and arable farming's impact on the environment, discussing methane from cattle, ammonia and slurry coming from big farms, and out-of-control crop-spraying. However, they largely perceived these environmental problems to derive from 'other' farms, including big, industrial farms (f2) (f5) or irresponsible farmers (f3) (f4).

Although interviewed farmers had a sense of detachment from environmental pollution, they *did* discuss local biodiversity and how it was something important to them, fondly conversing about their farms' flora and fauna. For example, farmer 3 discussed the sense of pride they felt when witnessing the biodiversity in their fields with "the orchids popping up", "farm-land birds" and the "butterflies and the moths". Farmer 1 spoke about a family of badgers living on their farm which they believed protected their cattle from TB, by warding off any badgers that may be infected. Farmer 5 described how happy it made them to see deer and foxes on the farm. Neither deer nor foxes had previously caused the farm problems, but they joked that if they did cause any financial loss, they still wouldn't want to deter them, as they enjoyed *seeing* them.

In an effort to protect their farms' biodiversity, the farmers employed various measures. The best illustration is hedges. Farmer 3 discussed how they try not to cut their hedges because they are *wildlife corridors*. Farmer 4 also talked about how farmers should be encouraged to fill in the gaps between the hedges to encourage birds and wildlife. While farmer 5 teased their father for being "sort of obsessed" with planting hedges to improve local biodiversity.

In addition to hedges farmers employed other measures to protect biodiversity. Farmer 3 had a particularly strong environmental focus for their farm, stating they were "more concerned about how [the farm] looks [and] feels, rather than whether it makes [...] money". Little to no herbicides or artificial fertilizers had been used on their farm and parts

of their farm run into SSSI status woodland<sup>4</sup>, so they decided to preserve the area by implementing a Higher-Level Stewardship (HLS) environmental focus for the whole farm. This included creating wildlife areas and reinstating orchards. Farmer 5 was also taking big steps to protect biodiversity. Their concerns over pesticide use was one of their motivations for entering a process of going organic:

We don't particularly want to spray the crops [...] we're very conscious of its impact on the environment, and as every year goes by and more and more pesticides become illegal, you are really aware, I mean, there is a reason they're being made illegal, like the damage they do to the bee population (f5).

They had already taken measures to protect the local environment, including planting thousands of trees on unproductive land and investing in machinery for more efficient fertilizer use.

Further illustrating farmers' commitment to local biodiversity, when asked what farmers would change about their farms if they had the resources, two farmers chose changes that would support biodiversity on their farms. Farmer 3 said they would create wildlife environments for wetland birds by putting in more ponds, while farmer 4 said they would like to put in more hedges. Both farmers 3 and 4 also supported regulations and policing to protect local environments: "if there was more control [...] there would be more policed, and a lot stopped" (f4). This suggests that although interviewed farmers often valued the freedom associated with their self-employed life-mode (see section 4.3.1) they will support governmental regulations which uphold their environmental values.

However, there were barriers to how much farmers could invest in biodiversity. Although money did not appear to be a *motivator* for farmers, it influenced *how* farmers managed their environmental choices. For example, when discussing government incentives to plant wildflowers, farmer 2 said, "I think you should be allowed to make the ground economic, but you don't have to, you know, go the opposite way". Farmer 3 also stated "it's a huge cost, being concerned about [...] environmental issues, and that never gets acknowledged". Farmer 5 also discussed how they were "very conscious of [crop-spraying's] impact on the environment," yet selling products at conventional prices forced them to farm in ways they were not necessarily comfortable with. Thus, despite farmers concerns about protecting the environment, they were constrained by the costs this entails.

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<sup>4</sup> SSSI woodland is designated a site of special scientific interest "protected by law to conserve their wildlife or geology" (Forestry Commission & Natural England, 2018, para 1).

### 5.3.5. Animal values

To explore farmers' perspectives on their livestock, I asked how they would describe their relationship with their animals. The responses illustrated how relationships were complex, ranging from forming attachments to forcing detachment. Farmers also iterated how animal welfare was important to them, and that they were concerned about the disconnect they perceived between consumers and farmers, which they felt could result in lower animal-welfare standards.

Humans and animals inevitably form bonds, as was the case with the interviewed farmers, who all had formed a sense of attachment to their animals. Some spoke of 'favourites' (f5), or 'nicknames/names' (f1) (f4) they gave to particular animals. Farmer 5 spoke affectionately about a sheep that had been *vetoed* to spend the rest of her life on the farm. While farmer 4 talked about how the animals could also get attached to the farmers, describing how when they were sick, the cows would come and "check [them] out".

However, most the farmers formed a distinction between animal and livestock; the first being an individual, the latter becoming a 'product'. Ultimately, farm animals will be slaughtered and sold as a consumable good – "livestock/deadstock" as farmer 3 put it. This knowledge impacted how farmers related to the farm animals. For example, farmer 1 named the dairy cows who stayed on the farm for many years, yet said they did not get attached to the "beef animals" which were going to slaughter; "you can't get connected to 'beef animals' because you have to think of pound notes" (f1). Farmers thus discussed the conflict between becoming attached and knowing the animals' fate; "you find an attachment to them, but you can't get too attached, because at the end of the day they've got to go, you know, you aren't rearing pets" (f2). Farmer 4 poignantly summarized their relationship with their livestock and their slaughter;

they mean a lot to you, you wouldn't let them suffer [...] we appreciate what they're there for, and what they do, and what they achieve, and they do sacrifice a fair bit, you know, the ultimate is that they give their life don't they, but you know, at the end of the day, it's, you've gotta live haven't you" (f4).

Although farmers distinguished between farm animals as individual and product, they still all voiced concern for the animal's quality of life. Farmer 3 stated they invested in the cows' welfare at the expense of profit, admitting the relationship with the cows was "heart-breaking most the time" (f3). Farmer 4 visited abattoirs to check they were satisfied with their standards. They also argued travel distance to slaughterhouses should be shortened to reduce



the animals' stress. Farmers also rejected certain types of animal 'production' they viewed as unethical, for example, farmer 5 said it was important for animals to be outdoor reared from a welfare perspective and that they would only eat free-range, while farmer 4 stated they "wouldn't touch" veal.

Farmers also discussed the disconnect between food production and consumers (f3, f4, f5), predicting that if consumers understood where their food came from, demand would grow for higher animal-welfare standards. Farmer 3 suggested that for consumers to know about the life the animal has had, supermarkets should *tell the story* of where food has come from. As a further measure, it was suggested that farmers mistreating stock should be penalized (f4). However, despite farmers discussing a need for further improvements, they viewed Britain's animal welfare as superior to other countries; "we've had to have a lot of pain for that, but it's the best in the world" (f4).

Despite interviewed farmers' selective attachment/detachment to their livestock, they took pride in maintaining high animal welfare. As farmers showed pride in high welfare, both on their own farms and in the UK as a whole, they accepted the regulations that came with the UK's strict welfare standards, despite the "pain" this entailed. Thus, as was also the case with environmental values, by accepting and supporting animal welfare regulations, farmers' strong personal values overshadowed the appreciation for freedom associated with farmers' self-employed life-mode.

## **6. Discussion: challenges and leverage-points for livestock farmers to transition to pulses**

The government, the market and farmers' identity all raise potential challenges and leverage-points for livestock farmers to shift to pulses. Of these three categories, the government featured most prominently in the interviews, holding a highly influential role for farmers due to provision of subsidies and grants. The government has controlled and financially upheld UK agriculture for centuries, however the government's central role may be changing. Following Brexit, direct-payments will likely be removed and replaced with payments for public goods. While in theory this could benefit farmers practicing sustainable agriculture, in practice, the extent to which the government will provide support is not yet apparent. Therefore, farmers may increasingly need to make choices aligned with trade opportunities. Thus to shift to pulses, farmers would need to be confident that a stable market exists. Although the government and the market influenced the interviewed farmers, decisions were also shaped by their identity, and particularly their values connected to local biodiversity. Furthermore, the farmer's values influenced whether they supported or criticised mandatory government policies. Accordingly to reveal challenges and leverage-points for livestock farmers to transition to pulses, the government, the market, and identity should not be considered as separate entities, but rather how they interact as a whole. These interactions will be explored in relation to the literature presented in section 3.2 on promoting livestock to pulses as part of a sustainable food-system.

Perhaps, the most encouraging leverage-point was that farmers displayed high-capacity to adapt to changing circumstances. While this came as no surprise as farmers have been adapting to changing climates and governance over millennia, the interviews shed light on which circumstances forced, encouraged and/or discouraged the farmers to make changes. *All* interviewed farmers had implemented changes; some substantial, for example moving from dairy farming to beef and ewe farming, and others smaller, like investing in more efficient machinery. Some of these changes were forced upon farmers, for example when the government implemented cross-compliance requirements, or when farmers were forced to leave dairy once dropping dairy prices substantially reduced their income. Although coercion from government or market forces is one way to change agricultural models, coercion conflicts with farmers' life-mode which values freedom, and therefore employing coercion may push farmers out of farming.

However not all changes farmers implemented were a result of coercion. Farmers seemed willing to ‘try something new’ if they were confident it would be **possible** and **profitable**, and thus presenting pulses as possible and profitable would create a leverage-point. Yet growing pulses may be challenging for some farmers. One farmer stated their soil type made it challenging to grow any crop other than grass, which although not insurmountable, creates a formidable barrier to growing pulses. However, three out of five farmers interviewed grew other crops including wheat, barley, oats, beans and oil seed rape giving them valuable arable experience if they were to shift to pulses. Furthermore, one farmer had also successfully grown pulses, indicating that for many farmers pulse-production would be possible. Research claims that most places in UK are suitable for growing pulses, and as the world’s top marrowfat and third largest fava bean exporter (The Andersons Centre, 2015), pulses are something the UK has already proven to grow well. Additionally, pulses may become attractive to farmers due to the UK’s changing weather, which has increased input costs for livestock farming. As the “unflinching David to the Goliath ravages of climate change” (FAO, 2017, p. 39), pulses are a sensible crop for a warming Britain, with the added benefit of improving the soil quality. Government investment in research could increase farmers’ confidence by informing how to produce high yields and quality in the UK climate (The Andersons Centre, 2015; The New Economic Foundation, 2017). One farmer specifically sought out new research to improve their farming methods, and therefore government investments in pulse-research would present a leverage-point by strengthening farmers’ confidence in their ability to grow pulses. Thus, while in certain cases the natural environment, for example soil type, will deter farmers from growing pulses, government funded-research could inform farmers when it would be possible and advantageous to grow pulses. Furthermore, farmers experience growing crops as livestock fodder could provide a leverage-point in a transition to pulses.

However, even if it is possible for farmers to grow pulses it also needs to be profitable for farmers to transition. As was also found in previous research, money was not farmers’ central motivator (Warren et al., 2016; Burton, 2004), yet farmers still need an income to survive. Farmers may fear that pulses would provide lower returns than other crops or livestock (The New Economic Foundation, 2017), thus acting as a barrier to transition. This fear may hold merit. Although farmer 5 had successfully grown pulses they ceased to do so because it was more profitable to import protein-crops for fodder than to produce them ‘at home’. As soy can be imported into the UK as an oilseed without import tariffs, it can be much cheaper for farmers to import soy for fodder than to cultivate protein-crops on their

farm (The New Economic Foundation, 2017) which consequently removes the incentive to do so. However, pulse prices are increasing, with the UK's Farmers Weekly stating “[s]trong prices resulting from a tighter pulse market mean [pulses] are worth a look for 2019” (Allison, 2018). Furthermore, an increase in flexitarians, vegetarians and vegans is pushing national demand for meat alternatives (Butler, 2018), creating new market opportunities for pulses. Although the outlook for pulses profitability and marketability is increasing, the market's competitive nature increases risk for smaller farmers as they feel they need to “go in big” to be competitive. Warren et al., (2016) also found that perceived risk raised strong barriers to implementing changes on farms. If farmers are not confident they will succeed, and a large change or investment is required, the uncertainty and risk increase forming a challenge to transition.

The government could boost farmers' confidence by both offering financial incentives, and stimulating a market for pulses, thus turning challenges into leverage-points. Payments for ‘public goods’ provides the government with a perfect opportunity to financially prioritise pulses for their lower GHG emissions and water use, their contributions to biodiversity, and their health properties. Prioritizing pulses may give farmers a valuable financial boost to attempt cultivation, however farmers may be uncertain as to the longevity of government support. The government's track-record of changing policies, for example stabilizing dairy farming prices before removing dairy support, makes relying on government income precarious. Furthermore, government bureaucracy and complicated processes have deterred farmers from using the government for anything outside of basic support. Therefore, in order to be accessible processes should be simple and well communicated to farmers. However, the government could also increase farmers' confidence in pulses profitability by stimulating the market for British pulses. One practical suggestion presented by the Vegan Society is for “government departments and local authorities to use UK-grown plant proteins as a staple meal in their canteens” (The New Economics Foundation, 2017, p. 26), which would effectively increase national demand and enable the government to create a leverage-point to encourage a pulse transition. Interviewed farmers were more confident to try something that had proven successful for their peers, and therefore if pulses provide profits for some farmers, this will encourage others to follow suit.

In addition to farmers responding to market and government circumstances, identity and values also played an important role in the interviewed farmers' decision-making process. The interviews suggest that livestock farmers' identity may present more of a leverage-point than a challenge in a sustainable agriculture transition. Although interviewed

farmers enjoyed working with animals, which may make them reluctant to leave livestock farming behind, the environmental and animal values they presented were largely in-line with a pulse transition. Firstly, farmers highly valued animal welfare and developed relationships with their animals. Farmers discussed their forced detachment from animals destined for slaughter which connects them to the nationwide debate around animals as food. Although unusual, news outlets report of livestock farmers donating their animals to sanctuaries rather than sending them to slaughter (Timmins, 2017; Finnerty, 2017), and one interviewed farmer spoke of a sheep that was ‘vetoed’ to stay on the farm. The livestock/deadstock conundrum thus illustrates the complexity of relationships between farmers and their livestock as both intrinsic beings and ‘products’.

In addition to caring for their animals, farmers were passionate about biodiversity, taking multiple measures to protect local environments even if doing so came at a financial cost. For example, one farmer chose to enter an ES scheme because they recognized the ecological importance of their farm’s location, stating “it’s a huge cost, being concerned about [...] environmental issues”. If farmers feel that changes are compatible with their environmental values, particularly promoting local biodiversity, they may be more willing to accept and even embrace changes. Thus, raising farmers’ awareness as to how pulses can promote biodiversity and benefit the environment as a whole could make farmers environmental values a leverage-point for an agricultural transition. If the government aligns farmers’ financial support with initiatives that support farmers’ values (particularly environment and life-mode *freedom*), the government has the potential to steer farming in desired directions by harnessing farmers support. In this case, increased ‘public goods’ payments for pulse farming combined with sharing the knowledge of how this would support a sustainable future for Britain’s agriculture, could help encourage an agricultural shift. Moreover, as farmers changing from livestock to pulses would still retain their self-employed life-mode, they would also retain the freedom they value as farmers.

However, even when farmers are confident that a change would be possible, profitable and aligned with their values, retirement age could present a barrier to farmers changing farm type. Two farmers were less willing to change farming practices as they felt they would not see the outcomes of their efforts. Previous research has presented contradicting results for how age impacts farmers’ disposition for change. While Convery et al., (2012) also reported that older farmers were less willing to adopt changes, research by Warren et al., (2016) found that older farmers were actually *more* willing to engage in innovation. Thus, presenting the challenge that “establishing causal relationships between

farmers' demographic characteristics and their decisions is complex" (Warren et al., 2016, p. 181). Yet, if age *does* present a barrier to change as my interviews indicate, this would challenge an agricultural transition as most farmers in the UK are nearing or past retirement age<sup>5</sup>. By 2010 the average farmers' age was 59 years old, with ages 65 and over forming the largest age group of farmers at 34% (Defra et al., 2017). Furthermore, only 13% of agricultural workers were under 44 (Defra et al., 2017). Although the aging population of farmers will likely create challenges for sustaining *any* form of agriculture, this challenge could also present a valuable leverage-point. It may well be easier to support a new pulse farmer than encourage an experienced livestock farmer to undergo a farm-type transformation. Thus, encouraging new pulse farmers could form an important step for the government to integrate pulses into the UK's sustainable food-system future.

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<sup>5</sup> Retirement age in the UK is currently 60 for women and 65 for men. It will increase to 66 for men and women by October 2020 (Age UK, 2018)

## 7. Conclusion

Although Britain's decision to leave the EU shocked the world and polarized opinions, it has created a unique possibility to reshape Britain's agriculture at a time when scientists are increasingly calling for drastic food-system change. Transitioning from livestock to pulses would help the UK meet legally binding emission reduction targets, while also boosting Britain's declining biodiversity. Furthermore, in times of global warming, shifting to pulses would both provide a drought hardy crop and reduce agricultural fresh water use, freeing up an increasingly valuable resource for the UK. In addition to meeting environmental goals, cultivating pulses would provide a nutritious home-grown protein source in-line with the governments' official food guidelines, at a time when British consumers are increasingly transitioning to plant-based diets. Thus, increasing pulse production would support the British government's sustainable food-system goals by providing a healthy, environmentally friendly, and ethical domestic protein-source.

Although there are strong arguments for shifting from livestock to pulses, interviews with farmers revealed potential challenges to do so. While farmers were certainly adaptable to changing circumstances, to encourage a shift they would need to view changes as both possible and profitable. While some land may not be suitable for pulse cultivation, research suggests that much of the UK is, and therefore increased pulse production is a possibility for farmers. Furthermore, as many livestock farmers grow crops for fodder, this knowledge may benefit them when cultivating pulses. Nevertheless, even if possible, the interviewed farmers were concerned that farming pulses would not be profitable thus acting as a barrier to transition. Yet as pulse prices are increasing, which may be further driven by the national demand for meat alternatives, farmers' confidence in pulse's profitability will likely also rise.

The government has the potential to increase farmers' confidence in both the possibility of cultivating pulses and their profitability. Funding research on pulse-cultivation in the UK would identify how and when it would be advantageous for farmers to grow pulses and produce high quality yields. Furthermore, providing financial incentives through public goods payments, and stimulating a market by serving pulses in all public canteens would also increase farmers' income-security. Once some farmers experience success, this could encourage others to follow suit.

Yet interviews indicated that farmers' identity and values also play an important role in farmers' decision-making. Most prominent was the interviewed farmers' passion for biodiversity. Therefore, if the government were to raise awareness as to how pulses stimulate

biodiversity, this could make farmers' environmental values a leverage-point for an agricultural transition. Thus, by aligning financial support through 'public goods' payments for pulse farming, and sharing the knowledge of how this would support a sustainable future for Britain's agriculture, the government could harness farmers' support to re-shape Britain's agricultural trajectory. However, independent of potential benefits for transitioning to pulses, the results indicate that farmers nearing retirement (which presents the highest percentage of British farmers) may be less willing to put effort into changes for which they will not see rewards. Thus the government should encourage a new generation to enter the pulse farming profession.

While scientists are raising awareness of the need to reduce meat consumption and increase plant consumption, the emphasis is placed on changing diets rather than agricultural models. In the UK, consumers *are* making this transition, yet livestock remains the predominant farm-type. By taking the initiative to promote an agricultural shift to pulses, the British government would fill an important gap by shifting responsibility from consumers to a food-system level. Therefore, to create a sustainable food-system, agricultural production should also follow scientists' recommendations by reducing livestock in favour of pulses. Although UK agriculture presents a small percentage of the global whole, this should not diminish the UK's sense of responsibility. Scientists, government, consumers and the interviewed farmers are aligned in their desire for a sustainable food-system. Brexit presents the UK with a special opportunity to deliver, by promoting pulses as a pathway to achieving our shared goals.



## 8. References

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## 9. Appendix

### Interview Guide

For my master's in environmental studies I am gathering livestock farmers' perspectives on the future of British livestock farming post-Brexit. I am interested to hear how farmers feel about farming today and how they think agricultural policy changes may affect them.

#### Identity

- Environment
- Animals

#### Adaptability

#### Livelihood Security

1. Could you tell me about the history of your farm and your own experience on your farm?
2. What is your farm's size?
3. What type of farming do you do?
4. Could you describe to me your average day as a farmer?
5. What do you cherish the most about both your farm, and being a farmer?
6. Would you say you are happy being a farmer? Why/why not?
7. What would you say are the major challenges with being a livestock farmer?
8. Where do you like to go to relax?
9. Are there any ways you would change your farm if you had the resources?
10. In his speeches, Michael Gove has a heavy emphasis on 'farming for the environment'. How do you think livestock farming impacts the environment?
11. Is protecting the environment important to you? Why/why not?
12. Do you produce feed for your livestock? Why/why not?
13. How would you describe your relationship with your livestock (animals)?
14. What do you think about the current trend of people not eating meat? Do you think this will have any impact on livestock farming?
15. Do you find being a livestock farmer provides a secure income? How does this compare with the past?
16. Have you ever experienced financial insecurity?
17. What governmental support do you/your farm receive?
18. What are the latest investments you made in your farm? Where did you obtain the funds?
19. How do you think Brexit might affect farming in the UK?
20. What do you imagine for the future for your farm, and other livestock farms in the UK?
21. The government recommends people eat more **British** pulses. Have you ever considered growing crops for the human consumption market? Why/why not?