Food Production or Environmental Conservation: Competition for Land in the United Kingdom and Canada

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PhD

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Environment

April 2018

Abstract

With a growing global population projected to surpass 9 billion by 2050, and associated food demand anticipated to increase by 70 to 100%, food security has emerged as a land-use challenge of critical importance. This has raised concerns regarding how increased agricultural production can be achieved without compromising the natural environment. This challenge of balancing agricultural and environmental land-uses occurs at a range of scales addressed by this research, beginning with high level policies and working down towards farmers, the actors ultimately responsible for the management of arable land. The study was comprised of three interconnected research projects completed in two regions of comparison: Ontario, Canada and England, United Kingdom. First, I compared the agri-environmental land-use policy context of both cases through a thematic analysis of policy documentation. Second, I completed 24 interviews with representatives of agricultural and environmental stakeholder organisations to examine the agri-environmental land-use preferences of these actors. Third, I conducted 30 interviews with farmers to investigate their views and motivations relating to the adoption of pro-environmental activities. In addition, due to the timing of the research, an unanticipated opportunity arose to explore the views of stakeholder organisations and farmers in England on post-Brexit agri-environmental policy. Overall, my main finding was that England and Ontario have taken very different approaches to managing competition between agricultural and environmental land-uses with Ontario leaning towards land-sparing and England toward land-sharing. I found that this may be partially explained by different stakeholder preferences for agri-environmental land allocation and the attachment of actors to different agricultural paradigms (productivism / post-productivism). Importantly, the use of an original multi-level comparison of agri-environmental land-use in England and Ontario illuminated many similarities and differences that would not have been apparent in the analysis of a single case. As a result, the thesis offers multiple contributions to knowledge for rural, land-use, and comparative studies.

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Acknowledgements

There are several people I would like to thank without whom I could not have completed this PhD journey.

First, I want to thank my supervisor Dr Peter Howley for his support over the course of my PhD and for continuing to provide thoughtful feedback on my papers, even after dozens of versions! Thank you for helping me to balance my wordiness with your succinctness. I would also like to thank Professor Charlotte Burns for being on my Thesis Advisory Panel and for going above-and-beyond in the role.

I would like to acknowledge the support of the Social Sciences and Humanities Research Council (SSHRC) of Canada which funded this PhD through the Doctoral Fellowship program. I was very proud to receive this award and it greatly improved my confidence as I carried on through my program.

I would also like to extend my sincere appreciation to all of the people who participated in this research during the interviews. Your stories and experiences in pursuit of sustainable agriculture were very inspirational. This work could not have happened without your involvement.

I feel it is also important to acknowledge my former colleagues at the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) for encouraging me to take-up this opportunity. I would also like to thank my current colleagues at the Global Engagement Office within the University of York for offering me a behind the scenes view of academia.

Thank you to my family and friends, both in the UK and back in Canada, for being positive and supportive as I undertook this journey.

Last but not least I need to acknowledge Michaela Smith for coming on this journey with me to the UK. I could not have completed this PhD without your support and encouragement.

Declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References. All data analysis and writing of this thesis is my own work. The contribution of co-authors for accepted or prepared papers for submission are detailed as follows.

Chapter 2:

Marr, E. J., Howley, P., & Burns, C. (2016). Sparing or sharing? Differing approaches to managing agricultural and environmental spaces in England and Ontario. *Journal of Rural Studies, 48*, 77-91. doi:http://dx.doi.org/10.1016/j.jrurstud.2016.10.002

The contribution by co-authors was as follows:

Peter Howley & Charlotte Burns: Supervision, review and editing.

Chapter 3:

Marr, E. J. & Howley, P. (2018). Woodlots, wetlands or wheat fields? Agri-environmental land allocation preferences of stakeholder organisations in England and Ontario. *Land Use Policy*. doi: https://doi.org/10.1016/j.landusepol.2018.02.008

The contribution by co-authors was as follows:

Peter Howley: Supervision, review and editing.

Chapter 4:

Marr, E. J. & Howley, P. (In review). The accidental environmentalists: factors affecting farmers' adoption of pro-environmental activities in England and Ontario. *Journal of Rural Studies*.

The contribution by co-authors was as follows:

Peter Howley: Supervision, review and editing.

Chapter 5:

Marr, E. J. & Howley, P. What next after Brexit? Redesigning agri-environmental policy in England.

The contribution by co-authors was as follows:

Peter Howley: Supervision, review and editing.

Chapter 1 Introduction

Chapter summary: This Introduction chapter provides background and rationale for the thesis as well as summarising the aims and objectives that will be addressed in subsequent chapters. I begin with a discussion of the global challenge of sustainable land-use focused on potential competition between society's agricultural demands and environmental sustainability. I then provide a brief introduction to my case regions – Ontario, Canada and England, UK – which I will expand upon in later chapters. Next I detail my objectives, research approach, and methods and outline how I will investigate and compare approaches to managing agricultural and environmental land-uses, as well as stakeholder preferences, within the case regions. Finally, I provide chapter summaries of the four papers that comprise this thesis including their objectives and main contributions.

1.1 Background and context

Numerous global trends are putting increasing pressure on a decreasing land base to deliver an ever-growing number of products and services. With a world population projected to reach (or even surpass) 9.8 billion by 2050, it has been estimated that global food production will need to increase by 70 to 100 % in order to meet the needs of this rapidly growing population (Godfray et al., 2010; United Nations, 2017). Not only is demand for the volume of food increasing, but changing diets with more demand for animal protein are also decreasing agricultural efficiency (P. Smith et al., 2010). Coinciding with this growing demand for food are additional demands for fuel, fibre, and other bio-based products that will put further pressure on a land base that is already overwhelmed. The land requirements to attain this growth in production are debated, however one source notes that it may require as much as 1 billion hectares (ha) of land to be cleared globally by 2050 (Tilman, Balzer, Hill, & Befort, 2011).

Alongside this increase in demand is an anticipated decrease in the supply of agricultural land, as well as reductions in agricultural efficiency. Factors such as urbanisation, climate change, infrastructure expansion, and resource extraction are anticipated to reduce the supply of viable agricultural land, whereas questions surrounding water scarcity, land degradation, pollinator health, and fertiliser availability may also decrease future agricultural yields (Pretty et al., 2010; P. Smith et al., 2010). Together, this "*perfect storm*" puts society's agricultural demands on a collision course with environmental sustainability objectives, with the risk of agriculture continuing to

displace natural areas in order to deliver the products society demands (Sayer et al., 2013, p. 8349).

This expansion of agricultural land at the expense of the natural environment is not sustainable, particularly when we consider that agriculture is already the Earth's largest land use covering 38% of the planet's terrestrial surface (Foley et al., 2011). According to the Planetary Boundaries model, we are near to - or have already exceeded - the limits of numerous planetary systems which are related to agriculture (Rockstrom et al., 2009). Examples include exceeding the systems of climate change, biodiversity loss, and nitrogen and phosphorous cycles as well as nearing the limits of land-use change (Rockstrom et al., 2009; Steffen et al., 2015). Recent research from Campbell et al (2017) argues that agriculture is a primary contributor to almost all nine planetary systems included in the model, as well as being a major or significant driver of five high or increasing risk zones (i.e. climate change, land-system change, biogeochemical flows, biosphere integrity, and freshwater use) (Campbell et al., 2017). Indeed, while agriculture provides numerous ecosystem services (e.g. food and fibre, flood control, recreation), if not managed properly it can also result in a multitude of ecosystem dis-services (e.g. habitat loss, nutrient runoff) (Zhang, Ricketts, Kremen, Carney, & Swinton, 2007). This is apparent in agriculture's impacts on biodiversity, being identified as the leading cause of biodiversity loss worldwide (Green, Cornell, Scharlemann, & Balmford, 2005; Pywell et al., 2012). The need to address these global challenges has been reflected in the United Nation's Sustainable Development Goals, a number of which will require a fundamental reconsideration of agriculture and its relationship with the natural environment.[1]

Nevertheless, resolution of these difficult challenges will be impossible without 'buy-in' from the various actors who influence agri-environmental interactions. For this reason I set out to explore the preferences, views, and motivations of diverse stakeholders regarding how a finite land base could be managed to achieve both agricultural and environmental objectives. The research includes three levels of analysis: (1) the policy context and views of policymakers embedded in policy documentation, (2) the preferences of stakeholder organisations as middle-actors who influence both policy development and landowner decision-making, and (3) the views and motivations of farmers, the actors ultimately responsible for the management of arable land. My intention was to understand the similarities and differences between groups of actors,

[1] See the following website for details on the UN Sustainable Development Goals: https://sustainabledevelopment.un.org/sdgs

operating at different levels within a jurisdiction, in order to identify ways to encourage sustainable land management while minimising stakeholder conflict and policy failure.

In addition to engaging with diverse actors operating at different scales, I also set out to understand and incorporate concepts from multiple disciplines. By observing findings through multiple disciplinary lenses I was able to develop a comprehensive understanding of the topic of agricultural and environmental land-use. As well, this approach encouraged disciplinary 'cross-pollination' by incorporating and comparing concepts across disciplines and levels of analysis. Therefore, the research was fundamentally interdisciplinary and makes contributions to knowledge in such areas as policy studies, land-use planning, behavioural economics, rural sociology, and studies of farmer psychology.

1.2 The comparative approach

The use of an international comparative analysis has multiple benefits for the research process as well as the application of research findings. For the researcher, it provides an opportunity to learn more about other cultures and systems as well as allowing them to gain a better understanding of their own context by challenging their assumptions and perceptions (Hantrais, 2009, p. 9). Indeed, comparative research "*enhances the understanding of one's own society by placing its familiar structures and routines against those of other systems*" as well as heightening our "*awareness of other systems, cultures, and patterns of thinking and acting, thereby ... enabling us to contrast them critically with those prevalent in other countries*" (Esser & Vliegenthart, 2017, p. 2). Comparison also provides benefits to the research process and improves the research findings by testing the general applicability of theory and the scope and significance of phenomenon (Esser & Vliegenthart, 2017; Hantrais, 2009). Importantly, comparison of international cases also helps to avoid over-generalisation or naïve universalism resulting from ethnocentrism (Esser & Vliegenthart, 2017; Hantrais, 2009).

In terms of the application of research findings, comparative analysis helps to illuminate policy alternatives and "*provides access to a wide range of alternative options and problem solutions that can facilitate or reveal a way out of similar dilemmas*" (Esser & Vliegenthart, 2017, p. 2). More specifically, Hantrais (2009) outlines multiple specific benefits of comparative research for policy development and evaluation as it is expected to "*inform policy; identify common policy objectives; evaluate the solutions proposed to deal with common problems; draw lessons about best practice; [and] assess the transferability of policies between societies*" (Hantrais, 2009, p. 11).

For my specific comparative analysis I have used an interpretative approach to comparing the management of agricultural and environmental land-uses within two case jurisdictions (Lowe, 2012) as well as incorporating a multi-stakeholder "*dialogue"* in order to identify and contrast the preferences of actors with agricultural and environmental interests (Gkartzios & Shucksmith, 2015, p. 54).

1.2.1 Case selection

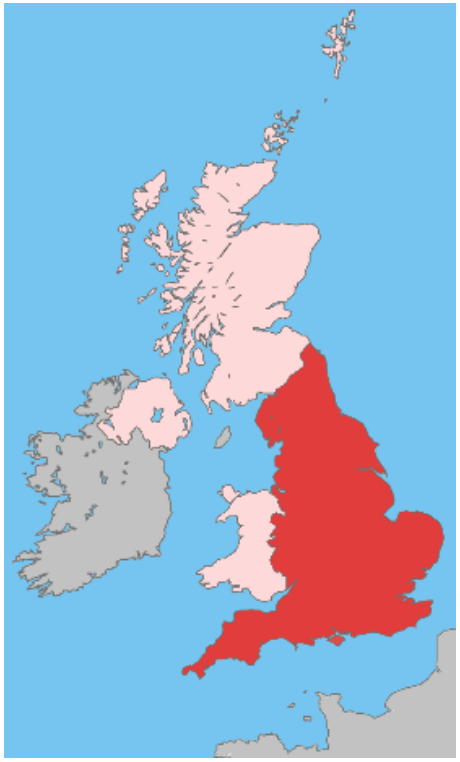
While perhaps most pronounced in the developing world, land-use conflict remains a challenge in developed countries where different land-uses compete for the same space, and society's demands for agricultural products sometimes come into conflict with social interest in environmental conservation. I have specifically set out to compare the country of England in the United Kingdom and the province of Ontario in Canada (see Figures 1-1 and 1-2 for maps of each jurisdiction). Both of these cases are challenged by habitat loss/fragmentation and reduced biodiversity, along with other negative environmental externalities from agricultural production that must be reconciled with social demands for food production and with other ecosystem services provided by agriculture.

I have chosen Ontario as my area of focus within Canada because land-use policy is a provincial jurisdiction. Ontario also best resembles England within the Canadian context as it contains the highest number of farmers in Canada, as well as a large proportion of the country's population living alongside prime agricultural land within a sensitive ecosystem (Statistics Canada, 2012). Ontario and England also present a valuable comparison based on their similar property rights regimes (Purdue, 2010; Schwartz & Bueckert, 2010), the shared origin of their political systems and land-use planning frameworks, and their shared experiences with urbanisation and attempts to conserve both agricultural and environmental land-uses (OECD, 2017; Pond, 2009).

Figure 1-1: Map of Canada with the province of Ontario highlighted in red

Source: Wikimedia Commons Atlas of the World:
https://commons.wikimedia.org/wiki/Atlas_of_Canada#/media/File:ON-Canada-province.png

Figure 1-2: Map of the United Kingdom with the country of England highlighted in red



Source: Wikimedia Commons Atlas of the World:
https://commons.wikimedia.org/wiki/Atlas_of_the_United_Kingdom#/media/File:
Map_of_England_within_the_United_Kingdom.svg

The history of land-use in England and Ontario also has more similarities than one might expect. It is relatively well known that food shortages and extensive rationing during and immediately following World War 2 drove considerable increases in agricultural production in England and elsewhere in Europe (Department for Environment Food & Rural Affairs [Defra], 2006). This post-war pursuit of production increases in the name of food security eventually led to over-production across the European Union popularised with such terms as 'grain mountains' and 'wine lakes' (Department for Environment Food & Rural Affairs [Defra], 2006). This overproduction was also associated with an overextension of agriculture at the expense of the natural environment, and the resulting loss of habitat has been associated with biodiversity declines in the abundance and range of farmland birds, native plants, and invertebrates (Macdonald & Johnson, 2000; Robinson & Sutherland, 2002). Efforts have since been made to decouple production from financial support alongside the introduction of agri-environmental schemes, each of which is intended to encourage more environmentally beneficial management of farmland (Dobbs & Pretty, 2008). Nevertheless, agriculture remains England's predominant land-use, accounting for approximately 70% of England's total land area (Department for Environment Food & Rural Affairs [Defra], 2016).

In contrast, the image of Canada is often characterised both inside and outside the country as containing large areas of untouched, pristine wilderness across a vast frontier. However, it has been argued that this characterisation represents a myth associated with a national narrative which neglects the changes to Canada's landscape that have taken place for millennia (Dent, 2013). For instance, early 18th and 19th Century European colonists in Canada made massive land-use changes over a short period and dramatically changed the landscape, as exemplified in the quote from Jameson, 1838: "*A Canadian settler hates a tree, regards it as his natural enemy, as something to be destroyed*" (as cited in Butt, Ramprasad, & Fenech, 2005, p. 83). This is particularly true in southern Ontario where efforts to expand urban and agricultural land-uses converted much of the region, and most areas with agricultural capability, from their natural state. For instance, forest cover is estimated to have declined in this area from over 80% prior to European settlement to less than 17% in recent years (Butt et al., 2005).

In southern Ontario, agricultural coverage peaked around 1931 when farmland occupied 60.7% of the area; after this point some farmland was abandoned or actively regenerated into natural areas, declining to a coverage of 35.5% in 2011 (P. G. R. Smith, 2015). This story has parallels to the English experience, however, unlike in England, a myth of pristine wilderness persists in Canada even in heavily converted areas such as southern Ontario, where one might incorrectly assume that areas which are currently in

a ‘natural’ state have always been this way (Butt et al., 2005). Like England, the southern Ontario landscape has been radically altered from its natural state to a greater degree and over a longer timescale than might be assumed. Also like England, southern Ontario was overexploited for agricultural purposes and efforts to regenerate natural areas have been undertaken in an attempt to re-balance the landscape between agriculture, the environment, and other land-uses (Nebel, Brick, Lantz, & Trenholm, 2017). Further details on the cases of England and Ontario, as well as additional justification for their comparison can be found in Chapter 2.

I set out on this research with the anticipation that England could provide useful lessons for Ontario given that it has a long experience with managing competition between agricultural and environmental land-uses within a smaller area and with a much larger population. However, before any potential transferability of policy approaches can be discussed, it is essential to understand whether or not the stakeholders ultimately responsible for their implementation would accept them. With this in-mind I set out to understand the similarities and differences in each jurisdiction’s approach to managing agricultural and environmental land uses, as well as the views and preferences of stakeholders. It is my intention that this will support the identification of appropriate policy instruments, to achieve similar objectives, while minimising stakeholder conflict and policy failure arising from the implementation of contextually inappropriate approaches.

1.2.2 Ensuring symmetry and transparency

As with all qualitative research, transparency and reflexivity are important for international comparative research. This is particularly important for addressing the issue of ‘*symmetry’* and avoiding ‘*asymmetrical’* or ‘*imperialist’* approaches to research (Gkartzios & Shucksmith, 2015; Hantrais, 2009). Indeed, comparative researchers need to take special care to avoid parochialism and ethnocentrism in their research approach which may result from imposing their own narrow views and assumptions on an unfamiliar context or by excluding local researchers and knowledge (Hantrais, 2009).

In the case of this research, the primary researcher (Eric Marr) is from Ontario and studied rural land-use at the graduate level in the province, with a focus on Ontario’s rural and agricultural land-use including trends, issues, systems, and governance. Following this, he worked in rural land-use policy within the provincial government, specifically within the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). This study was undertaken from England, based at the University of York, with supervision and assistance/advice from specialists in English agricultural and environmental policies and issues (Dr Peter Howley and Professor Charlotte Burns). This

approach ensured local knowledge was included from both cases as well as avoiding parochialism and ethnocentrism by viewing findings and phenomenon through the eyes of researchers with different backgrounds, assumptions, and perspectives.

Through this approach the primary researcher was able to provide a fresh perspective on the English case, coming from a different context, as well as being able to reflect back upon the Ontario case while immersed in a different environment with different norms and assumptions. This improved the value of the findings and illuminated similarities and differences that would not have been possible with a narrow focus on either case.

1.3 Thesis aim and objectives

The overall aim of this thesis is to compare and contrast the policy approaches that Ontario and England have taken to manage competition between agricultural and environmental land-uses, and to investigate the agri-environmental land-use preferences of stakeholders in each setting.

The thesis has three research objectives, each coinciding with a distinct level of analysis:

1. To understand the agri-environmental land use policy context of England and Ontario
2. To understand the agri-environmental views and preferences of stakeholder organisations in each case
3. To understand farmers' views and motivations relating to the adoption of pro-environmental activities on their farms in both jurisdictions

Taken together, these three objectives will allow me to comprehensively investigate the agri-environmental land-use preferences of diverse stakeholders for differing land management systems and policy approaches within each jurisdiction. Moreover, I will compare and contrast approaches to managing potential conflicts between agricultural and environmental land-uses in England and Ontario alongside a comparison of stakeholder preferences. This is important in order to understand where opportunities and obstacles exist in the pursuit of a widely agreed upon solution for managing competing land-uses within each jurisdiction. The use of a comparison between England and Ontario will also allow me to identify where approaches might be transferable and lessons shared, as well as where differing stakeholder preferences would impede policy transfer.

1.4 Approach

This research is fundamentally exploratory, as I have not set out with a pre-existing hypothesis or with the intent to prove/disprove an established theory; as a result, my approach is inductive and incorporates elements of Grounded Theory. The discovery of Grounded Theory is generally attributed to Glaser and Strauss (1967) who put forward an inductive approach to conducting research whereby theory is derived from data. In a qualitative study such as this one, largely reliant on participatory approaches (i.e. interviews), this approach can be described as developing "*theory grounded in the perspectives of those who have participated in the research process*" (Philip, 1998, p. 267).

From the starting point set out by Glaser and Strauss, Grounded Theory has been frequently used in inductive research and has been amended to be more pragmatic and to fit the realities of 'real world' research exercises (Bryant & Charmaz, 2007). Professor Kathy Charmaz is one such author whose revised approach to Grounded Theory has proved popular amongst researchers. She proposes six distinguishing characteristics of Grounded Theory as follows:

> *"(1) simultaneous involvement in data collection and analysis phases of research; (2) creation of analytic codes and categories developed from data, not from preconceived hypotheses; (3) the development of middle-range theories to explain behaviour and processes; (4) memo-making, that is, writing analytic notes to explicate and fill out categories, the crucial intermediate step between coding data and writing first drafts of papers; (5) theoretical sampling, that is, sampling for theory construction, not for representativeness of a given population, to check and refine the analyst's emerging conceptual categories; and (6) delay of the literature review*" (Charmaz, 1996, p. 28).

I have drawn inspiration for the design of my own inductive, exploratory research from this approach and have incorporated these principles into my research design. This includes the development of codes and categories from the data, memo-making, theoretical sampling as opposed to representative sampling, as well as minimising preconceptions through the use of an *ex post facto* review of the literature.

Like other researchers I found Grounded Theory to be a useful foundation, however I found that a strict adherence to Grounded Theory did not coincide exactly with the objectives of my research project (Karali, Brunner, Doherty, Hersperger, & Rounsevell, 2014; Schenk, Hunziker, & Kienast, 2007). For instance I cannot say that, over the course of the research, I was completely bereft of pre-existing knowledge of the topic or its literature. Moreover, while I started from a very exploratory foundation with

limited knowledge of the literature my awareness grew over the course of the project and later research exercises (e.g. the interviews with farmers) were undertaken with the knowledge derived from the previous research components (e.g. the review of policy documentation). Nevertheless, while perhaps not strictly adhering to the 'rules' of Grounded Theory, the inductive approach that I used in conducting this research was best suited to addressing the research objectives and allowed for findings to emerge from the data without the restrictions imposed by pre-existing parameters or the need to fit within a narrow framework. Put differently, over the course of the research I was free to follow the data wherever it led, which ultimately resulted in very interesting findings that I had not initially considered and, in the case of Brexit (see Chapter 5), could not have anticipated. As an inductive and exploratory study, conceptual frameworks that best suit the results of each chapter were identified through an *ex post facto* literature review. Therefore the academic literature is addressed in each chapter in parallel to the findings.

1.5 Methods

In order to achieve my research objectives, I set out to understand the preferences, views, and motivations of three distinct sets of actors operating at different levels of analysis – policymakers, stakeholder organisations, and farmers – in two comparable case jurisdictions: England in the United Kingdom and the province of Ontario in Canada. I utilised a qualitative methodological approach in order to reach a detailed, in-depth understanding of stakeholder preferences for agri-environmental land-use, including an investigation of *why* they held these preferences.

For my first objective, I used a documentary analysis of agri-environmental land-use policy documentation from each case. This involved a thematic analysis of policy documentation and a comparison of findings between cases in order to understand, and compare and contrast, approaches to managing agricultural and environmental land-uses in both England and Ontario. Policy documents were reviewed (read and re-read) and data items were identified where they were relevant for understanding the different approaches to managing agricultural and environmental land-uses. These initial data items (codes) were then organised into data-driven themes/patterns, then into organising themes, and finally into global themes. I used a novel approach to depict the interconnection between data items, organising themes, and global themes using a 'thematic network diagram' (Attride-Stirling, 2001). Through an *ex post facto* literature review, the conceptual frameworks of (1) land sparing / land sharing, and (2) productivism / post-productivism, were found to be global themes best suited to

interpreting the information and drawing meaning from the research findings. More details on these key concepts can be found in Chapter 2 and in Appendix 1.

For my second objective, I conducted semi-structured interviews with stakeholder organisations having agricultural and/or environmental mandates. The interviews were used to explore the agri-environmental land-use preferences of stakeholder organisations, as well as compare these preferences across case jurisdictions. I also elicited views on different landscape mixes using a photograph elicitation exercise embedded in the interview protocol. The photo elicitation exercise allowed me to (virtually) draw the participants into real-world landscapes in order to elicit deeper views and preferences, and help reposition these views and preferences from the conceptual/theoretical into the actual (Harper, 2002; Liamputtong, 2007). I conducted interviews with representatives from 24 organisations, 12 from each case study. Analysis was inductive, using an open-coding approach to identify and aggregate lower order codes into higher order codes and eventually into themes. The interview protocol was flexible enough to allow participants to introduce topics not considered in the original research design, yet structured enough to ensure consistency of topics across interviews necessary to support analysis (see Appendix 2 for the interview protocols used in each case). More details on this method are described in Chapters 3, 4, and 5.

For my third objective, my approach was similar to the second in that I conducted semi-structured interviews with farm owners and/or farm managers operating in each jurisdiction. Interviews were completed over the period of autumn 2016 and winter 2017 with a total of 30 farmers, including 12 from England and 18 from Ontario. Interviews were semi-structured following a flexible interview protocol to allow for participants to stray from the initial questions and introduce issues or opportunities that may have otherwise been missed (see Appendix 3 for the interview protocols used in each case). More information on the interviews with farmers are presented in Chapters 4 and 5.

Almost all 54 interviews (24 stakeholder organisations and 30 farmers) were conducted using the telecommunication software Skype® using either Skype-to-Skype connections or by calling participants' mobile phones or landlines, depending on their preferences.[2] The interviews were recorded, with the participants' explicit permission, and transcribed verbatim.

[2] Three of the Ontario stakeholder organisation interviews were conducted in-person. These were recorded using a mobile phone (iPhone 4) with a dictation machine backup. This was found to be costly in terms of time and resources and so the remainder were completed using Skype®.

While face-to-face interviews are typically considered to be the 'gold standard' in interviewing, in recent years online synchronous interviews, such as Skype[3] interviews, have been increasingly used with favourable results (Deakin & Wakefield, 2013; Hanna, 2012; Janghorban, Roudsari, & Taghipour, 2014; Lo Iacono, Symonds, & Brown, 2016; Weller, 2017). Indeed, this type of interviewing "*mitigates the distance of space, enables research to be easily internationalised without the usual associated travel costs and can be valuable for researchers contacting groups or individuals who may otherwise be difficult to reach*" (O'Connor & Madge, 2017, p. 416).

Benefits for the use of Skype include "*low costs, ease of access, minimization of ecological dilemmas, and the partial overcoming of issues of spatiality and physical interaction*" (Edwards & Holland, 2013, p. 49). The use of Skype is particularly effective for research with a geographically dispersed research population (Deakin & Wakefield, 2013). Online or telephone based interviews have also been found to be particularly suitable for research founded in environmental sustainability, such as this, where extensive travel to participate in face-to-face interviews would be inconsistent with the spirit of the research (Hanna, 2012). Online synchronous interviews are also effective for international comparative research as a means to reach a dispersed, international, varied, and purposeful sample (Lo Iacono et al., 2016). Due to the numerous benefits that online synchronous interviews offer, including several advantages over face-to-face interviews, it has been argued that online interviews should be viewed as a viable option parallel with face-to-face interviews rather than an alternative or secondary choice (Deakin & Wakefield, 2013; Weller, 2017).

In my own experience this process was found to be an efficient and cost-effective way of conducting interviews that was convenient for both the participants and the researcher, especially considering the challenges with distance, time-zones, and the limited resources available for the project. Recording from Skype also resulted in relatively clear audio files that helped ensure the accuracy of the transcriptions. Moreover, because the files were produced from two distinct sources (i.e. the two ends of the Skype call) each speaker could be isolated in instances where they overlapped to further ensure accuracy of the transcription. I used the software Audacity® for this purpose. Further reflections on the use of Skype as a research tool are included in Chapter 6.

[3] While there are various software options for conducing online synchronous interviews Skype is generally considered to have more international recognition and operating system compatibility than other software applications that are available (Deakin & Wakefield, 2013; O'Connor & Madge, 2017).

The sum of the interviews resulted in a very large amount of rich data. From more than 50 hours of audio recording I transcribed over 287,000 words totalling 654 pages. I analysed this considerable amount of information from both sets of interviews (i.e. with stakeholder organisations and with farmers) using an iterative, inductive approach whereby themes were developed by aggregating lower order codes, using a thematic analysis process (Braun & Clarke, 2006; Bryman, 2016; Burnard, 1991). Using NVivo 10, transcripts were systematically and rigorously coded, line-by-line, in their entirety through an open-coding exercise. By collapsing codes and removing repetition and redundancy, this large number of open-codes was aggregated into axial codes and then into themes. For more details on this method see Chapters 3, 4, and 5.

1.6 Breakdown of chapters

Chapter 2 Sparing or sharing? Differing approaches to managing agricultural and environmental spaces in England and Ontario

In Chapter 2 I provide the results of my first research objective, which was an analysis of agri-environmental land-use policy from England and Ontario. In order to meet this objective I undertook a thematic analysis of policy documents, relating to agri-environmental land-use policy, within each case and compared the results. The chapter discusses the differences and similarities in approaches to managing agricultural and environmental land-uses in these jurisdictions. I also identify policymaker preferences embedded within policy documentation and contrast across cases. I introduce the land-sparing / land-sharing and productivism / post-productivism (multifunctionality) theoretical frameworks to help explain the results (more details on these concepts in Appendix 1). Furthermore, this chapter also provides useful context for the rest of the thesis. It includes a detailed explanation of the England and Ontario cases as well as further justification for their selection. In particular, this chapter includes an important description of the approaches to agricultural and environmental policy within these two jurisdictions.

Chapter 3 Woodlots, wetlands or wheat fields? Agri-environmental land allocation preferences of stakeholder organisations in England and Ontario

In Chapter 3 I address my second research objective, to understand the agri-environmental land allocation preferences of stakeholder organisations operating within England or Ontario. To meet this objective I undertook 24 semi-structured interviews (12 from each case) with representatives of stakeholder organisations with agricultural and/or environmental interests. I use an inductive, exploratory approach to ascertain participants' preferences for agri-environmental integration or separation, using the land-sharing / land-sparing framework – introduced in Chapter 2 - to help organise participant preferences *ex post facto*. I discuss how participants across, and within, cases generally agreed with the principle of integrating agricultural and environmental objectives within the same area, reflective of the land-sharing approach. Nevertheless, in spite of the stated preference for an integrated approach, this research also identifies more nuanced disagreements between, and within cases, which pose challenges for the pursuit of a widely agreed upon approach to agri-environmental land allocation.

Chapter 4 The accidental environmentalists: factors affecting farmers' adoption of pro-environmental activities in England and Ontario

In Chapter 4 I focus on my third objective, to understand farmers' views and motivations relating to the adoption of pro-environmental activities on their farms. In this chapter I present the results of 30 semi-structured interviews undertaken with farmers based within England or Ontario. In addition to farmers, who are ultimately responsible for the management of agricultural land, it is also essential to investigate the views of organisational stakeholders who affect the policy environment in which farmers operate. With this in mind, in this chapter I also incorporate the 24 semi-structured interviews with stakeholder organisations to understand how these representatives interpret farmer motivations. In total, I present the results of 54 semi-structured interviews undertaken with four sets of actors across two case regions. I use the results of these interviews to discuss the factors that influence farmers' adoption of pro-environmental activities. The results of this chapter present a new data-driven framework to assist in explaining farmers' decision-making when it comes to the adoption of pro-environmental activities within their farming operations. This includes highlighting that these influences are frequently unrelated to the environment and farmers often become '*accidental environmentalists'* by undertaking many pro-environmental activities for non-environmental reasons.

Chapter 5 What next after Brexit? Redesigning agri-environmental policy in England

Chapter 5 resulted from an unanticipated opportunity to explore stakeholders' views on the future of England's agri-environmental policy after the UK's transition out of the European Union (EU). The chapter presents supplemental findings that crosscut my three original research objectives with regard to policy analysis and stakeholder preferences on land-use. In this chapter I discuss stakeholders' (organisations and farmers) views on England's approach to agri-environmental policy more generally, as well as their views on specific policy changes such as those arising from the 2014-2020 CAP Reform (i.e. Countryside Stewardship and Greening). The chapter is based on the results of the two sets of semi-structured interviews undertaken with stakeholder organisations (12) and farmers (12) in England. Through an inductive analysis of these two sets of interviews I present the findings of an in-depth exploration of the perspectives of stakeholder organisations and farmers on the topic of agri-environmental policy in England. The results are predominantly empirical however I do include some conceptual

findings and observations relating to the way various actors interpret and/or experience policy and how this influences their views on policy effectiveness.

Chapter 6 Overall Discussion & Conclusion

In Chapter 6 I briefly reiterate my overall aim and approach, and provide short summaries of the four papers that comprise this thesis. In this concluding chapter I also provide my own critical reflections on the methods used in the thesis, including specific discussion of the use of Skype as a research tool for conducting online synchronous interviews as well as reflections on the photograph elicitation exercise utilised in the interviews with stakeholder organisations. Following this I engage with the literature in order to critically reflect upon the land-sparing / land-sharing framework as well as discussing its potential use in future social science research. I also discuss opportunities for future research more generally and highlight the significance of the thesis findings for policy development. Finally, I conclude with a brief summary of the overall contributions to knowledge offered by this thesis.

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Chapter 2 Sparing or sharing? Differing approaches to managing agricultural and environmental spaces in England and Ontario

2.1 Preface

Jurisdictions around the world are challenged by the management of agricultural and environmental land-uses that often compete for the same rural spaces. With a shared history, similar cultures, and comparable institutional structures and systems, England and Ontario provide a useful comparison for understanding policy approaches to agri-environmental land-use. Indeed, England has experienced conflicts between urban, agricultural, and environmental land-uses for much longer than Ontario and thereby provides "*a preview of what may lie ahead and can help to identify policies for dealing with future challenges*" (Alterman, 1997, p. 220).

However, before we can discuss the transfer of policy instruments we must first understand each jurisdiction's current approach, as well as their differences and similarities. It is also essential that we understand the preferences of policymakers in order to understand the origin of policy approaches, as well as any opportunities or obstacles to sharing lessons, experiences, and instruments. With this in mind, I set out to achieve my first research objective, which was to gain an in depth understanding of current policy as it relates to agricultural and environmental land-use in each jurisdiction through the analysis of policy documentation. I also wanted to use the information embedded in these documents in order to extract policymakers' agri-environmental land management preferences. The chapter also presents a description of the policy approaches used for managing agricultural and environmental land-uses in England and Ontario that is particularly useful for contextualising the subsequent chapters.

Through this inductive, exploratory analysis I identified clear differences in the fundamental approach to managing agri-environmental land-uses between these two cases. I found that England leans towards an integrative approach, whereas Ontario typically separates these land-uses into their own distinct spaces. Through an *ex post facto* literature review I found that the theoretical concept of land-sparing / land-sharing was well suited to explaining these differing approaches. In parallel, I found that the theoretical framework of productivism / post-productivism (multifunctionality) helped to explain this difference in approaches due to a fundamental attachment by policymakers to contrasting agricultural paradigms and a different philosophical view of the purpose of agricultural land.

The following chapter is presented in the style of the *Journal of Rural Studies* where it was published as follows:

Marr, E. J., Howley, P., & Burns, C. (2016). Sparing or sharing? Differing approaches to managing agricultural and environmental spaces in England and Ontario. *Journal of Rural Studies, 48*, 77-91. doi:http://dx.doi.org/10.1016/j.jrurstud.2016.10.002

Declaration

I declare that the work submitted is my own. The contribution by co-authors was as follows:

Peter Howley & Charlotte Burns: Supervision, review and editing.

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Sparing or sharing? Differing approaches to managing agricultural and environmental spaces in England and Ontario. *Journal of Rural Studies, 48*, 77-91

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2.2 Abstract

The ability to balance agricultural production and environmental conservation in the face of increasing demand for food, fuel and fibre poses a major challenge for governments around the world. This challenge is explored in two areas of comparison: Ontario, Canada and England, UK in order to understand how each has balanced agriculture and environment in its land use policies. England and Ontario share similarities that suggest lessons and instruments may be transferable to achieve similar land use objectives. Through the use of a thematic analysis of policy documentation, from each case study area, themes are identified demonstrating differences in approaches, and underlying policy preferences, associated with balancing agriculture and the environment. Specifically, results suggest that policymakers in Ontario hold a preference for land-sparing and leanings towards the productivist paradigm, whereas the land-sharing approach coupled with evidence of post-productivism is more common in England. The structural similarities of these cases provides insights into less tangible aspects of either context, such as policymaker preferences, where different approaches have emerged from a similar foundation. Moreover, as England transitions out of the EU, it may draw on the experiences of other jurisdictions in the design of a new suite of agri-environmental policies, with Ontario's approach providing one alternative. Overall, this paper contributes to our understanding of the manifestation of land-sparing/sharing and productivism/post-productivism in real world policy contexts and the relationship between both sets of concepts.

Keywords: Comparative policy; Agri-environmental policy; Land use conflict; Land Sparing; Land Sharing; Post-Productivism

Highlights:

- We compare agricultural and environmental land use policy in England and Ontario
- Thematic analysis of land use policy documentation is conducted
- Approach is found to be land-sparing in Ontario and land-sharing in England
- Preference for productivism is found in Ontario and post-productivism in England
- Findings suggest policymaker preferences may explain different approaches

2.3 Introduction

With a growing global population projected to surpass 9 billion people by 2050, and associated food demand anticipated to increase by between 70 and 100 per cent, food security has emerged as a land use challenge of particular importance (Bridge & Johnson, 2009; Defra, 2008; Evans, 2009; FAO, 2009; Godfray et al., 2010; UN, 2013). Increasing population and food demand, alongside numerous other land use trends, summarised by Smith *et al.* (2010), have created a "*perfect storm"* with various land uses competing for a finite land base (Sayer et al., 2013, p. 8349). From this, two land uses that have emerged as particularly challenging to manage are agricultural production and environmental conservation, which have been described as being on a "*collision course*" (Sayer et al., 2013, p. 8349). These concerns have been reinforced by research findings pertaining to the land needs of a growing population, such as the estimate that as much as 1 billion hectares (ha) of land may need to be cleared globally by 2050 in order to accommodate increasing demand for agricultural production (Tilman, Balzer, Hill, & Befort, 2011).

The challenge of managing agricultural production and environmental conservation will take place at various scales and include a multitude of actors. This paper sets out to analyse the various land use policies that manage agricultural and environmental spaces within two jurisdictions: Ontario, Canada and England, United Kingdom. Ontario and England share many important characteristics such as their government structure, legal system, and culture/history, as well as similar land use planning traditions and associated property rights regimes. Hence, whilst there are notable differences across the two cases, they nevertheless share sufficient commonalities to render them similar enough instances of the same general phenomena

to justify comparison, and allow for useful insights into agri-environmental land use policy within the two jurisdictions.

Moreover, there is much that Ontario and England can learn from one another, particularly as they grapple with the same global challenges affecting land allocation. Comparison is particularly, though not exclusively, valuable for Ontario where England has experienced conflicts between urban, agricultural and environmental land uses for much longer than Ontario and thereby provides a preview of challenges that Ontario may face in the future, as well as potential solutions (Alterman, 1997, p. 220). On the other hand, as England transitions out of the European Union (EU), it may look towards the experiences of countries with similar foundations from which to build a new set of agri-environmental policies. Within the literature, the paper contributes a novel comparison, building from previous comparisons of agri-environmental and/or land use policy, such as between Norway and Australia (Bjørkhaug & Richards, 2008), New York State and England (Bills & Gross, 2005), and between the EU and the United States (Baylis, Peplow, Rausser, & Simon, 2008).

This research found that despite similar planning traditions and property rights regimes, Ontario and England have a very different approach to managing agricultural and environmental spaces. Ontario's approach was more reflective of a land-sparing approach in which agricultural and environmental spaces were separated, whereas policy in England is predominantly aimed at integrating agricultural and environmental spaces (land-sharing). These different land management approaches appear to reflect distinct preferences among policymakers. Policy rhetoric in Ontario is geared towards productivism, i.e. a belief that arable land should be used primarily for production. On the other hand, discourse in England emphasises the multifunctional nature of arable land, a key indicator of a post-productivist agricultural paradigm.

This paper provides a valuable contribution to both the literature and practice of rural land use, by comparing and contrasting the policymaker preferences behind land use policy approaches in two comparable jurisdictions. The article contributes to a gap in the academic literature by grounding the theoretical land-sparing/land-sharing and productivist/post-productivist typologies within 'real-world' policy contexts. While substantial literature has grown around the concepts of land-sharing and land-sparing, there is currently limited understanding of its application within actual land use policy systems, particularly in developed countries. Where this concept has been explored in real-world cases it has mostly been in the developing world including Ghana and India (Phalan, Onial, Balmford, & Green, 2011), Mexico (Gordon, Manson, Sundberg, & Cruz-Angón, 2007), Indonesia (Clough et al., 2011) and Argentina (Mastrangelo & Gavin, 2012). Research from developed countries, such as Australia (Dorrough, Moll, &

Crosthwaite, 2007), the UK (Hodgson, Kunin, Thomas, Benton, & Gabriel, 2010), and the United States (Egan & Mortensen, 2012), to this point have taken a positivist, evaluative approach to assess the benefits of either management option. Instead, this research explored the manifestation of these approaches within land use policies in developed countries.

Our research sheds new insights relating to the relevance of productivist/post-productivist ideological frameworks for shaping the design of land use policies. This is particularly true in the Canadian context, where an empirical study of productivism/post-productivism has not yet been completed, even though it has been applied outside the UK in multiple jurisdictions including Australia (Argent, 2002; Holmes, 2002, 2006), Denmark (Kristensen, 2001; Kristensen, Thenail, & Kristensen, 2004) and Norway (Bjørkhaug & Richards, 2008). Furthermore, Mather, Hill, & Nijnik (2006) describe the linkage of post-productivism with land use as a "*field that is ripe for the further development of theory and especially theory on the fundamental drivers of change,*" yet little has been conducted on this linkage since their article was published in 2006 (Mather, Hill, & Nijnik, 2006, p. 452).

This approach and its findings are novel within the academic literature. The concepts of land-sparing/land-sharing and productivism/post-productivism have rarely been explored in the Canadian context, representing a clear gap in our understanding of the application and wider transferability of these sets of concepts. Moreover, no literature was identified that explicitly notes the interconnection between the concepts of land-sparing/land-sharing and productivism/post-productivism, whilst this paper suggests there may be parallels and overlap between these two independent sets of literature that should be explored further.

Finally, the article has relevance for policy development in both contexts. The study found that different approaches to managing agricultural and environmental spaces have emerged from a similar government/legal structure in both Ontario and England, at least in part as a result of differing policymaker preferences. These findings support cautious efforts to share lessons and instruments between these jurisdictions, recognising the underlying differences that this research has identified. Similarly, the study supports further research on the transferability of agri-environmental policies between North America and Western Europe.

2.4 Methods

For the purposes of this paper, 'land use policy' is considered to comprise three sets of public policies with spatial implications for the use of arable land: planning policies, agricultural policies and environmental policies. This research also took a broad view of policy going beyond documents/statements labelled as 'policies' to include additional material listed in Table 2-1 (e.g. guidance material, legislation) which allowed for improved understanding of each government's policy preferences. Sources were compiled from current policies as of March 2015 and in certain circumstances we also drew on previous versions of policies to provide additional context. The full list of reviewed policies is provided in Table 2-1 with additional details provided in Appendix 4.

The sources used for the analysis were identified by systematically reviewing government websites, reports and academic publications for mentioned policies, legislation and other related documentation. The original documents were then obtained from official government websites with particular effort to ensure the most recent version was obtained (e.g. not superseded).

The study used an inductive approach incorporating elements of grounded theory, whereby theory was developed through the research findings, rather than the testing of a hypothesis (Charmaz, 2014; Glaser & Strauss, 1967). This process also included a thorough literature review be completed after the initial thematic analysis. This allowed for the consolidation, and interpretation, of themes through the lens of concepts already well developed within the academic literature.

The research used a combination of semantic and latent approaches for analysing documents (Shaw, Elston, & Abbott, 2004). This included the description of overt and explicit information extracted from documents, the review of broader policy documentation including guidance material, and the analysis of ideology/discourse within documents in order to help understand the underlying reasons for documents and decisions (Shaw et al., 2004). The process for analysing the documentation was based upon the six phases of thematic analysis outlined by Braun and Clarke (Braun & Clarke, 2006, p. 87).

Documents were reviewed (read and re-read) and data items, semantic and latent, were identified where they were relevant for the original research objective, using a focused coding strategy (Charmaz, 1996).[4] Through an inductive process, the initial data

[4] The analysis was conducted by one author with input/critiques from the other authors. From each round of input/critiques, the documents were revisited to ensure consistency in interpretation

items, derived directly from policy documents, were described and categorised into data-driven descriptive themes and patterns, such as ‘seeking new land for agriculture’ or ‘discouraging agricultural expansion’. These descriptive themes were then categorised further into organising themes dependent on topics, such as ‘Protected Landscapes’, ‘Planning Policy’, and ‘Governance Structure’, to create the consistency necessary for comparison. The creation of data-driven themes from original data items is depicted in Appendix 4. The arrangement and interconnections between descriptive and organising themes is depicted in the Thematic Networks (Figures 2-2 and 2-3).

Following the development of these sets of themes, a thorough review of the literature was conducted in order to “*interpret the information and themes in the context of a theory or conceptual framework*” and allow for the grounding of the findings within a broader set of literature (Boyatzis, 1998, p. 11). Through this literature review, the conceptual frameworks of (1) land-sparing/land-sharing, and (2) productivism/post-productivism, were found to be global themes best suited to interpreting the information and drawing meaning from the research findings.

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and to extract new observations that led to new themes or lent weight to existing themes. This allowed for consistency in the analysis and interpretation of findings, however continued involvement and questions from other researchers ensured that the analysis was conducted critically.

Table 2-1: Legislation, Policies and Programs/Schemes with Spatial Implications for Arable Land Examined within each jurisdiction

	Ontario	England
Planning Policy	• Planning Act, 1990 • Provincial Policy Statement (PPS), 2014 • Greenbelt Plan, 2005 • Oak Ridges Moraine Conservation Plan, 2002 • Niagara Escarpment Plan, 2005 • Minimum Distance Separation (MDS) • Growth Plan for Northern Ontario, 2011 • MMAH Mandate Letter (2014)	• Town and Country Planning Act, 1990 • Planning and Compulsory Purchase Act, 2004 • Planning Act, 2008 • National Planning Policy Framework (NPPF) • Planning Practice Guidance (8) Natural Environment

Agricultural	• Growing Forward 2
	  ○ Production Support: Agri-Stability, AgriInvest, Production Insurance and AgriRecovery
	  ○ Agri-environmental programs
	• The Farming and Food Production Protection Act (FFPPA), 1998
	• Environmental Farm Plan (EFP) program
	• Species at Risk Farm Incentive Program (SARFIP)
	• OMAFRA Mandate Letter (2014)
	• Local Food Act, 2013
		• Common Agricultural Policy (CAP)
		  ○ Pillar 1 (production support) and Pillar 2 (rural development)
		• CAP Cross Compliance:
		  ○ Statutory Management Requirements (SMRs)
		  ○ Good agricultural and environmental condition (GAEC) standards

Environmental	• Natural Heritage Reference Manual (2010) • Provincial Parks and Conservation Reserves Act, 2006 • Endangered Species Act, 2007 • MNRF Mandate Letter (2014)	• Hedgerows Regulations, 1997 • Wildlife and Countryside Act, 1981 • Countryside and Rights of Way Act, 2000 • Natural Environment and Rural Communities Act, 2006 • The Natural Choice: securing the value of nature – Natural Environment White Paper, 2011 • Biodiversity 2020 • English national parks and the broads: UK government vision and circular, 2010 • English Woodland Grant Scheme (EWGS) • Environmental Stewardship Scheme

2.4.1 Case Selection

Canada and the UK have several characteristics that make them appropriate for comparison in this study. Fundamentally, the UK and Canada have a shared history, remaining from their former colonial relationship, which is still evident in their shared Head of State and Commonwealth membership. Canada has modelled its Westminster parliamentary and common law legal systems from the UK, which has then been replicated in each of its provinces. As well, the people of Canada and the UK remain closely connected, for instance as recently as the *2011 National Household Survey* of Canada 35 per cent of Canadians identified the British Isles as their ethnic origin (Statscan, 2014).

Of particular relevance to this study, the planning systems of the UK and Canada share many resemblances, including similar property rights regimes. While comparisons of land use policy that include Canada tend to focus on the United States, this is complicated by the difference in private property rights and compensation for regulatory takings (Bryant & Russwurm, 1982; Bunce, 1998; Furuseth & Pierce, 1982). The UK and Canada provide a better comparison as neither has entrenched property rights and compensation for regulatory takings is minimal (Purdue, 2010; Schwartz & Bueckert, 2010).

In the UK, responsibility for planning rests with each of the countries (England, Wales, Scotland, and Northern Ireland) that comprise the Union and similarly, in the Canadian distribution of powers, the provincial governments have responsibility for land use planning. For this reason, systems have developed differently at the sub-state level within each jurisdiction. For this article, the province of Ontario and the country of England will be the units of comparison.

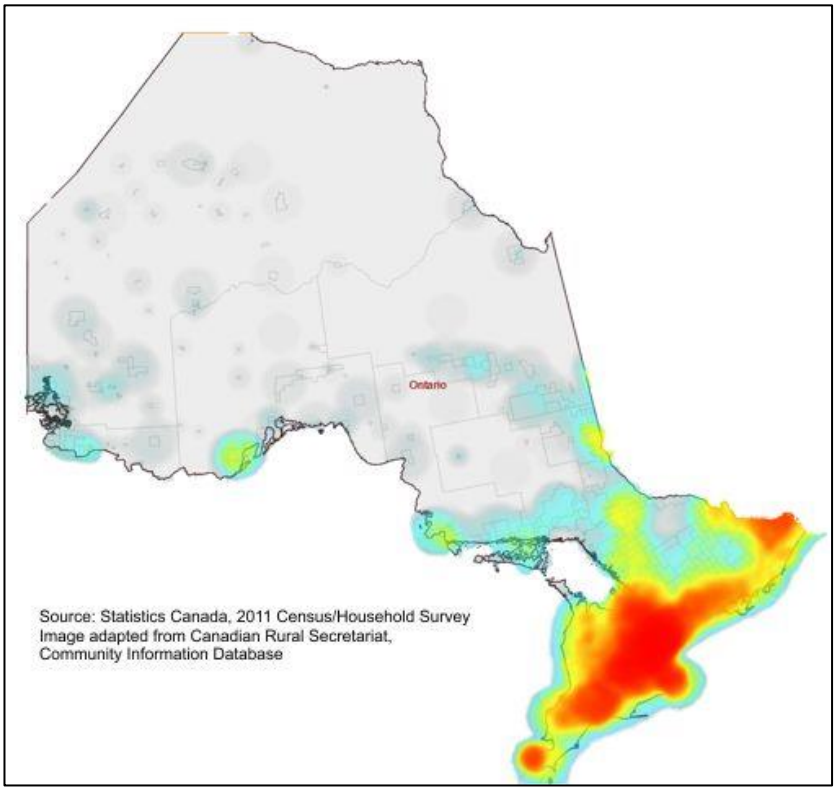
Table 2-2: Contextual Statistics for England and Ontario

	England	**Southern Ontario**	**Ontario**
Total Population	54,316,600 (2014)	12,076,643 (2011)	12,851,821 (2011)
% of Canada / UK population	84.09%	36.08%	38.39%
Land Area	132,937.69 km^2	105,832.49 km^2	908,607.67 km^2
Population Density (per km^2)	409	114	14
Sources: UK Office for National Statistics, England population mid-year estimate; Statistics Canada, 2011 Census of Population; UK Office of National Statistics, The UK and its countries: facts and figures			

Aside from their similar political, legal and planning systems, England and Ontario appear quite different, having a very different population size, population density, and land area (see Table 2-2). However, these cases have important relative similarities. Like England, Ontario is the most populated province in Canada and contains a large proportion of Canada's population within a small, and growing, area. Ontario is also sometimes colloquially referred to as being two provinces, with two very different sets of conditions and corresponding challenges. The northern portion of the province is very heavily forested and sparsely populated, where forestry and resource extraction are important industries. In the south of the province, the situation is quite different and is the area in which competition between agriculture and environment is most intense. This region has a large, and growing proportion of the Canadian population living in a relatively small area (see Figure 2-1), approximately 106 thousand square kilometres in size[5], projected to increase from 12 million in 2011 to 17.4 million by 2036 (MOF, 2013). Most important for this research, southern Ontario contains a large proportion of Canada's highest quality agricultural land, containing 56% of Canada's Class 1 land within a relatively small area (Hofmann, Filoso, & Schofield, 2005). This area also contains a unique, yet heavily converted ecoregion, the Mixedwood Plains, different from the Boreal Forest in the north of the province (Rankin, Austin, & Rice, 2011), as well as the remnants of the almost entirely converted Carolinian Forest 'life zone' (Johnson, 2009). This combination of population growth, high quality agricultural land, within a highly converted ecosystem is unparalleled in Canada. However, the challenges with managing agricultural and environmental objectives within a highly productive, yet already highly converted landscape, holds parallels with the English context.

[5] Southern Ontario is commonly considered to entail the Statistics Canada Census Divisions of Toronto, Durham, Halton, Peel, York, Brant, Dufferin, Haldimand-Norfolk, Haliburton, Hamilton, Muskoka, Niagara, Northumberland, Peterborough, Simcoe, Kawartha Lakes, Waterloo, Wellington, Ottawa, Frontenac, Hastings, Lanark, Leeds and Grenville, Lennox and Addington, Prescott and Russell, Prince Edward, Renfrew, Stormont, Dundas and Glengarry, Bruce, Elgin, Essex, Grey, Huron, Chatham-Kent, Lambton, Middlesex, Oxford, Perth. Total area was estimated using the total land area of these Census Divisions obtained from the 2011 Census of Population.

Figure 2-1: Population Density for Ontario, 2011



Additional information on the agricultural and agri-food sector in England and Ontario is provided in Appendix 5. To summarise, England and Ontario have comparable agricultural areas, though England has more land in permanent pasture and extensive livestock production. In both cases, agriculture and agri-food represents an important industry, though represents a relatively small portion of total GDP. Moreover, a clear trade deficit exists, in both cases, with imports exceeding exports of agri-food products.

Like England, Ontario has experienced an over-exploitation of its land base and has been undergoing a 're-balancing' of agricultural and environmental land uses. While England's land use change has occurred over a very long period of time, in Ontario clearing of land for agriculture by colonists rapidly and dramatically altered the landscape beginning in the late 1700 and early 1800's, and peaking around 1931 where farmland occupied 60.7% of southern Ontario (Smith, 2015, p. 35; Watelet, 2009). From this point farmland began to decline, reaching 35.5% of southern Ontario in 2011, though cropland remained largely stable due to a decline in land in pasture (Smith, 2015). In England, utilised agricultural area has declined but not as markedly as in Ontario. For instance, in 1983 utilised agricultural area in England reached 74% of England's total area, however has declined to 68% as of 2015 (Defra, 2015b). Moreover, presumably at least in part due to differing farmer support mechanisms, pasture for extensive livestock production remains a more important land use in England than in Ontario. This contributes to

explaining the considerable difference in the proportion of total area in agriculture, but comparable area in crop production.

2.5 Case Description

2.5.1 Ontario

In Ontario, land use planning is administered by local governments within the direction set by provincial land use policy. The primary legislation governing land use planning in Ontario is the *Planning Act (1990)* which sets the foundation for land use planning in Ontario as well as explaining how land uses may be controlled and by whom. Flowing from this legislation is the *Provincial Policy Statement (PPS)*, the primary land use policy document in Ontario, which sets out the province's objectives and expectations for planning across all municipalities.

Along with the PPS, Ontario also makes use of *provincial plans* with more specific requirements for land use planning in a delineated area of the province. Ontario presently has four provincial plans in the densely populated, and fast-growing area around Toronto referred to as the Greater Golden Horseshoe: the *Greenbelt Plan, the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan and the Growth Plan for the Greater Golden Horseshoe*. The first three plans deal primarily with the protection of agricultural and natural areas whereas the latter is primarily a growth management plan.

Within the provincial government, planning policy is led by the Ministry of Municipal Affairs and Housing which acts as the 'one-window' for planning in the province. The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) plays an important role in providing guidance on agricultural and rural matters, whereas the Ministry of Natural Resources and Forestry (MNRF) is responsible for natural heritage in Ontario and plays a major role in managing the spatial aspects of the environment (e.g. woodlots, wetlands, Niagara Escarpment). The Federal Government does not play a major role in planning policy, however it does in agricultural policy as Ontario does not have complete control over the major agricultural funding program (*Growing Forward 2*) which is the result of negotiations between the Federal Government and provincial/territorial governments.

2.5.2 England

The planning framework for England is similar to Ontario in that the government prepares a guiding policy, the *National Planning Policy Framework (NPPF)*, which provides high level direction that local governments must comply with. The Secretary of State for the Environment, Food and Rural Affairs and the non-governmental body Natural England, are tasked with providing advice to planning authorities when development is proposed on arable land or other greenfield sites.

Within England, large tracts of land are covered by either National Parks or Areas of Outstanding Natural Beauty (AONB). National Parks are managed by independent National Park authorities who have responsibility for local planning, whereas planning permission in AONBs is the responsibility of local authorities with the assistance of local advisory committees. Natural England also plays an important oversight and advisory role in protected landscapes.

Within the governance structure of England, the Department for Communities and Local Government has responsibility for land use planning, including the NPPF and associated guidance material. The Department for Environment Food & Rural Affairs (Defra) is responsible for both environmental and agricultural policy. However, the role of the supra-national EU is very important in understanding policy development in England. Of particular relevance to this research is the *Common Agricultural Policy (CAP)* and the associated limitations in domestic agricultural policy it places on England.

2.6 Results

Through the use of thematic analysis of land use policy documentation a series of themes emerged that indicate that Ontario and England share numerous similarities, but also key differences, in their land use policies that affect the management of agricultural production and environmental conservation. Ontario and England have a similar planning system where both utilise development control/planning permission, with policy developed at the provincial/country level and implemented by local governments. Both have made efforts to contain urban development and both have established green belts around their major urban settlements. Policymakers in Ontario and England each clearly value the protection of agricultural and environmental spaces, and both have developed agri-environmental schemes, although their design is quite different. Similarly, both jurisdictions provide considerable financial support to their agricultural industries, but in different ways and for different purposes, and both have created a system of national/provincial parks, though again the design is notably different. Finally, both

Ontario and England have considerable influence from a higher order of government, the Government of Canada and the EU, which limit the decision-making and policy development within each context, particularly within agricultural policy.

In what follows we discuss two prevalent differences that emerge from the thematic analysis. First we discuss the different policy approaches taken by each jurisdiction to integrate, or separate, agricultural and environmental spaces. Second we discuss the differing policy preferences pertaining to the use of arable land evident in both jurisdictions. These thematic findings are summarised in the thematic networks presented in Figures 2-2 and 2-3. These networks depict the data-driven themes on the exterior, organising themes and global themes in the interior (Attride-Stirling, 2001).

Figure 2-2: Thematic Network for Ontario

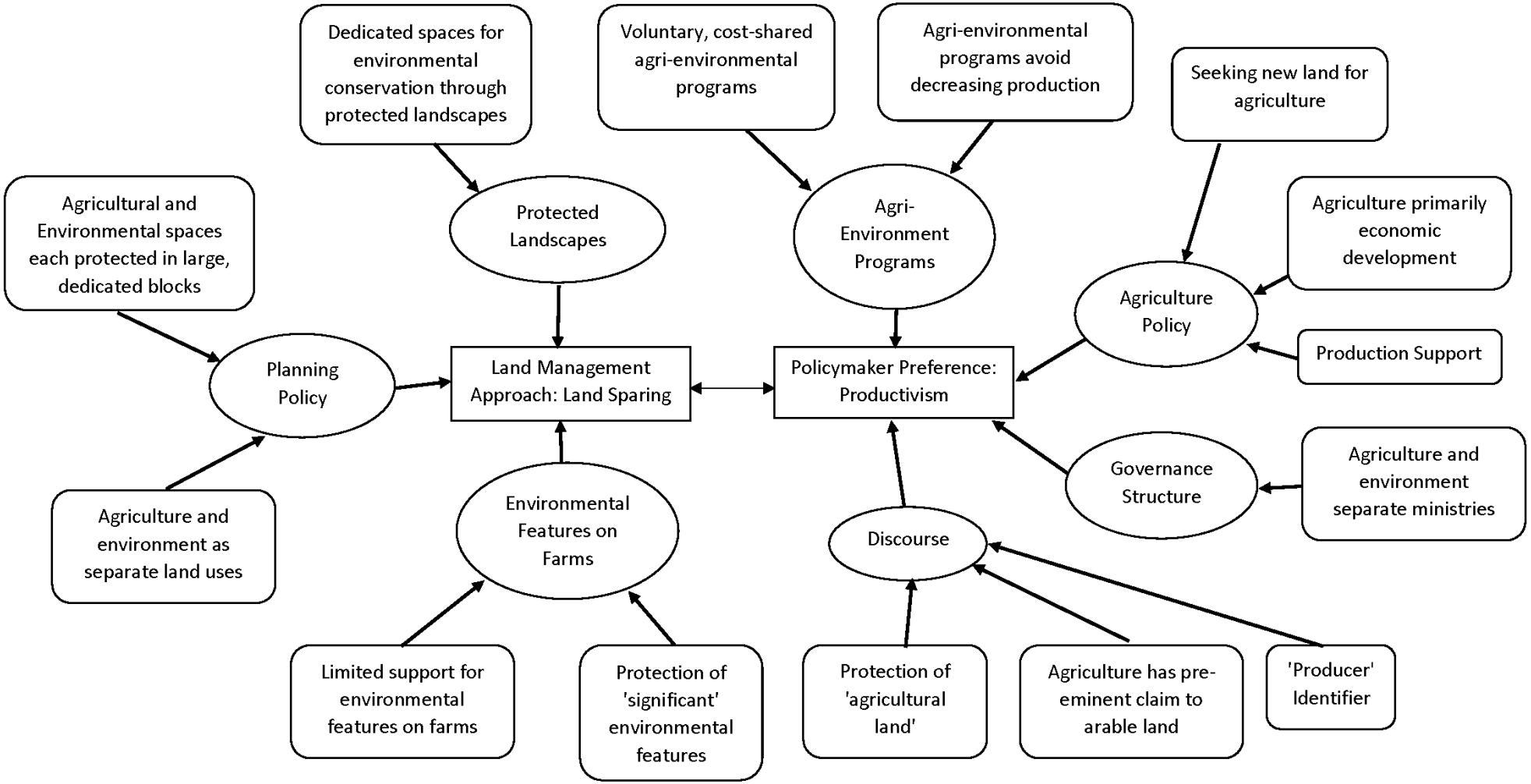
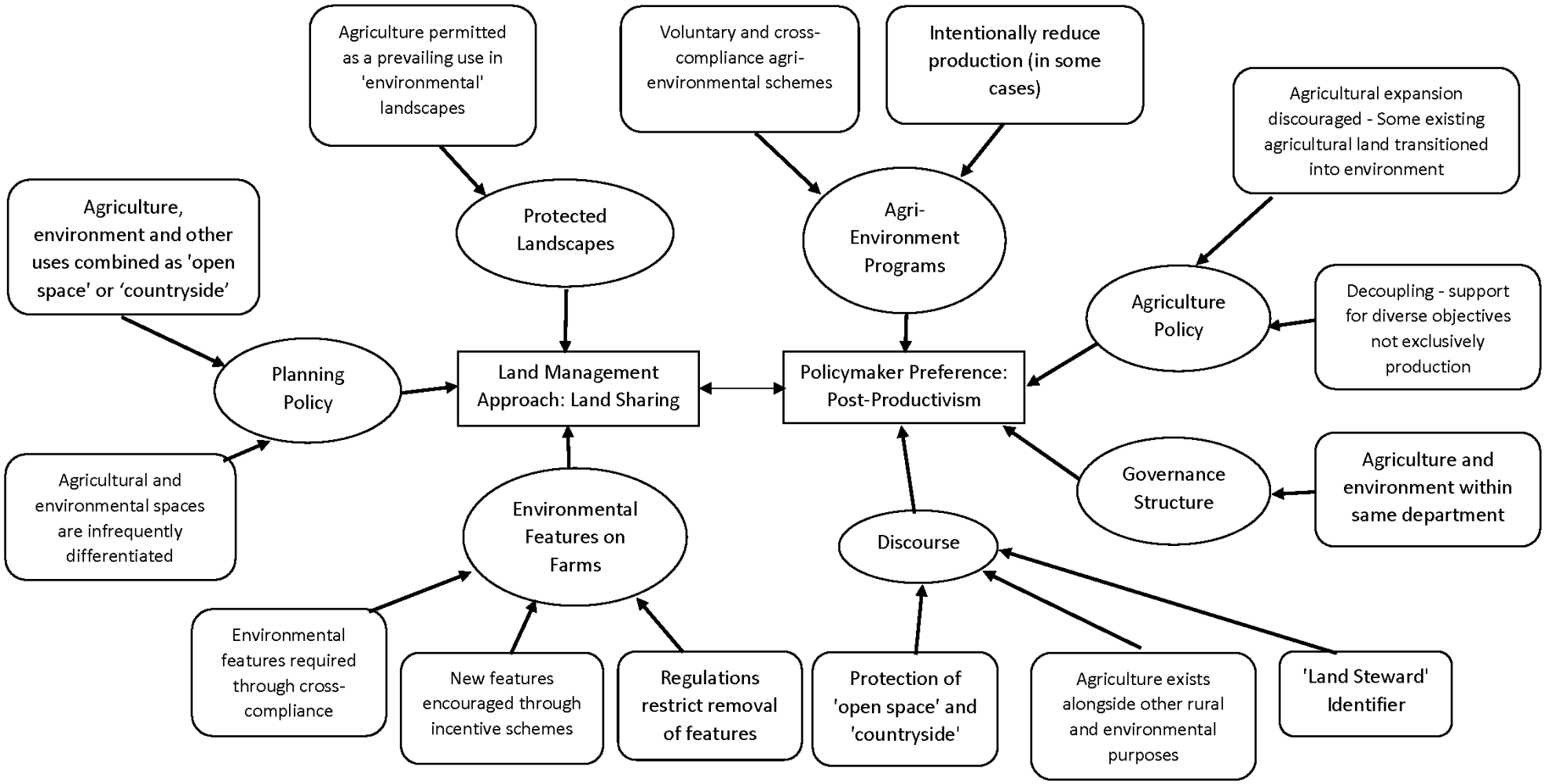


Figure 2-3: Thematic Network for England



2.6.1 Theme 1: Approach to Managing Agricultural and Environmental Spaces

One key difference that emerged from the thematic analysis was the way in which agriculture and environmental features are addressed within land use policies. Within the documentation from Ontario, a theme emerged in which agricultural production and environmental conservation were considered to be separate land uses, whereas in England they were actually encouraged to co-exist in the same space.

One way of characterising these two approaches is through the *land-sparing* and *land-sharing* dichotomy, often associated with the seminal article by Green *et al.* (Green, Cornell, Scharlemann, & Balmford, 2005). Land-sparing and land-sharing represent opposing endpoints on the *Land Allocation Continuum,* and while both see value in ensuring agricultural production and environmental conservation, they disagree as to the means to achieve this objective (Wentworth, 2012).

Land-sparing can be succinctly described as "separating land for conservation from land for crops, with high-yield farming facilitating the protection of remaining natural habitats from agricultural expansion" (Phalan et al., 2011, p. 1289). The origins of land-sparing are often attributed to Norman Borlaug, the architect of the Green Revolution, with those in favour arguing that by allowing for a dedicated and more intensive use of agricultural land, production objectives may be attained on a smaller land base (Kremen, 2015). This would allow for other areas to be dedicated (spared) for environmental purposes and allow for larger, higher quality habitats (Green et al., 2005; Wentworth, 2012).

Land-sharing, sometimes used interchangeably with the term *wildlife-friendly farming*, can be described as integrating environmental conservation and agricultural production on the same land, the result of which means less land is set aside specifically for either land use (Fischer et al., 2014; Phalan et al., 2011). The land-sharing approach promotes the creation of heterogeneous agricultural landscapes and is thereby associated with the concept of *multifunctionality* (Tscharntke et al., 2012; Wentworth, 2012).

2.6.1.1 Ontario

The preservation of agricultural land and the conservation of natural spaces are high priorities for land use policy in Ontario. This is exemplified in the *Planning Act (1990)* which identifies both "*the protection of ecological systems, including natural areas, features and functions*" (s. 2(a)) and "*the protection of the agricultural resources of the Province*" (s. 2(b)) as matters of provincial interest. From this foundation, Ontario's

planning policies tend to treat agricultural land and natural spaces as separate land uses. For example, the PPS (2014) includes policies to protect both *prime agricultural land* s.2.3 and *natural heritage* s2.1. Terminology used in the PPS (2014) suggests that protection for these land uses should be implemented independently, such as stating that prime agricultural areas "*shall be protected for long-term use for agriculture*" (s.2.3.1) and that "*development and site alteration shall not be permitted*" in *significant* natural features (s.2.1.5). This is not to say that agriculture is precluded in natural areas, however it does limit the expansion of agriculture into identified significant natural heritage features. Similarly, the policy does not preclude significant natural features from existing on agricultural land and within agricultural operations. Nevertheless, the policy does represent a clear focus on protecting concentrated natural features, demonstrated through the intentional use of the term *significant*, as opposed to protecting natural spaces dispersed across the landscape, particularly if those features occupy a relatively small space. This suggests a view that agricultural and environmental spaces should be 'spared' from one another allowing for both land uses to be protected independently in delineated, large, contiguous blocks dedicated to either use.

The *Greenbelt Plan (2005)* uses similar terminology to the PPS (2014) in protecting the agricultural system (s.3.1) and natural system (s.3.2) within the Greater Toronto Area. Again, under the *Greenbelt Plan* these systems do overlap, however there is a goal of ensuring "*expansive areas*" where either use "*predominates*" (s.3.1.1). The *Niagara Escarpment Plan (NEP)* and the *Oak Ridges Moraine Conservation Plan (ORMCP)* are related to the Greenbelt Plan and cover the same geography in the area around Toronto. Unlike the *Greenbelt Plan*, these two plans are predominantly focussed on environmental conservation, nevertheless both incorporate areas of agricultural land. Again, both the NEP and ORMCP protect environmental areas and agricultural areas separately attempting to ensure both may co-exist, but within different spaces.

Similarly, the *Provincial Parks and Conservation Reserves Act (2006)* can be viewed as an environmental conservation policy utilising a land-sparing approach. The purpose of this act is to permanently protect a system of land for the purposes of natural and cultural heritage, biodiversity and recreation (s.1). Landscape conservation in Ontario has tended to concentrate on conserving pristine environments by restricting uses that may compromise the act's first priority of maintaining *ecological integrity* (s.3.1). While agriculture is not explicitly listed as a prohibited use, farming and private land ownership are much less common when compared to the European context (Hamin, 2002). There are presumably several reasons for this difference, including a lack of 'untouched' landscapes in Europe (Hamin, 2002) as well as the first *Ontario Parks Act*

(1913) establishing the province's early protected spaces in areas "*not suited for agriculture*" (Murphy, 2012, p. 338).

While land use policy in Ontario generally resembles a land-sparing approach, there are exceptions. The province does include examples of land-sharing, such as the provincial and federal governments' multiple agri-environmental programs intending to support the uptake of Best Management Practices (BMPs) and the protection or creation of environmental features. Examples include the *Species at Risk Farm Incentive Program (SARFIP), Growing Forward 2*, and the *Environmental Farm Plan (EFP)*. These voluntary programs are based on an application based, cost-sharing model with agreements between public funders and private landowners in order to achieve specific environmental objectives on agricultural land. Examples of projects funded through these programs include reforestation and wetland restoration, as well as a long-list of farming practices with environmental benefits.

Another example of regulation resembling a land sharing model in Ontario is the *Endangered Species Act (2007)* which protects endangered or threatened species and their habitat. While it is unclear how often it occurs, the act could prevent the farming of arable land, or restrict opportunities for expansion of agricultural land, where it risks damaging the habitat of an endangered or threatened species. Nevertheless, there are important exemptions that limit application of the act on agricultural land, most notably the exemption for the habitat of the Bobolink and Eastern Meadowlark (grassland-nesting bird species) both of which nest in hayfields and pasture. This suggests that in practice, the Act does not always represent a land-sharing approach whereby exemptions have lessened the requirement for some threatened species and their habitat to co-exist with agricultural production.

2.6.1.2 England

In England, the National Planning Policy Framework (NPPF) emphasises the interdependence between different land uses in sections 7 and 8, which encourage the planning system to contribute to the economy, society and environment while discouraging planning each role in isolation. Within its core principles, the NPPF emphasises the role of planning in contributing to "*conserving and enhancing the natural environment*" including the recognition "*that some open land can perform many functions (such as for wildlife, recreation, flood risk mitigation, carbon storage, or food production)*" (pg. 6). From this position, agricultural and environmental spaces are intertwined

throughout the NPPF and agriculture is not addressed in isolation but rather within part 11: *Conserving and enhancing the natural environment*.

Within the policies of the NPPF, agricultural land and environmental conservation are particularly addressed within part 9 (*Protecting Green Belt land*) and part 11 (*Conserving and enhancing the natural environment*). The protection of existing Green Belts throughout England is an important priority within the NPPF which encourages the permanent protection of open space around urban areas for the explicit purpose of growth management (e.g. preventing urban sprawl). The NPPF uses the term *open space* to encapsulate a range of uses that are not development, in fact the discussion surrounding open space in the NPPF seems to centre more on what open space is not (e.g. the built environment) than what it is.

In part 11 of the NPPF (*Conserving and enhancing the natural environment)* there is a clear emphasis on directing development away from areas of wildlife, cultural heritage, and high quality agricultural land.[6] Within this section, the NPPF does not emphasise a separation of agricultural and environmental land uses, and instead encourages the protection of environmental spaces, particularly biodiversity and habitat, across a wider landscape scale.

Agricultural policies in England strongly encourage a land-sharing approach (environmental conservation on farms) particularly through the agri-environmental schemes of the CAP (Wentworth, 2012). For years the CAP has incorporated *Statutory Management Requirements (SMRs)* and *Good Agricultural and Environmental Conditions (GAECs)* as part of cross-compliance measures which encourage farmers to protect the environment in exchange for financial support. One example on the land-sharing side of the spectrum is the 'greening' requirement introduced as part of the 2014-2020 CAP reform. Greening is a cross-compliance measure representing 30 per cent of the *Basic Payment Scheme (BPS)* and includes the protection of permanent grassland across England, as well as the set-aside of arable land on farms (with more than 15 hectares of arable land) referred to as *Ecological Focus Areas (EFAs)* (Defra, 2014).

A range of voluntary agri-environmental schemes also demonstrate England's preference for land-sharing. These schemes have recently been merged under the *Countryside Stewardship* scheme, however until recently the *Environmental Stewardship (ES)* and the *English Woodland Grant Scheme (EWGS)* represented examples of voluntary agri-environmental schemes encouraging farmers to maintain

[6] The NPPF defines the *best and most versatile agricultural land* as land in grades 1, 2 and 3a of the Agricultural Land Classification (p. 50).

environmental spaces on their farm through financial agreements. Similarly, the requirement for *Environmental Impact Assessments (EIAs)* in order to make alterations to land, and particularly uncultivated land, represents a regulatory approach to protecting environmental spaces on arable land (Natural England, 2015).

The protection of environmental features on agricultural land is an integral part of England's environmental policy. Regulations restrict the removal of hedgerows, heathland and moorland on private land for the purpose of environmental conservation, and particularly for biodiversity protection (Natural England, 2013). Moreover, England has protected environmental landscapes in the form of National Parks and Areas of Outstanding Natural Beauty (AONBs). England has 13 National Parks and 33 AONBs (NAAONB, 2015; UKELA, 2014) covering an estimated quarter of England's total land area (English Heritage, n.d.). In contrast to the case of protected landscapes in Canada or the United States, these protected landscapes often include working farms which are not considered to be incompatible uses and in many cases certain types of agriculture (e.g. conservation grazing) are important for maintaining certain types of biodiversity and cultural landscapes (Hamin, 2002).

2.6.2 Theme 2: Preferences for the Use of Arable Land

The land-sparing/sharing divide evident in the policy documentation from both case study regions appears to reflect distinct preferences regarding the use of agricultural land. Specifically, policymakers in Ontario hold what can be thought of as more of a productivist viewpoint, whereas the viewpoint of policymakers in the UK can perhaps be best conceptualised within the post-productivist framework. There are numerous indicators of what constitutes a productivist or post-productivist agricultural paradigm, previously summarised by Wilson (2001, p. 80-81). Without attempting to demonstrate adherence to productivism or post-productivism in its entirety, we found the concept to be a useful framework for comparing diverse objectives and preferences that emerged from the results.

Productivism can be conceptualised as an agricultural regime whereby state support for agriculture is based primarily on output, yields and increased productivity (Lowe, Murdoch, Marsden, Munton, & Flynn, 1993, p. 221). A key tenet of productivism is the notion of *agricultural exceptionalism* whereby agriculture is seen as having a "*pre-emptive claim on the use of rural land*" and where a strong belief exists that farmers are the best protectors of the countryside and the greatest threats to the countryside are "*perceived to be urban and industrial development – not agriculture itself*" (Wilson, 2001, p. 79). This agricultural exceptionalism has important parallels with North American

agrarianism and the *agrarian ideal* deeply rooted in the political culture of the United States and Canada (Bunce, 1998, p. 240). Ultimately, the productivist landscape is one in which impediments to agricultural production (e.g. woodlots, hedgerows) would be discouraged.

On the other hand, a key component of post-productivist land use is characterised by a diverse and multifunctional landscape, comprised of both agricultural production and other environmental or social benefits derived from the land. Within the ecosystem services framework, this can be viewed as expanding the purpose of arable land from a focus on provisioning services to also provide supporting, regulating, and cultural services. Farmers are encouraged to work towards environmental objectives often at the expense of agricultural productivity.

2.6.2.1 Ontario

The preservation of high quality land[7] for the explicit purpose of agricultural production is a key priority within Ontario's land use policy (s.2.3.1). Similarly, the vision of the *Greenbelt Plan, 2005* states that it intends to "*protect against the loss and fragmentation of the agricultural land base and support agriculture as the predominant land use [emphasis added]*" (s.1.2.1). This set of policies works to protect the potential of land for use by agriculture, but stops short of directing the use of land once it is protected. Nevertheless, we can glean some perspective on policymakers' preferences for the use of arable land from the use of instruments and the discourse found within policy documentation.

Key land use policies for agriculture in Ontario include the PPS (2014), the four provincial plans, and the *Minimum Distance Separation (MDS)* formula. One of the primary instruments used to protect agricultural land within these policies is the direction of development and urban expansion away from prime agricultural areas, and to seek opportunities to utilize lower quality agricultural lands where development is necessary. From this foundation additional instruments are used to direct land use towards more specific objectives. For instance, under the PPS (2014) permitted uses on prime agricultural land are restricted to those that provide economic benefit or support to the

[7] Under the PPS the term *prime agricultural land* is used to identify the highest quality agricultural land in the province and is defined as "specialty crop areas and/or Canada Land Inventory Class 1, 2, and 3 land" (p. 46).

farm operation, either directly related to agricultural production or by providing supplemental income without inhibiting the farming operation from continuing.

Moreover, an important objective of land use policy in Ontario is avoiding fragmentation of the land base, and maintaining large farm sizes in order to ensure parcels remain large enough to be commercially viable (PPS, s.2.3.4). This rests on a clear assumption that farm consolidation and mechanisation of agricultural production is the agricultural model that is expected to persist into the future. Finally, the imposition of the MDS formula is intended to separate livestock facilities from residential, commercial or institutional uses. While intended as a means to avoid nuisance complaints, and ensure flexibility to grow livestock operations without coming into conflict with neighbouring uses, the MDS formula also creates a radius where development will not occur thereby restricting rural non-farm development (OMAFRA, 2015). These policies seem to envision the creation of a contiguous agricultural landscape, with minimal obstacles to agricultural production, in order to maximise efficiency and output predominantly for economic objectives.

The discourse used to describe agricultural land in Ontario provides a useful insight into the value and purpose associated with these spaces. For instance, the term *agricultural land preservation*, or similar terminology, is used commonly throughout North America to describe efforts to ensure viable agricultural land remains available for future generations (Beesley & Ramsey, 2009; Bryant & Russwurm, 1982; Bunce, 1998). In Ontario, this terminology is commonly used in policy such as in the *Mandate Letter of OMAFRA* which describes the *Farms Forever Program* and its objective to "*help preserve the productive capacity of agricultural land close to major urban centres*".[8] The MMAH is the lead ministry for land use planning policy in Ontario and in its own *Mandate Letter* emphasises the objective to "*protect prime agricultural lands*" as part of the 10 year review of the four provincial plans surrounding Toronto.

The use of this terminology is important in that it reflects a mind-set indicative of the productivist paradigm. Fundamentally, it proposes that agricultural land is under threat by competing, incompatible land uses thereby necessitating protection of the land for the explicit purpose of agricultural production. Discourse from Ontario regularly emphasises that the main threats to rural areas are urban and industrial development – a key indicator of productivism put forth by Wilson (2001). In a recent example, before the 2014 election where they won a majority government, the Ontario Liberal Party

[8] 'Mandate Letters' are the Premier's instructions to the Minister on priorities for their Ministry.

announced their plan to establish a *Farms Forever* program which "*will support #Ontario farmers by protecting prime agricultural land from development*" (OntLiberal, 2014).

Throughout land use policies we also see examples of the belief that farmers are best positioned to protect the countryside from urban encroachment, and that agricultural production should be maintained as the pre-eminent land use, at least in areas of quality farmland. As mentioned earlier, the PPS and *Greenbelt Plan* both identify agriculture as being the pre-eminent land use within *Prime Agricultural Land,* and the *Protected Countryside* around Toronto, representing a deeper conflict around the purpose of the protected space, as described by Cadieux, et al. (2013) in their own research on the Greenbelt Plan (Cadieux, Taylor, & Bunce, 2013).

We also see some examples of the pre-eminence of agriculture in the natural heritage policies in Ontario, for instance s2.1 of the PPS (2014) describes how "*Natural features and areas shall be protected for the long term*" however concludes by stating that "*nothing in policy 2.1 is intended to limit the ability of agricultural uses to continue*" (s.2.1.9). Similarly, the *Natural Heritage Reference Manual,* which supplements the policies found in the PPS, uses careful language to discuss natural heritage features on agricultural land and states that "*farmers will be better able to manage their agricultural operations to protect natural heritage resources*" through the use of voluntary agri-environmental programs (MNR, 2010, p. 10).

In addition to protecting agricultural lands for the purpose of production, we also see the encouragement of expansion into new areas of the province which may displace natural or semi-natural landscapes. For instance, in the 2014 Mandate Letter for OMAFRA one of the top priorities for the ministry is identified as *Expanding Agriculture in the North*. This priority is echoed in the *Growth Plan for Northern Ontario (2011)* which encourages the expansion of agriculture in the North of the province, particularly as a result of Climate Change and an anticipated longer growing season (s.2.3.3).

Within agricultural policies we see further adherence to productivism in Ontario through policy instruments and discourse. The most important policy representing government support for agriculture is the *Growing Forward 2 (GF2)* agreement between the federal and provincial/territorial governments. GF2 is a comprehensive agreement encompassing a range of programs, however of particular relevance here are the Business Risk Management (BRM) suite of programs intended to help farmers manage risks inherent in agriculture (Agri-Stability, AgriInvest, Production Insurance and AgriRecovery) (AAFC, 2014). In Ontario, the BRM programs are administered through the Crown agency Agricorp. These shared programs are also complemented in Ontario by the Risk Management Program (RMP), a provincial program that also provides

protection for farmers against rising input costs and market price volatility (Agricorp, 2015).

Financial support to farmers in Canada is fundamentally different from the CAP in the EU, which provides direct payments decoupled from production. The Canadian programs are founded on the principle of production support and managing business risks and, unlike in the CAP, remain coupled to production outcomes. The principle of production comes through strongly in the documentation associated with the programs. For instance, when discussing eligibility, the *Production Insurance* plan states that "*You are expected to use good farm management practices at all times. If you use practices that contribute to a production loss, you may lose some or all of your insurance coverage*" (Agricorp, 2014, p. 3). Similarly, in the *Contract of Insurance – Terms and Conditions,* the requirement for farmers to use *good farm management practices* is discussed as an eligibility requirement which includes a concentration on achieving a *reasonable yield* (Agricorp, 2008). It is clear that within the financial support provided to farmers production maximisation is not only a founding principle, but in some cases essentially an eligibility requirement. This reaffirms previous research which found productivism to be the dominant paradigm within Canada's agricultural policy more generally (Skogstad, 2012).

As noted earlier, Ontario's agri-environmental programs also have a productivist slant. These programs, such as the EFP, are not intended to reduce outputs but rather help farmers with readily identifiable environmental practices that have minimal interference with their farming operation (Robinson, 2006a, 2008). EFP documentation also places a clear focus on the economic and production benefits of environmental practices alongside a lesser emphasis on their inherent environmental benefit. In Ontario, most publicly funded agri-environmental programs are delivered by an agricultural organisation, the Ontario Soil and Crop Improvement Association (OSCIA), which holds an interest in pursuing sustainable agriculture, but not sacrificing production for environmental betterment.

Within other agricultural policies in Ontario we see clear emphasis on the productive aspect of agricultural land. For instance, in 2013 the Premier challenged the agri-food industry to double its annual growth rate by 2020 with particular emphasis on import substitution, through local food promotion, and export development (OMAFRA, 2013b). This was supplemented by the *Local Food Act, 2013* which, Premier Kathleen Wynne described as intending to "*increase demand [for] homegrown food, [which] will create jobs and boost the agri-food sector's contributions to our economy*" (OMAFRA, 2013a).

Like with planning policies, the choice of language used in agricultural policies is useful for understanding underlying preferences and objectives associated with the policies. One powerful example is the consistent use of the term *producer*, as opposed to *farmer,* when referring to those who utilise arable land. This terminology of *producer* suggests that the actor's identity is based on outputs (e.g. production of commodities) whereas the term *farmer* refers to an action (e.g. operating the farm). This clearly productivist discourse is used throughout the documentation pertaining to the GF2 program as well as in other policy documentation. Another example of clear productivist discourse comes from the *Farming and Food Production Protection Act (1998)*. The productivist underpinnings of this Act are succinctly described in the first line which states that "*It is desirable to conserve, protect and encourage the development and improvement of agricultural lands for the production of food, fibre and other agricultural or horticultural products*".

Finally, the governance structure of agricultural and land use policy in Ontario demonstrates leanings towards the productivist paradigm. In Ontario, OMAFRA is the lead ministry for agricultural policy while environmental and natural heritage policies are the responsibility of other ministries. OMAFRA can be described as an economic development ministry where the mandate is directed towards growing the agri-food industry, and supporting rural communities, with a focus on economic objectives and less so on social or environmental goals. This is reflected clearly in the *Results-Based Plan 2013-14* which describes the overall mandate for the ministry as promoting "*a more competitive and productive agri-food and agri-product sector*" (OMAFRA, 2013c). In contrast, the mandate of the MNRF is described as being "*to conserve biodiversity and manage our natural resources in an ecologically sustainable way to ensure that they are available for the enjoyment and use of future generations*" (MNR, 2013). This separation of mandates between different aspects of land use in Ontario is reflective of an underlying preference that the purpose of agricultural land is production and other aspects, such as biodiversity, should remain separate.

2.6.2.2 England

Agricultural policy in England, and across Europe, has been developed through a post-productivist lens. Indeed, Natural England (2013) quite succinctly states that "*Farm support schemes have moved away from production-only based payments to stewardship of the environment and support for other sustainable activities*". This shift is associated with the production surpluses that began in the mid-1980s and subsequent effort to reduce production. The trend, and ongoing post-productivist momentum, is

outlined in *Biodiversity 2020* which states that "*successive reforms of the CAP have given it a greater focus on the achievement of public benefits, such as environmental outcomes and we want to see an acceleration of this process*" (Defra, 2011, p. 25). The current design of farmer support no longer focuses on production support but rather on direct payments, partly provided in exchange for adherence to cross-compliance requirements (e.g. environmental, food safety, animal welfare).

Within the current incarnation of the CAP (2014-2020), the BPS represents payments that farmers are entitled to so long as they follow a list of standards of good agricultural and environmental condition (GAECs). Many of these GAECs, such as the newly introduced greening requirements, can be expected to ensure reduced production levels on farms in exchange for meeting a broader set of environmental or social objectives. This shift is definitively post-productivist where farmers have been encouraged, if not required, to take actions intended to reduce their production.

Post-productivism is also evident in the government structure pertaining to agricultural and environmental policy. Unlike Ontario, who retains separate ministries for agriculture and environment, these portfolios were merged in England with the dissolution of the Ministry of Agriculture, Fisheries and Food (MAFF), which was merged with the environment portfolio and reconstituted as the Department for Environment, Food and Rural Affairs (Defra). The combination of agricultural and environmental objectives within the organisation of government aligns well with the post-productivist paradigm and, at very least, this symbolises a change in agricultural and environmental perspectives in England's institutions (Mather et al., 2006, p. 453).

Within the discourse surrounding agriculture in England we also see examples of post-productivism, such as in the depictions of farmers. For instance, the CAP describes farmers as 'managers of the countryside' such as with the following description "*Farmers manage the countryside for the benefit of us all. They supply public goods – <u>the most important of which</u> [emphasis added] is the good care and maintenance of our soils, our landscapes and our biodiversity*" (EC, 2012, p. 5). Interestingly, this language places the provisioning services of agriculture below other services not directly associated with production. Instead of emphasising the farmer as producer, the farmer is instead described in the CAP as a land steward. However, a recent discourse analysis of the CAP reform (2014-2020) found a more complex picture with the CAP documentation representing multiple discourses simultaneously with a hybrid of productivism, post-productivism and neo-liberalism depending on the section of the document reviewed (Erjavec & Erjavec, 2015). Nevertheless, this discourse analysis acknowledges that the environmental sections of the CAP reform, and particularly the greening component, represent post-productivist discourse.

While post-productivist preferences in England may be partly attributable to influence of the EU, this research also found that this preference is also evident within England's own policies, such as environmental policies, which have sought to protect the environment at the expense of agricultural production. We see this in the government's willingness to regulate spaces, such as hedgerows, moorlands and other environmental features which may interfere with increases in efficiency, productivity and mechanisation of farming operations, creating a landscape that The Economist recently referred to as "*green, pleasant, and inefficient*" (The Economist, 2015). We also see restrictions in the expansion of agricultural land, such as through the Environmental Impact Assessments required to cultivate new land, or even efforts to transition lands from agricultural into environmental purpose through agri-environmental schemes. Mather et al (2006) agree that this is indicative of post-productivism and go on to argue that a major shift occurred in the mid-1980s from a "*virtual prohibition*" on afforestation of arable land to positive incentives coinciding with agricultural policy reform (Mather et al., 2006, p. 447). Further still, the protected landscapes of England, and associated alterations in farming techniques described earlier, have been associated with the post-productivist paradigm and a means to reduce production (Hamin, 2002, p. 342). It seems clear that policymakers in England have gone beyond the minimum levels imposed by the EU and instead appear to have internal preferences for achieving environmental objectives, even at the expense of agricultural production.

While examples of the post-productivist paradigm appear throughout England's spatial, agricultural and environmental policies, there is also some evidence of a resurgence of productivism described by some authors as *neo-productivism* (Burton & Wilson, 2012; N. J. Evans, 2013; Wilson & Burton, 2015). This is particularly evident in discussions of food security which is "*at the forefront of the domestic policy agenda in the UK to an extent unprecedented since the 1950s*" (Lobley & Winter, 2009, p. 1). Indeed, in recent years the challenge of re-balancing food production and environmental conservation has been the focus of high profile projects including the *Future of Food and Farming* (2011) project from the Government Office for Science and the *Green Food Project* (2012) organised by Defra. This context is quite unlike that of the previous few decades which focused on over production and surpluses (Lobley & Winter, 2009).

Neo-productivist discourse is also evident in some policy related documents and government releases, particularly from politicians. For instance, in two recent speeches from the Rt. Hon. Elizabeth Truss, Secretary of State for Environment, Food and Rural Affairs, the agriculture industry was described as "*a core part of our long-term economic plan*" as well as emphasising the challenge of food security and the opportunities provided by export development and import substitution (local food) (Truss, 2015a,

2015b). These speeches also expressed opposition to regulation ('red-tape'), including environmental regulations, while describing one key element of the new greening component of the CAP reform as "*bureaucratic nonsense*" instead stating that she wants "*farmers growing what the market demands, not what Brussels instructs*" (Truss, 2015a).

Nevertheless, at this point it does not appear that this discourse has yet translated into neo-productivist policies and post-productivist preferences clearly prevail in England's formal policies and schemes. The degree to which this can be explained by the limited autonomy that England has over agricultural policy is unclear. Indeed, the UK expressed a vocal opposition to the EU's further greening efforts during the recent CAP reform (Defra, 2013; HoC EFRA Committee, 2012). However, as this article has shown, England has created its own policies and schemes outside of those imposed through the CAP, which suggests that post-productivist leanings are not exclusively the result of EU membership.

2.7 Discussion

The documentary analysis used for this research identified two major themes representing differences between the land use policies of Ontario and England in the way that agricultural production and environmental conservation are balanced. The first theme suggests that Ontario's approach to balancing agriculture and environmental spaces can be characterised as leaning towards a land-sparing approach, whereas England has taken a land-sharing approach. Ontario seems hesitant to intervene at the farm level and risk the possibility of interfering with farmers' management of their land. Instead, an approach is taken to protect both agricultural land and environmental features independent of one-another with limited overlap. The exceptions to this are found in application based, voluntary, cost-shared programs which rely on either environmentally conscientious farmers and/or anticipation that environmental practices will lead to increased production or profitability. In these cases, farmers are trusted to self-identify projects and practices that do not interfere with their primary business – production. Farmers are also expected to help finance a large share of the projects, assuming their application is successful. This form of 'bottom-up' agri-environmental program design has been described as "*the antithesis of the state regulation approach to obtaining environmental benefits from agriculture as promoted in most of the EU's agri-environment schemes*" (Robinson, 2006b, p. 870).

In England, the approach is quite different where agricultural and environmental spaces are rarely separated and are rather spatially integrated as open space or countryside. Beyond merely a lack of separation, we also see a conscious effort to

integrate agricultural and environmental uses in the same space. For instance, voluntary agri-environmental schemes, as well as cross-compliance measures embedded in the CAP, provide considerable financial incentive to farmers in exchange for maintaining environmental features on farms. Coinciding with this incentive based approach are regulatory efforts to protect environmental features (e.g. hedgerows, moorland) in farming landscapes, something Ontario has been reluctant to do, instead relying "*overwhelmingly on using carrots (fiscal incentives and voluntary measures) rather than regulatory sticks*" (Skogstad, 2011, p. 10). Within protected environmental landscapes, namely National Parks and AONBs, we also see agriculture coexisting with environmental conservation.

Whilst the analysis suggests that, broadly speaking, England leans towards a land-sharing approach, and Ontario towards a land-sparing approach, it also supports previous literature on the limits of thinking in such binary terms (Fischer et al., 2014; Fischer et al., 2008; Tscharntke et al., 2012). Instead, this research found that neither case fit perfectly within either the land-sparing or land-sharing approach and, instead, both Ontario and England demonstrated some elements of each approach. This suggests that the concept of land-sparing/land-sharing is a useful heuristic device for comparing approaches to land use policy, however, instead of representing a dichotomy, is actually better positioned as a spectrum.

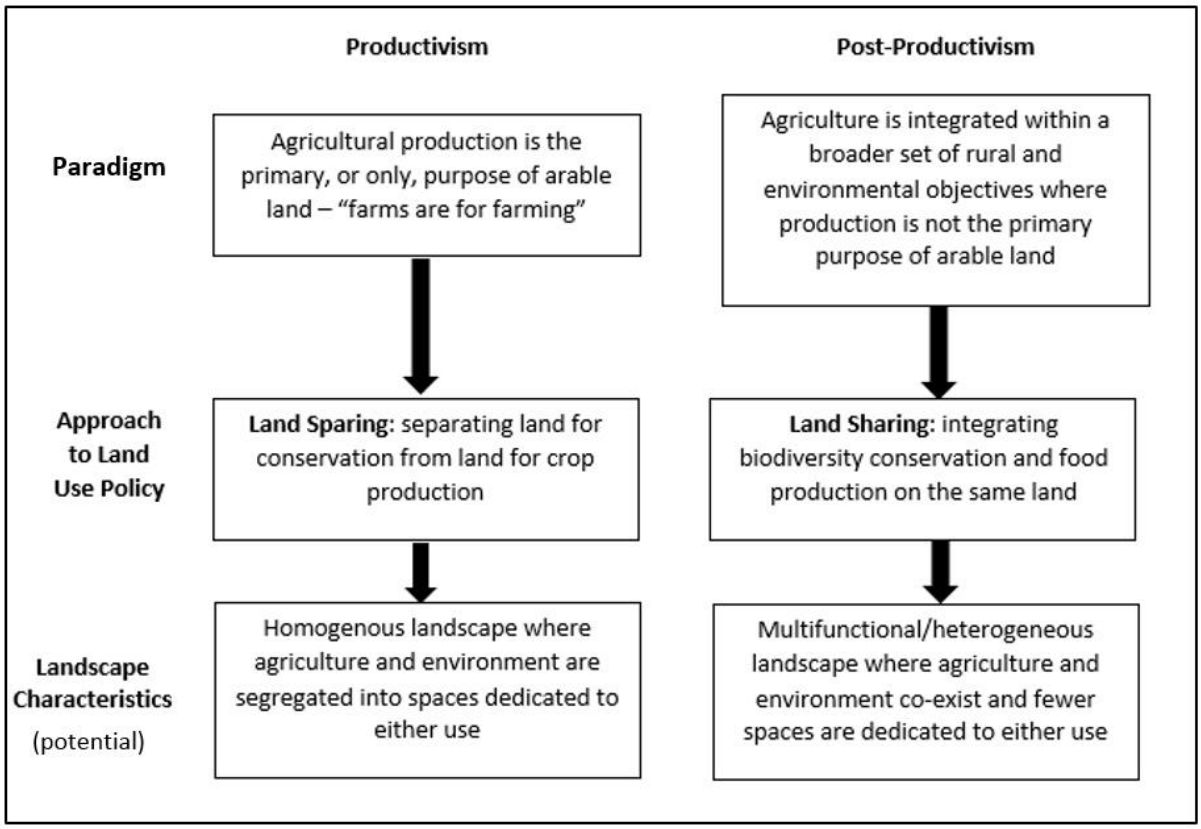
A second major theme that emerged from the analysis was a difference in policymaker preferences for the use of arable land, exemplified in both the choice of policy instruments and discourse. In England, regulatory requirements such as EIAs, incentive based agri-environmental schemes, and cross-compliance measures such as greening, suggest adherence to a post-productivist paradigm, where agricultural expansion has not only been halted but existing cultivated land is being actively transferred to environmental conservation. This is completely contrary to the context of Ontario where agriculture maintains a *pre-emptive claim* on the use of arable land. Further still, in Ontario new agricultural lands are being sought and expansion of agriculture into new areas of the province, at the expense of natural or semi-natural landscapes, like in Northern Ontario, are actively being encouraged by the provincial government.

Similar to land-sparing/land-sharing, criticism has been expressed in regard to productivism and post-productivism in that they are not necessarily dichotomous, that they do not necessarily represent a transition, or that it is not relevant outside the European experience (Bjørkhaug & Richards, 2008; N. J. Evans, Morris, & Winter, 2002; Walford, 2003; Wilson, 2001). Doubt as to the transitory element of productivism to post-productivism has particularly arisen with the potential resurgence of *neo-productivism* in

the UK context. Again, this research demonstrates that regardless of whether productivism/post-productivism truly represents a transition, it does present a useful heuristic device for organising differing views/preferences as to the use of arable land and what objectives policymakers are seeking to achieve.

Overall, the findings of this study suggest that productivism/post-productivism and land-sparing/sharing are linked whereby different underlying preferences for the use of arable land have manifested in a different integration/separation of agricultural and environmental spaces. For instance, Ontario's approach is to separate these spaces and where they are not separated it often frames the protection, or creation of, environmental features on agricultural land from a productivist perspective, emphasising the benefits to production anticipated from such features as wind breaks (e.g. reduced soil erosion, higher yields). In England, environmental conservation on farms appears to be more commonly framed in terms of its intrinsic environmental value (e.g. biodiversity), or even efforts to reduce production. While it is outside the scope of this article, and more research would be needed, there is potential that these differing paradigms and corresponding approaches to land use policy have also resulted in differing landscape characteristics within the two areas. A graphical depiction of this potential relationship is presented in Figure 2-4.

Figure 2-4: Potential Relationship between Productivist/Post-productivist and Land-sparing/Land-sharing



2.8 Conclusion

This paper set out to compare the land use policies of Ontario and England in order to understand how each has managed agricultural and environmental land uses in the face of similar land use challenges. Through the use of a thematic analysis of policy documentation, the study found that Ontario's land use policies appear indicative of a land-sparing approach to separating agricultural and environmental spaces, whereas England has adopted a land-sharing approach to integrate these land uses. Similarly, the analysis identified a productivist preference in Ontario and post-productivist leanings in England. Overall, the study provides a novel comparison in order to understand why each jurisdiction has taken different approaches to overcoming similar land use challenges. The study also grounds the concepts of land-sparing/sharing and productivism/post-productivism in real world land use policies, including in Ontario where literature incorporating these concepts is lacking. Finally, the research identified a potential linkage between the concepts of productivism/post-productivism and land sharing/sparing – a novel observation that will contribute to the theoretical development of both sets of concepts.

While this research has demonstrated a potential relationship between productivism/post-productivism and land-sharing/land-sparing it does not attempt to attribute the spatial separation/integration of agriculture and the environment entirely to policymaker preferences. We instead view it as one component of multiple drivers of policy outcomes, including the influence of contextual differences such as agricultural histories, development patterns, and availability of 'undisturbed' landscapes in which to spare. The degree to which these contextual differences are the result, or cause, of differing preferences is outside the scope of this paper and may be an opportunity for future research. Nevertheless, the findings of this paper contribute to our understanding of why these comparable jurisdictions have taken such different approaches to managing agricultural and environmental spaces.

The findings also support careful efforts to share lessons and instruments between these jurisdictions, recognising the underlying differences that this research has identified. While this research identified a potential difference in policymaker preferences, it cannot speak to the depth of these different preferences within policymakers or the wider stakeholder community. From these particular findings, it would appear that, at the present time, policies are not easily transferable as they would be opposed to seemingly deeply held preferences in either case. However, preferences and power dynamics change, and policies from either case may become appropriate, or popular in time. For instance, environmental stakeholders in Ontario may look to the English model as more palatable, and in-line with their own post-productivist objectives, whereas agricultural stakeholders in England may look to the Ontario model as furthering their own production objectives. Similarly, policymakers may derive lessons from either case to align with their own objectives or changing realities. Interestingly, this may be particularly current, where England has recently revised its core agri-environmental scheme, Countryside Stewardship, in a way that resembles the Ontario approach, such as by adopting the principle of competitiveness in agreements and shifting from a 'broad and shallow' to a 'deep and narrow' approach to driving on-farm stewardship. Similarly, as the UK transitions out of the EU, and England develops a new suite of agri-environmental schemes, it may draw lessons from Ontario's experience.

Future research should explore the role of higher level governments (e.g. EU, Federal Government) in influencing the land use policies of England and Ontario in order to understand the autonomy of policymakers in these cases, and where apparent preferences are the result of external influences. This is particularly important where preferences between levels of government are opposed, as seems to be the case in the UK around the greening portion of the CAP. As the UK transitions out of the EU it will need to develop a new agricultural policy framework, and suite of agri-environmental

schemes, providing an opportunity for further research to delineate UK and EU policy preferences. Similarly, the role of party politics was beyond the scope of this article, however this may be another area for research in policy preferences surrounding the use of arable land.

Finally, as a result of a potentially re-emerging neo-productivism, evident within the discourse of decision makers, we may actually witness a closer alignment between the land use policies of Ontario and England in the near future. While it is not yet evident in the formal planning, agricultural or environmental policies of England, the positioning of agriculture within political discourse appears to be moving away from the realm of environment, into the realm of economic development, where it is viewed predominantly as an opportunity for economic growth; a view already held in the Ontario context. It will also be important to continue to observe this potential re-emergence, and whether this will influence the design of England's land use policies in the future, particularly as it transitions out of the EU and develops its own agri-environmental policies. Similarly, it will be important to observe either confirmation or diversion from the land-sparing approach and productivist paradigm within Ontario's upcoming review of the four provincial land use plans.

Acknowledgements

The authors are grateful to the handling editor and the three anonymous reviewers for helpful comments and suggestions which greatly improved this paper. This research was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC) Doctoral Fellowship program.

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Chapter 3 Woodlots, wetlands or wheat fields? Agri-environmental land allocation preferences of stakeholder organisations in England and Ontario

3.1 Preface

In Chapter 2 I investigated the agri-environmental land-use preferences of policymakers and revealed the clear differences in policy approaches, and associated policymaker preferences, between the England and Ontario cases. In this chapter I build on these findings, by examining land-use preferences at another level, using an in-depth examination of the land-use preferences of stakeholder organisations. This chapter addresses my second research objective, which aimed to uncover what representatives from key organisational stakeholders see as their preferred solution to reconciling competing visions on the use of land between agriculture and the environment. It is valuable to understand their preferences, as these organisations lobby policymakers, influence public opinion through advocacy, and even work directly with farmers/landowners to influence individual land management decisions through education, outreach, and financial incentives. Thus these 'middle actors' play an important role in influencing 'top' (e.g. policymakers) and 'bottom' (e.g. farmers) actors that may provide an inlet for change (Parag & Janda, 2014) though they are often overlooked in land-use research.

To achieve this aim I conducted 24 semi-structured interviews with representatives of stakeholder organisations with agricultural and/or environmental mandates, operating within England or Ontario (12 in each case). Building from Chapter 2 I used the land-sparing / land-sharing framework to organise and contextualise the results. I found that stakeholder organisation representatives from both cases had more similar preferences for agri-environmental land-use than might be expected, given the clear distinction identified in Chapter 2, with representatives across both cases generally preferring a land-sharing approach in principle. However, a deeper look at stakeholder preferences provides a series of obstacles for achieving this type of landscape model including differing views on: (1) the interpretation of integration and separation in practice, (2) the conversion of land into agricultural production, (3) the environmental restoration of arable land, (4) the ownership of farmland, and (5) public access to nature on private farmland.

Overall, I found that while stakeholder organisations were not entirely in agreement as to the application of agri-environmental integration in practice, they generally agreed in principle that agricultural and environmental land-uses can and should be integrated across the landscape and at the farm scale. This finding suggests that in both cases

farmers – as a large group of private landowners - will continue to be relied upon to create and protect environmental features. This emphasises the importance of understanding farmers' views and motivations regarding on-farm stewardship, which will be the focus of Chapter 4.

The following chapter is presented in the style of the journal *Land Use Policy* where it was published as follows:

Marr, E. J. & Howley, P. (2018). Woodlots, wetlands or wheat fields? Agri-environmental land allocation preferences of stakeholder organisations in England and Ontario. *Land Use Policy*. doi: https://doi.org/10.1016/j.landusepol.2018.02.008

Declaration

I declare that the work submitted is my own. The contribution by co-authors was as follows:

Peter Howley: Supervision, review and editing.

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Woodlots, wetlands or wheat fields? Agri-environmental land allocation preferences of stakeholder organisations in England and Ontario. *Land Use Policy*.

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Highlights

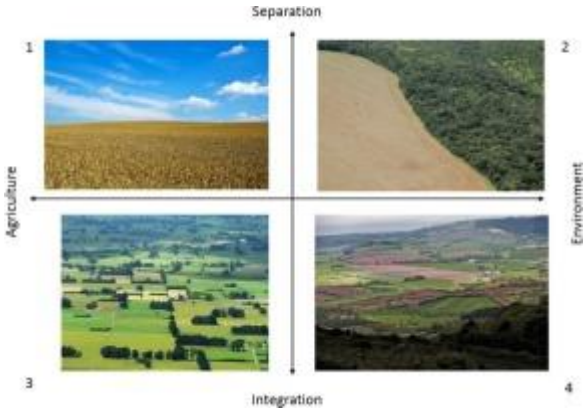
- Stakeholder organisations are middle actors between policymakers and landowners.
- Semi-structured interviews are conducted in England and Ontario.
- Land-sparing/sharing is used to organise land allocation preferences.
- Preference for land-sharing is supported in principle by both sets of actors.
- Deeper disagreements pose a challenge for a unified solution.

3.2 Abstract

Society's increasing demands for a multitude of products and services are putting pressure on a finite land base, resulting in potential competition between agricultural and environmental interests. Stakeholder organisations wield considerable power in determining land allocation and the pursuit of different land-use objectives. Through the use of an inductive, qualitative methodology this study analyses the agri-environmental land-use preferences of organisational level actors operating in two comparable cases: England, UK and Ontario, Canada. The use of a comparative approach allowed for the illumination of differences and similarities within the preferences of stakeholders from like jurisdictions, which may not be evident from the analysis of a single case. In each case, semi-structured interviews, coupled with a photo-elicitation exercise, were used to explore preferences relating to agri-environmental integration (land-sharing) or separation (land-sparing). We found that the preferences of stakeholder organisations are more similar than might be expected with actors from both cases generally preferring a land-sharing approach in principle. However, a deeper look at stakeholder preferences provides a series of obstacles for achieving such a landscape model including differing views on: (1) the interpretation of integration and separation in practice, (2) conversion

of land into agricultural production, (3) environmental restoration of arable land, (4) ownership of farmland, and (5) public access to nature on private farmland. The research uncovers what representatives from key organisational stakeholders see as their preferred solution for reconciling competing land-use objectives and thereby sheds light on the contextual suitability of land sparing/sharing expanding beyond production/biodiversity optimisation into social considerations.

Graphical abstract



Keywords

Agri-environmental management; Stakeholder preferences; Land-use conflict; Land sparing; Land sharing; Semi-structured interviews

3.3 Introduction

Rural landscapes around the world are facing pressure to deliver a multitude of products and services, while remaining environmentally sustainable. A growing global population, coupled with demand for new products such as bioproducts and biofuels, is putting pressure on agricultural land to deliver an ever increasing amount of food, fuel, and fibre (Foley et al., 2011; Godfray et al., 2010). Meanwhile, urbanisation, climate change, and other factors are decreasing the availability of land forcing agricultural intensification, or expansion, and pushing it against environmental land uses with the potential to displace habitat and other areas of environmental conservation (Smith et al., 2010). This competition between society's demands on agriculture and the environment is a major challenge, for both developing and developed countries, with the two land-uses having been described as being on a "*collision course*" (Sayer et al., 2013, p. 8349). For instance, it has been estimated that as much as 1 billion hectares (ha) of land may

need to be cleared globally by 2050 in order to accommodate increasing demand for agricultural production (Tilman et al., 2011). These challenges have been recently reflected in the Sustainable Development Goals (SDG) set out by the United Nations in 2015. Indeed, meeting these goals will require a fundamental reconsideration of the allocation of agricultural and environmental uses, on a finite land base, in order to provide more agricultural products and services from less land and with less impact.

Land-sharing and *land-sparing* have been proposed as two approaches to manage agricultural production and environmental protection in the spaces where actors compete over the best use of rural land. The approaches are on opposing ends of the land allocation continuum, with land-sharing representing an integration of agriculture and the environment, and land-sparing representing a separation of these land-uses. There is much debate in the literature surrounding which approach is best able to optimally achieve society's agricultural and environmental objectives, with authors such as Green, Phalan and Balmford advocating for land-sparing (see Green et al., 2005; Phalan et al., 2011a; Phalan et al., 2014; Phalan et al., 2011b) and authors such as Fischer advocating for land-sharing (see Fischer *et al*., 2014; Fischer *et al*., 2011; Fischer *et al*., 2008). This paper is not intending to choose a side in the debate, but rather use the concept as a device for organising participant preferences. It is intended that the results will also contribute to advancing social science research within the land-sparing vs. land-sharing debate, and help to understand where stakeholder preferences fit within assessments of optimal land allocation.

Moreover, much research on sustainable land allocation, including within the land-sparing and land-sharing framework, has been approached from a positivist angle to assess the optimal landscape design for a given region (Clough et al., 2011; Dorrough et al., 2007; Egan and Mortensen, 2012; Gordon et al., 2007; Hodgson et al., 2010; Mastrangelo and Gavin, 2012; Phalan et al., 2011b). This approach has been criticised for neglecting the social challenge of sustainable land-use, and for lacking engagement with stakeholders with diverse preferences and objectives, which may actually be more challenging to manage than the scientific considerations (Firbank, 2005, p. 172; Mascia et al., 2003). Recognising this challenge, other authors have also recently studied the perspectives of stakeholder organisations in land-use conflict (Steinhäußer et al., 2015; Villamor et al., 2014), such as a recent study of stakeholder preferences for land-sparing/land-sharing within Swedish forestry (Nordén et al., 2017).

In seeking to understand the social aspect of sustainable land allocation, this study set out to explore the preferences of stakeholder organisations operating within the realms of agriculture and/or the environment. The research uncovers what representatives from key organisational stakeholders see as their preferred solution to

reconciling competing visions on the use of land between agriculture, and the environment, and thereby sheds light on the contextual suitability of either approach beyond production/biodiversity optimisation. As advocated by Firbank (2005), it is essential to engage with, and understand, the views of a range of stakeholders interested in pursuing sustainable land allocation if we are to achieve an outcome suitable to all parties. Stakeholder organisations wield considerable power in determining land allocation and the pursuit of different land-use objectives. These organisations lobby policymakers, influence public opinion through advocacy, and even work directly with farmers/landowners to influence individual land management decisions through education, outreach and financial incentives. These 'middle actors' play an important role in influencing 'top' and 'bottom' actors which may provide an inlet for change, however are often overlooked in land-use research (Parag and Janda, 2014).

This study utilised a comparative approach in order to illuminate differences and similarities within the preferences of stakeholders from like jurisdictions, which may not be evident from the analysis of a single case. We investigated the cases of Ontario, Canada and England in the United Kingdom, two jurisdictions each grappling with the challenge of managing agricultural and environmental spaces, though for varying lengths of time. While England has long been confronted with land-use competition amongst a range of alternative uses, Ontario is increasingly experiencing a similar phenomenon. An increasing population, and historically sprawling development patterns, have provided the impetus for a series of land-use plans to control growth, and protect high quality farmland and sensitive ecosystems of national importance. Nevertheless, the question remains as to how agricultural production can co-exist with environmental conservation, particularly in southern Ontario where numerous actors with different land-use objectives compete for the same space. Given their similar political cultures, planning systems and property rights regimes, there is potential that Ontario may look to England's experience to find lessons and identify potential policy instruments. On the other hand, as the UK transitions out of the European Union it will be important to understand the preferences of stakeholders in the design of new policies, as well as identify jurisdictions with similar preferences from which to draw ideas and experiences.

Overall, this research found that participants across, and within, cases generally agreed with the principle of integrating agricultural and environmental objectives within the same area, reflective of the land-sharing approach. Indeed, taken together, participants within both cases seemed to agree on the pursuit of a heterogeneous landscape, where corridors of habitat through farmland are established, specifically on marginal areas of farms, connecting blocks of larger intact habitat, particularly in sensitive ecosystems. This level of agreement across cases is an important finding taken

alongside previous research from Marr et al. (2016) whose own comparison of land-use policy documents, and corresponding policymaker preferences in England and Ontario, found notable differences. This suggests a potential disconnect between stakeholder preferences and policymaker preferences within these cases, appearing more pronounced in the Ontario case where there is a clear slant towards land-sparing within formal land-use policy (Marr et al., 2016). Nevertheless, in spite of the stated preference for an integrated approach, this research also identified deeper disagreements between, and within cases, which pose challenges for the pursuit of a widely accepted approach to agri-environmental land allocation.

3.3.1. Agri-environmental policy context

Before moving into a detailed analysis of the preferences of stakeholder organisations, when it comes to agri-environmental land allocation, we first thought it instructive to introduce the agri-environmental policy context in each case area (see (Marr et al., 2016) for a detailed comparison of approaches to agri-environmental land use policy). While there are similarities in the approaches and instruments utilised in both cases, there are also important differences. The approach to agri-environmental land use policy in Ontario has been described as leaning towards a land-sparing approach, whereas in England the approach is more indicative of land-sharing (Marr et al., 2016). Indeed, within Ontario's approach, agricultural and environmental land-uses are typically addressed separately with an effort to maintain large contiguous blocks dedicated to either use. This can be seen in the 'fortress conservation' approach inherent in protected landscapes (e.g. Provincial Parks) or, as an example, the distinction between the Agricultural System and Natural System within the *Greenbelt Plan (2017)*. Moreover, when compared to the English case, there is much less emphasis on agri-environmental programs to encourage environmental features on farms, particularly if they result in decreased production (Atari et al., 2009).

In contrast, England's approach may be best described as leaning towards land-sharing. This includes a more multifunctional view of the countryside and less physical separation of agricultural or environmental spaces in protected landscapes (e.g. both uses are permitted within National Parks). In England's policy there is also much more involvement at the farm scale and particularly the encouragement of on-farm environmental features through agri-environmental schemes. However, the recent end of the Entry Level Stewardship (ELS) scheme and the introduction of the Countryside Stewardship (CS) scheme has resulted in a shift from a 'broad and shallow' approach to a 'deep and narrow' approach to agri-environmental schemes in England (Darragh and

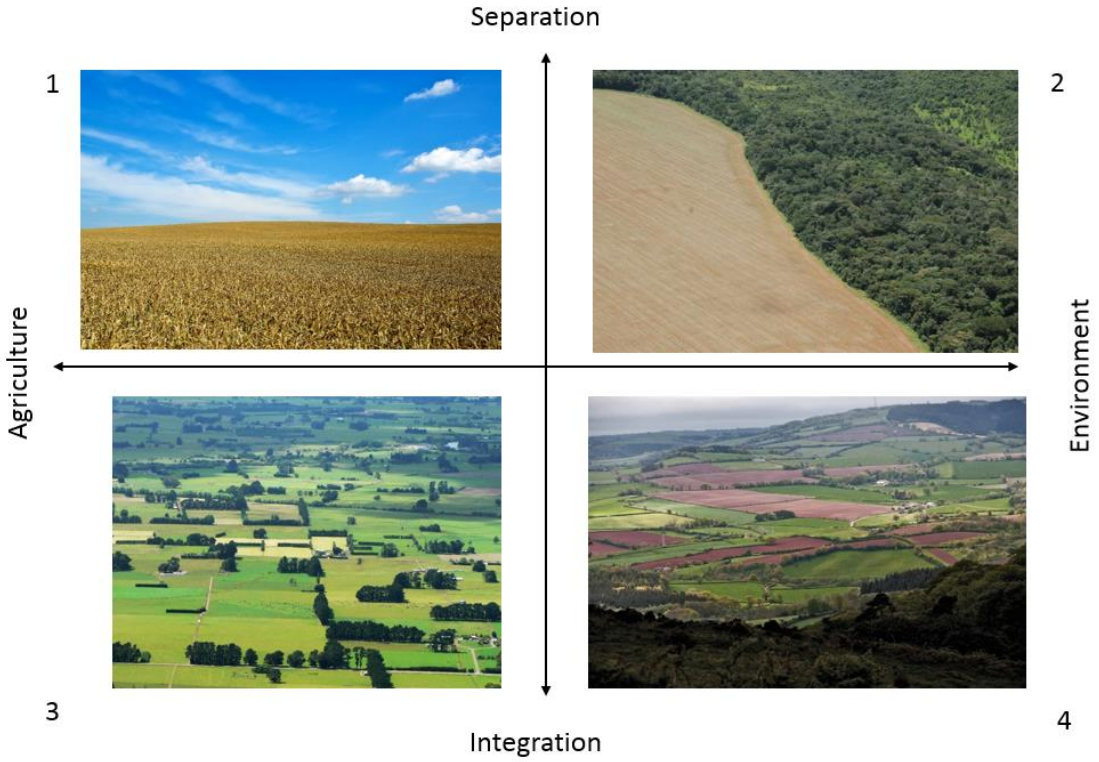
Emery 2017). The anticipated result of this change is a considerable reduction in the number of participating farmers, and an estimated reduction in the land enrolled in agri-environmental schemes from 70% to around 35–40% of England's total agricultural area (Mills et al., 2017). That said, England's policy approach still may be described as adhering to a post-productivist, or multifunctional agricultural paradigm that is reflected in the design of its agri-environmental land-use policy (Marr et al., 2016).

3.4 Methods

In order to examine the agri-environmental land allocation preferences of stakeholder organisations we conducted 24 semi-structured interviews with representatives of agricultural and environmental organisations operating in England or Ontario. Interviews were conducted during the autumn of 2015, and spring of 2016, and tended to last 1–1.5 h. An interview protocol was used to guide the conversation in order to extrapolate both the participants' stated and underlying preferences for agri-environmental land allocation. Topics used to frame the discussion included the stakeholders' perspectives on: opportunities and challenges surrounding agriculture's relationship with the environment; views on land-use conversion/restoration; and views on integration or separation of agricultural and environmental spaces.

We also elicited views on different landscape mixes using a photograph elicitation exercise (see Figure 3-1). Landscape photographs are commonly used in landscape research, and particularly for landscape assessment/evaluation with stakeholders (Arriaza et al., 2004; Howley et al., 2012; Kaltenborn and Bjerke, 2002; Wherrett, 2000). Similarly, photograph elicitation exercises are often inserted into research interviews in an effort to draw out deeper insights from participants, and potentially even reach different levels of human consciousness, when compared to reliance on words alone (Harper, 2002; Liamputtong, 2007).

Figure 3-1: Four photographs used for photograph elicitation exercise selected based on differing landscape characteristics



Sources: Picture 1 (sumo4fun), Picture 2 (BBC World Service), Picture 3 (Brenda Anderson), Picture 4 (Mark Robinson)

The intention of using images, rather than solely description, was to (virtually) draw the participants into real-world landscapes in order to understand deeper views and preferences, and help reposition these views and preferences from the conceptual/theoretical into the actual. Participants were shown each image in-turn and asked their general sentiments, and observations of drawbacks or benefits associated with each landscape design. Participants were not provided any geographical context of the images beforehand, in order to prevent the conversation straying from the actual landscape depiction. The images were selected to represent different landscape mixes between agriculture and the environment, as well as images that, at least in the researchers' view, represented a separation or integration of agricultural and environmental spaces (see Figure 3-1).

For the purposes of this study "stakeholder organisations" were taken to mean formally organised groups operating exclusively, or with a chapter/division, within either jurisdiction holding agricultural and/or environmental interests. We intentionally kept a broad scope of stakeholder organisations and included both large and small

organisations, and included organisations whose activities were predominantly policy advocacy, public education and engagement, and/or programme delivery. It cannot be said that participants spoke on behalf of their entire organisation, however individual participants were recruited through their role within their organisation and spoke through that filter, often referencing official organisational stances where available. Nevertheless, the findings are a combination of official organisational positions, and professional views, based on the participants' roles as policy experts.

An initial list of potential participants was compiled based on the researchers' knowledge of key organisations, online searches (e.g. Google), and suggestions from academic colleagues. This initial list was supplemented by suggestions from participants, who were asked to suggest other key organisations, throughout the research undertaking. Based on this list, participants were purposively selected to ensure a diverse representation of perspectives from public and non-governmental organisations with either, or both, agricultural and environmental interests.

In total, 42 organisations were invited in Ontario and England with 24 organisations ultimately participating, 12 from each case (see Appendix 6 for details of participants). To ensure anonymity of participants, their names or titles are not included here, however participants tended to be amongst the highest ranking members of the organisation (e.g. Director, CEO) or, particularly in large or diverse organisations, the individual responsible for agricultural or environmental topics within their organisation. In the case of public sector agencies we spoke with civil service staff, as opposed to politicians or political staff. We concluded recruitment as a result of theoretical saturation, as well as having captured a diversity of organisations, including most of the main organisations representing agriculture and/or environment in each region.

The sample of participants provides a diverse set of views representing the breadth of actors in each case region. While it is valuable to understand the diverse views of stakeholder organisations, including smaller organisations, it is important to recognise that each organisation has varying levels of influence within their context. This sample includes both very large and very small organisations as well as unequal numbers of agricultural and environmental representatives − although this represents the actual imbalance towards environmentally focused organisations in each case's stakeholder organisation landscape. Therefore, while the findings present a breadth of views, it will not represent the depth of stakeholder views within either case nor can it account for the varying powers of organisations to exert influence and create policy changes.

Interviews were recorded, with each participants' explicit permission and transcribed verbatim. Analysis was conducted using an iterative, inductive approach whereby themes were developed by aggregating lower order codes, using a thematic analysis process (Braun and Clarke, 2006; Bryman, 2016; Burnard, 1991).

Using NVivo 10, transcripts were systematically and rigorously coded, line-by-line, in their entirety through an open-coding exercise. By collapsing codes and removing repetition and redundancy, this large number of open-codes was aggregated into axial codes and then aggregated again into themes (see Table 3-1 for examples). From this multitude of data-driven themes, six themes relating to preferences for agri-environmental land allocation were identified, which were internally emphasised, and repeatedly mentioned, across participants. These six themes are: stated preferences for agri-environmental integration or separation; interpretation of an integrated landscape; conversion of land into agriculture; environmental restoration of agricultural land; ownership of viable farmland; and public access to nature.

Table 3-1: Examples of Coding from Thematic Analysis

	Example 1	**Example 2**
Original Text	"Rewilding is a myth…what are we trying to achieve with it? I can't see the logic myself." EN-P11	"in a perfect world the agricultural sector should be allowed to expand where the land, the soil, the climate is best suited for that type of operation." ON-P06
Open Code	Opposed, uncertain about rewilding	Agriculture should be allowed to expand wherever conditions make it viable
Axial Code	Rewilding / large-scale restoration	Support for expansion of agricultural land
Theme	Environmental Restoration of Agricultural Land	Conversion of Land into Agriculture

The two sets of interviews (England and Ontario) were coded independently and only aggregated at the theme development stage, allowing for unique findings to emerge from either case, including themes emerging as significant in one case, but not the other (e.g. public access to nature). The analysis did not have an explicit hypothesis, however the land-sparing/sharing framework was used as an analytical tool to organise, and contextualise, the interview findings after the themes were identified. It is important to note that these terms were never introduced by the interviewer, though in some cases participants used the terms, without prompting, reinforcing the suitability of the framework.

3.4.1 Case selection

The UK and Canada have clear differences, such as in their land area and population size, nevertheless these cases have important similarities that help support this comparison. Fundamentally, as a former colony, Canada shares a history with the UK, including sharing a Head of State and maintaining Commonwealth membership. Canada also has a transplanted Westminster parliamentary system, and associated institutional design, and common law legal system. The people of Canada and the UK remain closely connected, for instance as recently as the *2011 National Household Survey* of Canada, 35 per cent of Canadians identified the British Isles as their ethnic origin (Statscan, 2014). Of particular interest to this research, the planning systems of the UK and Canada are quite similar, as well as having similar property rights regimes where compensation for regulatory takings is minimal (Purdue, 2010; Schwartz and Bueckert, 2010). These political, legal, cultural, and planning system similarities suggest that similar land allocation interventions may be appropriate in both contexts.

For the purpose of this research we have chosen to compare the province of Ontario with the country of England. These jurisdictions were chosen for three reasons. First, for practical reasons both the UK and Canada are too diverse, with too many sub-state actors to compare as a whole. Second, within the federal distribution of power in Canada, and the devolution of authority in the UK, much responsibility for land-use exists at the sub-state level. Correspondingly, civil society groups have emerged with similar geographical focus. Third, within Canada, land-use conflict is most pronounced in Ontario, notably southern Ontario, where a relatively large and growing population shares the same area as some of Canada's highest quality agricultural land, all within a unique, yet heavily converted, ecosystem. This context has few parallels in Canada, but is similar to the context of England where land-use conflict has been experienced for much longer than in Ontario.

For context, Ontario is Canada's most populous province and England is the most populous country in the UK. While geographically much larger than England, the vast majority of Ontario's population is situated in the southern portion of the province in the area between the Great Lakes. This area has a different ecoregion, the Mixedwood Plains, distinct from the Boreal Forest in the north of the province (Rankin et al., 2011), and has been heavily converted for agriculture and urban development purposes. England has long experienced a similar phenomenon of agricultural expansion, and subsequent 'rebalancing' of agricultural and environmental land-uses. Both Ontario and England have made efforts to reduce land-use conflict, such as the creation of the four land-use plans in the area around Toronto in Ontario (the Greenbelt Plan, the Niagara

Escarpment Plan, the Oak Ridges Moraine Conservation Plan and the Growth Plan for the Greater Golden Horseshoe) and the use of green belts and National Parks/Areas of Outstanding Natural Beauty (AONB) in England, among other instruments. Nevertheless, competition between land-uses persists in both cases, notably between agriculture and the environment, with various interest groups promoting different land-use objectives.

Overall, England and Ontario are facing the same fundamental challenges with land allocation. While they are occurring at different geographic scales, the issue remains the same: in both jurisdictions a perception exists that society's demands for development and agricultural products are competing for land with the natural environment, which has already resulted in large scale conversion and fragmentation of sensitive ecosystems. It is therefore valuable to identify and compare the preferences of those involved in advocating for different interventions and management strategies in order to understand the potential for sharing lessons, approaches, and policy instruments, as well as supporting the resolution of internal differences between organisations.

3.5 Results

We begin the results by describing the stated, surface-level, land allocation preferences of stakeholder organisations before delving into the deeper agri-environmental land-use preferences that arose from the interview process. These deeper preferences include: (1) views on what constitutes an integrated landscape in practice, (2) views on the conversion of land into agriculture, (3) views on the environmental restoration of arable land, (4) views on who should own viable farmland, and (5) views on public access to nature on private farmland. Each of these are addressed in turn in the results section.

While most participants, in both cases, agreed in principle with integration of agricultural and environmental land-uses, these surface-level preferences of stakeholders became more complex, and began to unravel, as we explored their preferences in greater detail and depth. These differing preferences amongst stakeholders pose a barrier for a mutually agreed upon approach within cases, as well as highlighting challenges and opportunities for policy transfer between the England and Ontario cases.

3.5.1 Stated preference for integration (Land-Sharing) or separation (Land-Sparing)

During the interviews participants were asked whether they thought it was better to pursue the integration of agricultural and environmental land-uses on farms, or whether it was preferable to separate these land-uses into their own, dedicated, spaces. Overall the interview findings demonstrate general agreement across both cases that integration of agricultural and environmental land-uses was preferred to separation – at least in principle. Here we discuss participants' stated agri-environmental land-use preferences, and corresponding justification, in each of the two jurisdictions.

3.5.1.1 England

Participants from England unanimously agreed that agriculture and the environment rely on each other and that agriculture needs to work with, not against, ecosystems. Correspondingly, the majority of participants presented a preference for integrating agricultural and environmental land-uses (land-sharing). Participants stated that farmed landscapes are necessary for the success of some species, notably some bird species, and that land-sharing in livestock operations was both appropriate and necessary for the maintenance of grassland habitat.

Participants discussed the benefits to agricultural production from having on-farm environmental features. Examples included reducing soil erosion and maintaining soil health; reduction or more efficient use of inputs; encouraging predator prey and 'natural enemies' dynamics; pollinators; market opportunities for agricultural products; pest and weed management; and providing shade trees and shelterbelts. Some participants presented a more inherent disagreement or discomfort with separated landscapes, and the more 'North American' model of conservation through nature reserves. Participants also commonly stated a belief that there was no space left to spare in England and that land-sharing was the only way to achieve environmental objectives − generally dismissing the viability of large-scale environmental restoration often associated with the term 'rewilding'.

However, there was some mention of drawbacks from having environmental features on farms and the integration of agricultural and environmental land-uses more generally. Examples include damage from wildlife, creating habitat for pests, and the

introduction of ‘weeds’ into arable crops. Indeed, one participant noted that ‘weeds’ and ‘crops’ are separated in farming landscapes, and correspondingly within the minds of farmers, as well as stating that the two cannot co-habituate and need distinct spaces. The challenge of overcoming the distinction of beneficial and harmful plant species within the minds of farmers has parallels with previous research on farmers’ construction of stewardship and their conceptualisation of conservation and environmentally beneficial farming practices (Darragh and Emery, 2017; McHenry, 1998).

In parallel, a minority of participants felt that land-sparing could meet wider environmental objectives and be successful in some contexts. These participants felt that the reduction in intensification generally associated with land-sharing would result in a considerable yield reduction, and that land-sparing would allow for continued intensification of agriculture while also allowing for environmental conservation elsewhere. It was also noted that separating these land-uses would be easier for farmers, and fit best within the spatially compartmentalised views of arable farmers.

3.5.1.2 Ontario

With a few examples of slight uncertainty, similar to the England case, most participants in Ontario agreed that integration of agricultural and environmental land-uses (land-sharing) was preferable to separation of land-uses (land-sparing). Participants described the benefits that they perceive arising for both agriculture (e.g. integrated pest management, timber extraction, and reduced soil erosion) and the environment (e.g. habitat for grassland birds, linking natural systems) by integrating uses. This is somewhat unexpected given that previous research has found that Ontario’s approach to agri-environmental land-use within formal policies has tended to lean towards land-sparing (Marr et al., 2016).

However, there was some evidence of uncertainty amongst Ontario participants, with some discussion of the benefits of having a clear separation of agricultural and environmental land-uses, as well as recognition of some of the potential drawbacks of integration. Examples of the benefits of separated land-uses reported by participants include the opportunity for greater mechanisation and the potential for wider public access to natural areas. Drawbacks of integrated landscapes described by participants include wildlife damage and pests, risk of lost production or profits, and a perceived incompatibility with arable farming (e.g. field sizes too small to be commercially viable, reduced use of necessary inputs). Nevertheless, at least in principle, a preference for

integrating agriculture and the environment was voiced more strongly, and by more participants, than preferences for separating these land-uses.

3.5.2 What constitutes an integrated landscape?

Within both the England and Ontario cases, participants disagreed in their interpretation of what constitutes an integrated landscape. This was particularly evident through the photograph exercise. In England, participants voiced quite contrary views on Picture 2, with some participants describing it as being a separated landscape, even using the term 'land-sparing', whereas other participants described it as an integrated landscape (see Figure 3-1). This suggests a disagreement as to what integration really means in practice, or the landscape scale at which it should be pursued.

Participants from England were also highly critical of Picture 3, which they uniformly described as an integrated landscape (see Figure 3-1). Participants perceived a lack of connectivity between features, that features provided little environmental value, and described it as an agricultural monoculture/intensive industrial farming system. This presents a complex view as the same participants that supported integration in principle voiced strong opposition to what they agreed to be an integrated landscape, but did not match their expectations of effective integration.

Quite unlike the English case, in Ontario, most participants expressed positivity towards Picture 2, describing the dual opportunity it provided for biodiversity in an intact woodlot and the opportunity for intensification of production (see Figure 3-1). However, like in England, some participants referred to this landscape as mixed or integrated, whereas others referred to it as a clear separation of agriculture and environment, suggesting that participants did not share a common understanding of an integrated landscape. Also, interestingly, participants who described it as separated had different views on how to better 'integrate' this landscape, with some proposing that environmental features should be added to the field, and one participant (ON-P01) suggesting the agricultural portion of the image could be extended into the forested area, demonstrating different ideas as to which side should sacrifice for the sake of integration.

3.5.3 Conversion of land into agriculture

In the English case the expansion of agriculture was, unsurprisingly, not a main area of discussion given the already high proportion of area in production – 68% of England's total land area as of 2015 (Defra, 2015). Participants noted that the current model was to keep land in production, but not really to expand the agricultural area. Participants also felt that the considerable expansion of agricultural land around the Second World War had negative connotations and suggested that it needed to be undone rather than protected as an ongoing necessity. This view coincided with a low interest in food security/self-sufficiency among participants, with most participants dismissing the topic as not possible or not an issue.

Views on the conversion of land into agriculture were much more mixed in Ontario. Unlike in England, where expansion was largely dismissed, in Ontario it was clearly much more contentious. Some participants were strongly opposed to the expansion of agriculture, and supported the creation of more habitat: "*forest should not be lessened under any circumstances. Natural environments should not be lessened under any circumstances anywhere. I just can't imagine an argument against that*" ON-P05-Food & Water First. Whereas other participants supported expansion of agriculture into new areas, such as by stating "*in a perfect world the agricultural sector should be allowed to expand where the land, the soil, the climate is best suited for that type of operation*" ON-P06-OSCIA. The proposed expansion of agriculture into currently heavily forested areas in northern Ontario was an area where some participants were particularly supportive:

> "*I don't personally see any problem with expanding agriculture in the north. There's huge opportunities there, some of it attributed to science and the fact that we've got soybean and corn and other crop varieties now that can successfully be grown in the north, whereas 10–15 years ago that just wasn't the case. And with the anticipation of continued climate change the north is seen as a huge opportunity. Again I don't think, from an organization Soil and Crop doesn't have, necessarily, a problem*."ON-P06-OSCIA

Unlike in the England case, the connection to food security was also discussed, though not in name, such as in the following excerpt:

> "*I guess the understanding has to be that, if we need to provide food for this potential population growth, we're going to have to do it somewhere. Why depend on somebody else, when we can do it ourselves?*" ON-P01

3.5.4 Environmental restoration of agricultural land

3.5.4.1 England

The environmental restoration of viable agricultural land was a highly controversial topic across both cases. In England, small scale restoration was not particularly controversial among participants, though there was mention of some sensitivity and opposition within the agricultural community:

> "*I mean there is, there is [sic] certain sectors of the community, the agricultural community, who are not open to the idea, who want society to reinforce their view that you just have to farm the buggery out of everything but that is not necessarily the entire agricultural community.*" EN-P03-RSPB

Participants described the concern over small scale restoration as being based on a principled view of the 'best' use of arable land as well as practical concerns with the loss of support payments, particularly as a result of tree planting.

Unlike small scale restoration, the concept of large scale restoration, sometimes associated with the term 'rewilding', was highly contentious in England. Opposition was mixed between principled opposition and practical obstacles, notably a perception that England did not have enough space to pursue rewilding. For instance, some participants voiced a principled concern with converting viable farmland, such as one based in East Anglia who states:

> "*you know you don't want to lose good agricultural land, I think it would be probably unwise if not criminal to take good agricultural land out of production for something like rewilding … we are the breadbasket of the country to some extent*." EN-P06-FWAG

While others had more inherent concerns with the concept of rewilding within the English context:

> "*Rewilding is a myth. It lets people – we haven't had a wild landscape for centuries in this country because it's been managed for that long and rewilding, what are we trying to achieve with it? I can't see the logic myself*." EN-P11-GWCT

Another noted obstacle was that rewilding was not commercially viable, though conversely it was also raised that rewilding has the potential to diversify rural economies. While in the minority, some participants did support rewilding and saw benefits with the

approach: "*I'm very keen on the concept of rewilding landscapes that − as much landscape as we can of course*" EN-P05a-Wilderness Foundation.

Participants were also divided on upland management, including the use of sheep for conservation grazing, with multiple participants being highly critical. Participants noted the cultural attachment to sheep and upland grazing, as well as the theoretical benefits from proper conservation grazing, however often questioned the use of the uplands for sheep production and the actual benefits of conservation grazing:

> "*I don't think there's a very strong business case in the UK to grow sheep on the uplands, I think it's more a tradition and people look at it through rose tinted glasses, so I think we need to be a bit more honest about why we grow sheep on the uplands. The romantic in me absolutely loves it, the realist in me thinks it's a really stupid use of resources and nature.*" EN-P07-WWF-UK

Instead, it was proposed that there may be potential to convert the uplands to a landscape more focused on environmental conservation.

Nevertheless, there was widespread agreement among participants that farmers should convert marginal land into areas for environmental conservation on their farms and leave unprofitable land out of production. There was a view that farmers should concentrate on high quality land on their farms and it was inefficient to keep marginal land in production. However, there was concern that land previously enrolled in the Entry-Level Stewardship (ELS) agri-environmental scheme under the previous iteration of the CAP may be reincorporated into agricultural production after agreements end, and that 'marginal land' may be reverted back into arable production without the financial incentive (see Darragh and Emery (2017) for a recent description/analysis of this challenge). This was particularly current as multiple participants independently raised their concerns with the end of the ELS scheme:

> "*so you know the fear is that those that have been in ELS and are no longer going to get it, will just revert back and plough up their margins and whatever else they've done. You have to hope, you know, whether they've been persuaded that the changes they've made is actually good for their farm or was it just to get the money?*" EN-P08-Woodland Trust

It was also acknowledged that the idea of 'marginal' land fluctuates with commodity prices and the design of the agri-environmental schemes. This is a challenge for long-term conservation as farmers may be hesitant to create permanent features and run the

risk of losing direct payments through the Basic Payment Scheme[9], as well as decreasing their ability to expand their production in times of high commodity prices. In-turn, the amount of marginal land left out of production would then fluctuate as markets and schemes change.

3.5.4.2 Ontario

Among participants in Ontario there was clear disagreement between stakeholders over the conversion of agricultural land for environmental purposes. There was prominent disagreement over availability of land in Ontario, for instance one participant (ON-P02) states that:

> "*But as far as forested areas, we already did that, we already cut down the trees to create agricultural land so why would we want to go back to that again when only 5% of our fertile farmland in Canada is good for agriculture. We have a lot of land to grow trees on and only a certain quantity of land for agriculture*." ON-P02

whereas another states: "*but you know the mind-set in Canada is that we've got tons and tons of space and not so much necessity to save something down here because we've got lots of it up there. That's just been the Canadian mind-set for a long time*" ON-P05-Food & Water First.

Similar to the English case, some participants, mostly agricultural representatives but also some environmental representatives, were opposed in principle to the conversion of agricultural land: "*Sorry, good farm land is needed to raise food. Reforestation of land suitable for farmland makes little sense unless it is done to create buffers*" ON-P08-Farm & Food Care. Other stakeholders professed the need to rebalance and build connections in southern Ontario, where features have been removed and the landscape fragmented: "*Specifically in Ontario, which is where I can speak of directly, it's really about managing habitat, creating more habitat, recreating habitat that's maybe been lost in the past*" ON-P04-NCC.

[9] Basic Payment Scheme: Under Pillar 1 of the Common Agricultural Policy farmers are entitled to receive direct payments for land that they are actively farming so long as they maintain their land in good agricultural and environmental condition through adherence to a set of cross compliance obligations (e.g. Greening).

Importantly, some participants also described a cultural/historical attachment to the farmed landscape, going beyond the utility of agricultural land to describe the heritage aspects of cleared land: "*it's the whole idea of in the 19th century having gone to the trouble of clearing land and picking stones and going through the converting a parcel of land from natural habitat to farmland in Ontario was quite an undertaking*." ON-P09-OFA. This attachment to cleared land, as part of a cultural landscape, adds another layer of complexity to conversations around environmental restoration of arable land.

Similar to the English case there were strong feelings by most participants that only marginal land should be available for environmental restoration:

> "*No, it's because that land is to serve, it's to serve a very high purpose it's to feed us. Right? So let's identify the land that doesn't feed us well and let's put natural features back on it*." ON-P10-ALUS

> "*we're usually quite aware that the restoration aspect would ideally be focused on the lower capability soil type of situation or areas of steep slope, whatever you want to call that if it's within a broader area of farmland … I would say that we're pretty sensitive about pushing for natural vegetation to be restored on land that's productive farmland*." ON-P12

However, unlike in the English case, the conversation did go further among Ontario participants to say that agriculture should be allowed to expand wherever it is viable:

> "*We do not adjust the 'ratio' of ag to conservation lands to suit some ratio. If land is suitable for agriculture we generally use it. The question is do we set aside enough space for trees and habitat for biodiversity*." ON-P08-Farm & Food Care

This preference for unfettered agricultural expansion is complicated for two reasons. First, high quality agricultural land and the at-risk ecosystems of southern Ontario share essentially the same area, and at face-value this approach would lead to a near complete conversion of that ecosystem. Second, viability of land for agriculture fluctuates with technology and commodity prices, as understood by some participants: "*Well $10 corn makes land economical that wasn't economical a minute ago. Right?*" ON-P10-ALUS. In particular, participants commonly raised the case of Chatham-Kent, a municipality in southwest Ontario with good soil quality across a large area, where high commodity prices in 2013 contributed to extensive removal of features for the purposes of production.

3.5.5 Ownership of viable farmland

3.5.5.1 England

Among the English participants, the ownership of land by environmental organisations was quite common. Stakeholder organisations often purchased land, including viable farmland in some cases, and often owned commercial farms themselves which they continued as demonstration farms. There was some sensitivity to the purchase and ownership of viable agricultural land by environmental organisations, though much less than in the Ontario case. Nevertheless, participants were careful to emphasise that the land they purchased was a very small area and they were not pursuing large scale conversion. They also noted that the land they purchased was targeted to particular landscapes, habitats, or species and that, for practical reasons, they did not often purchase viable farmland as it was too expensive.

3.5.5.2 Ontario

The ownership of viable agricultural land by environmental organisations was much less common in Ontario when compared to the English case. Unlike in England where most organisations were involved with land acquisition and restoration, only one organisation pursued the purchase of land for the purpose of restoration and none operated dedicated demonstration farms. This organisation was also very sensitive about the purchase of viable agricultural land, recognising that it was often viewed negatively within the agricultural community:

> "*We're obviously limited to the land that we purchase, we purchase that land in a strategic manner, we're not out to grab all the land that we can possibly get our hands on … we spend a lot of time communicating what we're really trying to do in order to avoid mistrust and people being concerned that we're going to remove farming from the landscape completely, because that's definitely not our intention*." ON-P04-NCC

While other organisations were not involved in land securement, some were supportive of the concept of land purchase and restoration:

> "*in some cases we should just be buying up, or providing the resources or funding or matching funding from the public purse to match private donations relating to land securement and conservation easements and that sort of thing, in high priority areas*." ON-P07-Carolinian Canada

However, other organisations, even organisations with similar environmental objectives, were strongly opposed to the purchase of viable agricultural land by environmental organisations:

> "*It's a failed model because then all of a sudden somebody from far away is making choices about that community and making choices about the land-use…that gets offensive, that gets offensive to certain communities. Because they didn't make a judgement about which should be for food baring use and which should be for natural uses right?*" ON-P10-ALUS

The clear difference in principles complicates the pursuit of a land-sparing regime, where several stakeholders were strongly opposed to the ownership of viable land by non-agricultural stakeholders.

3.5.6 Public access to nature

The challenge of ensuring public access to nature was emphasised in Ontario, but was almost unmentioned among the English participants. In England, public right-of-way's often traverse private land, including farms, and so environmental features on private farms may still provide the public benefits of access to nature. Participants from England did not raise this topic in the interviews.

Within the Ontario context the conversation was quite different. In Ontario trespassing is well ingrained, both socially and legally, and public access to farmland is not considered acceptable. Instead, public land is dedicated for public access to nature, notably through the federal or provincial parks systems or local conservation areas. From this basis, some participants did voice a preference for spared areas in order to ensure public access to nature outside of farmed landscapes:

> "*I guess when you talk about the separation of land-use, I would agree with that as well. And that gets back to the public access, because in Ontario, as you well know, farms are private property and there's not many farmers that would provide public access to their farm and there are biosecurity reasons for that that we could cite so we would definitely say that farmland is not parkland*." ON-P09-OFA.

This is an obstacle for public access to nature in an integrated landscape, suggesting spared spaces would need to be maintained in the Ontario context.

Moreover, multiple participants observed that only a small proportion of the heavily converted bioregion of southern Ontario was actually within public ownership, and felt that the current proportion of parkland was inadequate.

3.6 Discussion and conclusion

This research sought to explore the preferences of stakeholder organisations involved in agri-environmental land allocation within the jurisdictions of England, UK and Ontario, Canada. It is essential to understand the views of this group as stakeholder organisations are important middle-actors who will greatly influence agri-environmental land management within their jurisdictions, by influencing policymakers, the public, and/or individual landowners and farmers.

The results of this study suggest that participating stakeholder organisations, from England and Ontario, share very similar views on the solution for balancing agricultural and environmental objectives within a finite land base, generally preferring a land-sharing approach in principle. However our analysis found that deeper disagreements over some aspects of land-use will continue to complicate the pursuit of a widely acceptable solution. The findings suggest that, within both cases, stakeholder organisations prefer a mixed approach, combining elements of land-sharing and land-sparing, where natural corridors through farmland are created, specifically on marginal areas of farms, connecting blocks of habitat, focussed on sensitive ecosystems. This has parallels to what has been previously proposed in the literature, such as in the recommended policy guidelines for agricultural landscapes set out by Fischer et al. (2008, p. 384). However, a deeper look at stakeholder preferences provides a series of obstacles for achieving such a landscape model.

In practice, the actual pursuit of a mixed landscape model is complicated by sensitivity around the environmental restoration of viable agricultural land and the views of some participants that only marginal land should be restored for environmental purposes. This poses a particular challenge for highly converted areas where there is perceived to be limited or no marginal land (at least in some years), such as Chatham-Kent in Ontario or parts of East Anglia in England. Similarly, the controversy over large-scale habitat restoration, and the high proportion of privately owned land in both England and southern Ontario, inhibits the creation of large areas of interior habitat in areas where it does not already exist. This undermines proposals from such authors as Phalan et al. (2011a) who state that *“In some circumstances, price premiums and subsidies which*

currently go towards wildlife-friendly farming certification or agri-environment schemes might be more effectively spent on large-scale habitat protection and restoration" (Phalan et al., 2011a, p. 569).

Another impediment raised by participants relates to the long-term maintenance of natural corridors through marginal areas of farmland, as definitions of 'marginal land' fluctuate with biophysical and socio-economic conditions. The sensitivity surrounding public access to nature on private land, and the ownership of viable farmland by non-agricultural interests, poses an additional challenge for both land-sparing and land-sharing, particularly in the Ontario context. This contributes to the conversation surrounding human contact with nature, within the land-sharing vs. land-sparing debate (Fischer et al., 2008; Miller, 2005; Phalan, et al., 2011a), and reminds us that the solution to public access to nature is highly context specific.

Overall, while stakeholder organisations held many of the same principles, our research found that multiple areas of disagreement both within and between these two jurisdictions supports the idea that multiple, context specific, management solutions will be required in-order to avoid land-use conflict. We also found that strict adherence to either the land-sharing or land-sparing approaches will not suit the preferences of stakeholder organisations. Therefore, our findings have parallels to previous research, in other cases, who utilised the land-sparing/land-sharing framework but ultimately propose a mixed approach in practice (Fischer *et al*., 2014; Fischer *et al*., 2008; Kremen, 2015; Scariot, 2013).

While we have identified important differences between these two cases it is interesting that our research found that the preferences of stakeholder organisations are more similar than might be expected. Indeed, previous research from Marr et al. (2016) found considerable differences in policy approaches, and policymaker preferences, between these two cases. Their research found that England's approach to agri-environmental policy was more indicative of land-sharing, whereas Ontario's may be best described as land-sparing. This raises several questions around the relationship between stakeholder preferences and formal agri-environmental land-use policy, and suggests a potential disconnect somewhere in the policy process where stakeholder preferences may not be accurately reflected in policy. By exploring how stakeholder preferences for agri-environmental land allocation are similar, or different from formal institutions (policies), the findings help to understand how actors in either jurisdiction both shape, and are shaped by, their institutional context (Vatn, 2005). However, we cannot conclude from our findings whether stakeholder organisation preferences had resulted from, or caused, the differing policy approaches within each jurisdiction. This could be

an important avenue for future research that may be undertaken in these same jurisdictions. Indeed, a more historical comparison of England and Ontario may be particularly useful given their similar political, cultural, and institutional characteristics, as well as their colonial history, in-order to better understand whether policy differences have emerged from a similar foundation because of differing stakeholder preferences, or if stakeholder preferences have evolved in-line with policy changes.

Within the literature, this paper contributes to expanding the land-sparing/land-sharing framework to consider the social acceptability of either approach and builds upon previous research on stakeholder organisation preferences in agriculture (Baudron and Giller, 2014) and forestry (Nordén et al., 2017). While the land-sparing and land-sharing framework was found to be a useful tool for organising the land allocation preferences of participants, it was clear that even within individual participants, elements of both approaches were preferred. This suggests a combined land-sparing/land-sharing approach is necessary in practice, and while a useful heuristic, suggests that the land-sparing or land-sharing framework does not transfer cleanly into the land allocation preferences of stakeholder organisations − at least within these two cases.

Moreover, we found that while participants constructed their interpretations of what constitutes an agricultural or environmental feature/landscape in similar ways, they often held different ideas as to what scale integration or separation should occur. This was particularly evident in the photograph elicitation exercise. It was sometimes difficult to reconcile preferences for land-sparing or land-sharing within a single participant's transcript, let alone between participants. While a challenge for our own inductive approach, future social science research attempting to use the land-sparing/land-sharing framework should be more explicit in their discussion of scale from the beginning of the research exercise which will ease analysis and help to strengthen the research findings.

Acknowledgements

We wish to thank all of the participants who took time out of their busy schedules to contribute to this study. The authors are grateful to the editor and to the two anonymous reviewers for their helpful comments and suggestions which greatly improved this paper. We would also like to thank Professor Charlotte Burns at the University of Sheffield for her very useful comments on this paper. This research was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC) Doctoral Fellowship program.

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Chapter 4 The accidental environmentalists: factors affecting farmers' adoption of pro-environmental activities in England and Ontario

4.1 Preface

The findings of the previous chapter emphasised the importance of better understanding farmers' views and motivations regarding on-farm environmental stewardship, as they are the actors ultimately responsible for integrating agriculture and the environment through the adoption of pro-environmental activities on their farms. Therefore, in this chapter I present the results of an inductive investigation of the factors influencing farmers' uptake of pro-environmental activities as interpreted by stakeholder organisations and farmers themselves operating within the jurisdictions of England and Ontario. This chapter addressed my third research objective, which was to understand farmers' views and motivations relating to the adoption of pro-environmental activities on their farms in both jurisdictions.

In this chapter I contribute a new data-driven framework to assist in explaining farmers' decision-making when it comes to the adoption of pro-environmental activities within their farming operations. The use of a comparison between England and Ontario was also valuable for drawing out insights that may have been overlooked in the analysis of a single case. The resulting findings contribute to a better understanding of the similarities and differences between the views of comparable groups of stakeholders and the influence of context on farmers' decision-making. I also add to the broader literature on farmers' motivations and decision-making, which is an under-researched area in the Canadian context that I hope to stimulate.

The findings also highlight the importance of a multiplicity of influences on farmers' decisions relating to whether, or not, they adopt pro-environmental activities, and the importance of not oversimplifying farmer motivations exclusively as profit seeking or as environmental stewardship. During the stakeholder organisation interviews described in Chapter 3 some participants emphasised that farms are fundamentally a business and, therefore, farmers may be expected to concentrate on decisions that maximise the profitability of the farm. Examples of quotes from stakeholder organisations include the following:

> "*I mean I think at the end of the day they are businesses, they are small and medium enterprises so they have to make money*." (ORG-EN-P01-Linking Environment and Farming (LEAF))

"*I would say that in the last two decades the shift from farming being seen as a lifestyle to being a business has been a big shift in the mind-set of people. Farmers today, successful farmers, are as much of a businessman as someone running a clothing store downtown in the city*."(ORG-ON-P01-Anonymous Farm Organisation)

"*You've got to have policies in place that keep agriculture on the ground, operating as independent businesses, and operating profitably. And some of the wants and desires of some citizens do not necessarily lend themselves to agriculture remaining profitable, so that has been a huge challenge*." (ORG-ON-P06-Ontario Soil and Crop Improvement Association (OSCIA))

However, previous research has often found that this is not the case and farmers are not exclusively profit maximisers nor are they solely driven by pecuniary motivations (Duesberg, Dhubháin, & O'Connor, 2014; Edwards-Jones, 2006; Howley, Buckley, O Donoghue, & Ryan, 2015; Pannell et al., 2006; Willock et al., 1999). Nevertheless, policies tend to narrowly focus on farmers' profit seeking motivations. Within agri-environmental policy, for example, we can see this profit-maximiser perspective manifest itself in the extensive use of financial agreements and incentives (e.g. agri-environmental schemes/programs) in order to encourage farmers' adoption of pro-environmental activities. While an important tool for rewarding environmentally conscientious farmers, as well as persuading more financially motivated farmers, this approach is very costly and may be unsustainable, or at least limited in the environmental benefits it can obtain. This is particularly true in times where governments are looking to reduce expenditure.

Ultimately, this chapter finds that this narrow focus may be missing opportunities to target farmers' other interests and motivations in order to further environmental objectives. I particularly emphasise an underutilised opportunity to target farmers' non-environmental interests, such as recreation, health, farm succession and even, in some cases, productivist objectives, in the promotion of pro-environmental activities.

The following chapter is presented in the style of the *Journal of Rural Studies* where it is currently under review.

Declaration

I declare that the work submitted is my own. The contribution by co-authors was as follows:

Peter Howley: supervision, review and editing

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The accidental environmentalists: factors affecting farmers' adoption of pro-environmental activities in England and Ontario

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Highlights:

- We explore farmers' pro-environmental decision-making in England and Ontario, Canada
- We identify a range of internal orientations that are common in both case study regions
- These orientations are Production, Business, Environmental, Lifestyle, and Farm Health
- These interests form a frame through which options are internally analysed and decisions derived
- Farmers are undertaking many pro-environmental activities for non-environmental reasons

4.2 Abstract

Based on semi-structured interviews with 54 distinct actors in the UK and Canada, we identify a range of internal psychological orientations that are common (albeit to varying degrees) in both case study regions that, when taken together, provide a lens through which on-farm decisions relating to pro-environmental behaviours are internally analysed and subsequently operationalised. We label these orientations as *Production, Business, Environmental, Lifestyle*, and *Farm Health*. Through these orientations, we find farmers are often becoming 'accidental environmentalists' by undertaking many pro-environmental activities for non-environmental reasons. Prominent examples include adopting environmentally beneficial on-farm decisions to support field sports (i.e. shooting), pursuing production improvements with environmental spin-offs (e.g. cover crops, beneficial pollinators), or seeking improvements to personal or family health and well-being (e.g. reduced use of chemicals). This analysis therefore highlights the

importance of not oversimplifying farmer motivations along a dualistic profit-seeking v stewardship divide when it comes to understanding environmental behaviour.

Keywords: Farmers' environmental attitudes; Stakeholder organisations; England; Ontario; Comparative analysis

4.3 Introduction

Farmers are a large group of private landholders with the potential to make significant changes to the wider environment, impacting issues ranging from water quality and biodiversity conservation, to climate change (Foley et al., 2011). In order to influence this private land-use, it is essential to understand both farmers, who are ultimately responsible for the management of agricultural land, as well as the organisational stakeholders who affect the policy environment in which farmers operate. Focusing specifically on the uptake of pro-environmental activities[10] we present the findings from two sets of interviews, one undertaken with farmers (owners and managers) operating within the country of England in the United Kingdom (UK) or the province of Ontario in Canada, and another set completed with agricultural and/or environmental stakeholder organisations within these two jurisdictions. The intention of including the views of stakeholder organisations along with farmers is two-fold. First, they provide a broader view of the farm community, working at a higher-scale with a large number of farmers. Secondly, stakeholder organisations operate as 'middle actors', both representing the farm community in policy development and influencing farmers' decision-making through education, outreach and financial incentives (Parag & Janda, 2014). It is therefore essential to investigate the accuracy of their views on farmer decision-making in order to maximise the pro-environmental outcomes of their on-farm intervention, and minimise conflict and policy failure arising from misrepresentation of farmers' motivations.

Our comparison of England and Ontario allows us to draw insights that may have been overlooked in the analysis of a single case, as well as explore the generalisability of frameworks across jurisdictions. England and Ontario present a useful comparison due to some important social, cultural, and institutional similarities, arising from a former colonial relationship and a large proportion of Ontario's population migrating from

[10] In this paper we use the term 'pro-environmental activities' to broadly refer to on-farm decisions and behaviour with environmental benefits. We did not use this term during the interviews and instead allowed participants to describe what they deemed to be beneficial activities for the environment, focusing on the reasons for undertaking activities rather than the activities themselves.

England. For instance, as recently as the 2011 National Household Survey, 39.44 per cent of Ontarians identified their ethnic origin as originating from the British Isles and 23.12 per cent of Ontarians specifically identified their ethnic origin as English (Statistics Canada [Statscan], 2014). Through a comparison of farmers and stakeholders in both case areas we can also better understand the influence of farmer support and agri-environmental schemes, as well as other contextual factors, which is particularly significant given recent events such as the UK's decision to leave the European Union (EU).

Our findings highlight the importance of a multiplicity of influences on farmers' decisions relating to whether, or not, to adopt pro-environmental activities. Specifically we identify a range of internal psychological factors (values, beliefs, and attitudes) that are common (albeit to varying degrees) in both case study regions that, when taken together, provide a lens through which on-farm decisions relating to pro-environmental behaviour are operationalised. Importantly, we find that these influences are frequently unrelated to the environment and farmers are often becoming *accidental environmentalists* by undertaking many pro-environmental activities for non-environmental reasons. Prominent examples include adopting environmentally beneficial on-farm decisions to support field sports (i.e. shooting), pursuing production improvements with environmental spin-offs (e.g. cover crops, beneficial pollinators, conservation tillage), or seeking improvements to personal or family health and well-being (e.g. reduced use of chemicals).

This analysis therefore underscores the importance of not oversimplifying farmer motivations when it comes to understanding environmental behaviours. Specifically, we found that farmers make on-farm decisions for a multiplicity of reasons and so it is important that farmer motivations are not narrowly classified exclusively as profit seeking or as environmental stewardship. Instead, we suggest that profit/production, stewardship and a variety of other interests exist within each individual farmer, albeit ordered differently depending on the personal value attached to each interest (Thompson, Reimer, & Prokopy, 2015). Together these interests form a frame, or lens, through which options are internally analysed and decisions derived (Best, 2010; Thompson et al., 2015). Each frame/lens will appear differently within each farmer, depending on a variety of factors, including their personal interests, values, and attitudes pertaining to different aspects of the farm; what we call 'orientations' and have divided into: Production, Business, Environmental, Lifestyle, and Farm Health. When evaluating whether or not to undertake a pro-environmental activity on the farm, all of these orientations, and not just specific environmental motivations, will affect the ultimate decision.

Our findings contribute a new data-driven framework to assist in explaining farmers' decision-making when it comes to the adoption of pro-environmental activities within their farming operations. The typology we present depicts farmers' perceptions about themselves and what influences their decisions rather than being based upon the decisions themselves. This is useful in that farmers' attitudes have been shown to influence their actual behaviour, in our case suggesting that attachment to various orientations will result in differing uptake of pro-environmental activities (Ajzen & Fishbein, 1977; Lynne, Shonkwiler, & Rola, 1988; Sulemana & James Jr, 2014).

These findings are valuable alongside previous research in farmer behaviour and decision-making. While studies of farmers' pro-environmental behaviour often utilise such theories as the Theory of Planned Behaviour (Goodale, Yoshida, Beazley, & Sherren, 2015; Lokhorst, Staats, van Dijk, van Dijk, & de Snoo, 2011; Mills et al., 2017; Price & Leviston, 2014) or the Theory of Reasoned Action (Beedell & Rehman, 2000; Willock et al., 1999; Wilson, 1996) we have adopted an inductive approach with principles of Grounded Theory including the use of an iterative coding strategy, avoiding preconceptions by not conducting a literature review *a priori,* and allowing the framework to emerge from the data (Charmaz, 1996). While the use of pre-existing theories certainly has merit, we found our approach to be effective for deriving the framework from the data without narrow attachment to a preconceived theory or framework as well as by allowing participants to freely provide their views and experiences with minimal influence from the researcher. The result is a novel empirically founded framework which we hope is useful within both academic and applied environments. Finally, this research also contributes to developing a comprehensive understanding of the factors that influence farmers' pro-environmental decision-making in parallel with more socio-cultural research that look at factors such as social relationships / pressures, culture, family / community influence, and status / prestige (Burton, 2004; Burton & Paragahawewa, 2011; Saxby, Gkartzios, & Scott, 2017; Siebert, Toogood, & Knierim, 2006).

Within the academic literature, this paper contributes to a rich history in researching farmers' motivations and decision-making, particularly with regard to the adoption of pro-environmental decisions. Our data-driven findings and associated orientations map well onto previous research into the factors that influence farmer decision-making. As an inductive study incorporating principles of Grounded Theory we conducted our literature review *ex post facto* and have thus provided references to the literature in parallel to the findings.

4.4 England and Ontario: Policy Environment

In the country of England, agriculture is the dominant land-use occupying approximately 70 per cent of England's total land area (Department for Environment Food & Rural Affairs [Defra], 2016). With such a large footprint, agricultural production poses both a threat and an opportunity to ensure sustainable land-use in the country as a whole.

A similar circumstance exists in southern Ontario, Canada a highly productive agricultural region which has been heavily altered for development and agricultural purposes and, in the same geography, contains much of Canada's best agricultural land as well as being one of "*Canada's biodiversity hotspots*" (Olive & McCune, 2017; Smith, 2015). In the southwest portion of the province, where agricultural capability is highest, land conversion has been particularly significant such as the conversion of more than 85 per cent of wetlands in part for agricultural production (Nebel, Brick, Lantz, & Trenholm, 2017).

While governments in both England and Ontario have made efforts to influence farmer decision-making towards environmental objectives, their approaches have been very different. In England, direct payments make up a significant portion of farmers' income, representing more than half of farm income in some years (UK Parliament, 2016). Under the current iteration of this direct support, termed the Basic Payment Scheme (BPS), additional environmentally based cross-compliance obligations have been introduced (i.e. 'Greening') which provide a considerable financial incentive for farmers to undertake environmentally beneficial activities. In parallel, payments from agri-environmental schemes also play a major role in farm income for some farmers.

Ontario's model of agricultural support is much more market-oriented where there is no comparable subsidy program of guaranteed payments, and instead voluntary Business Risk Management (BRM) programs play an important role in insuring farmers by stabilising farm income against market volatility and natural disasters. Similarly, agri-environmental programs are generally cost-shared, providing one-time payments to offset capital costs with environmental benefits, thereby quite unlike the English schemes, participating farmers would not see an immediate financial gain from participation in the programs. A useful question to explore then is how have these very different approaches to supporting farmers, and encouraging stewardship decisions, influenced farmers' pro-environmental decision-making in either case?

Multiple recent decisions have made this question particularly relevant. First, in June 2016 the UK voted to leave the EU in what has popularly been termed 'Brexit'. This puts the future of England's agricultural support schemes into question as they have

been previously tied to the EU's Common Agricultural Policy (CAP). While the UK government has committed to uphold the current design until 2022, England will need to develop a new set of agricultural support policies following the transition out of the EU. What will these new policies look like? In the recent past, government spokespeople have indicated a preference for a more market-oriented policy with lower financial support (Franks, 2016; Watts, Howarth, Baker, & Swales, 2016), suggesting that ideas and lessons may be drawn from Ontario.

As well, in the nearer term, it is important to better understand the major drivers of on-farm decision-making when it comes to environmental practices, particularly with the end of the Entry Level Stewardship (ELS) scheme and introduction of the Countryside Stewardship (CS) scheme. The former ELS scheme was designed as a 'broad and shallow scheme' open to all farmers and relatively easy to access (Darragh & Emery, 2017). In contrast, the new CS scheme takes a more targeted and competitive approach, being referred to as 'deep and narrow', with the result being an estimated reduction in land enrolled in agri-environmental schemes from 70 per cent to around 35–40 per cent of England's total agricultural area (Mills et al., 2017). It will also mean that 36,100 farmers, previously enrolled in ELS, will need to decide whether to maintain stewardship practices for which they no longer receive compensation (Darragh & Emery, 2017). The use of a targeted and competitive approach to agri-environmental schemes such as these has similarities with the design of Ontario's programs, which are highly competitive with actions cost-shared by farmers.

This paper provides insights into the factors that influence English farmers' adoption of environmentally beneficial activities, which may help to elucidate whether they will maintain stewardship practices in the absence of financial compensation. This has relevance in the short-term by helping to understand farmers' likeliness to maintain stewardship practices previously supported by ELS. Moreover, through comparison with Ontario this research provides insights into the influence of financial support on English farmers' uptake of environmental activities, and how this might change were a shift to a more market-oriented approach to farmer support to occur.

From an Ontario perspective, this paper provides valuable insights into the factors that influence farmers' decision-making, along with enablers and barriers for pro-environmental decisions. When compared to Europe or the United States much less has been written on farmers' motivations for adopting environmental activities in Canada (OECD, 2012). Indeed, there are few examples of comprehensive explorations of farmers' environmental behaviour and decision-making from Ontario or Canada more broadly. Instead, much research in Canada on farmers' environmental motivations and decision-making has been based on enrolment in existing programs, notably the

Environmental Farm Plan, rather than on underlying motivations whether or not to adopt pro-environmental activities (Atari, Yiridoe, Smale, & Duinker, 2009; Goodale et al., 2015; G. M. Robinson, 2006; Smithers & Furman, 2003).

Previous research from Canada also tends to focus on the uptake of specific practices, such as conservation tillage (Knowler & Bradshaw, 2007) or water conservation (A. D. Robinson, Gordon, VanderZaag, Rennie, & Osborne, 2016) or landowner views on specific environmental impacts, such as endangered species (Henderson, Reed, & Davis, 2014; Olive & McCune, 2017) or adaptation to climate change (Tarnoczi & Berkes, 2009). Instead, this research looks at the multitude of factors that influence farmers' voluntary uptake of pro-environmental activities more generally, both inside and outside enrolment in programs, an approach that has often been ignored in research (van Dijk, Lokhorst, Berendse, & de Snoo, 2016).

4.5 Methods

We conducted two sets of interviews, with different groups of stakeholders, within two areas of analysis. First, we conducted 24 semi-structured interviews with representatives of agricultural and/or environmental organisations operating in England or Ontario. Interviews tended to last 1 to 1.5 hours each and were conducted between the autumn of 2015 and spring of 2016. An interview protocol was used to guide the conversation with participants on the topic of farmers' role in environmental stewardship and what enables, or prevents, environmentally beneficial decisions.

For the purposes of this study "*stakeholder organisations*" were taken to mean formally organised groups with agricultural and/or environmental interests, operating within either jurisdiction. We intentionally kept a broad scope of stakeholder organisations and included both large and small organisations, and included organisations whose activities were predominantly policy advocacy, public education and engagement, and/or program delivery.

In total, 42 organisations were invited in Ontario and England with 24 organisations ultimately participating, 12 from each case (see Table 4-1 for the list of participants and Appendix 6 for descriptions). Recruitment was concluded as a result of theoretical saturation, as well as having attained a diverse sample including prominent stakeholders in each region.

Table 4-1: List of Participating Stakeholder Organisations

England		Ontario	
Participant	**Participant Code**	**Participant**	**Participant Code**
Linking Environment and Farming (LEAF)	ORG-EN-P01	Anonymous Farm Organisation *	ORG-ON-P01
Natural England	ORG-EN-P02	Anonymous Environmental NGO *	ORG-ON-P02
National Farmers Union (NFU)	ORG-EN-P03	Friends of the Greenbelt Foundation	ORG-ON-P03
Royal Society for the Protection of Birds (RSPB)	ORG-EN-P04	Nature Conservancy of Canada (NCC)	ORG-ON-P04
Wilderness Foundation	ORG-EN-P05a **	Food & Water First	ORG-ON-P05
Anonymous Large Farm Business *	ORG-EN-P05b **	Ontario Soil and Crop Improvement Association (OSCIA)	ORG-ON-P06
Farming and Wildlife Advisory Group (FWAG)	ORG-EN-P06	Carolinian Canada Coalition	ORG-ON-P07
WWF – UK	ORG-EN-P07	Farm & Food Care	ORG-ON-P08
Woodland Trust	ORG-EN-P08	Ontario Federation of Agriculture (OFA)	ORG- ON-P09
Agriculture and Horticulture Development Board (AHDB)	ORG-EN-P09	Alternative Land-use Systems (ALUS)	ORG-ON-P10
Plantlife	ORG-EN-P10	Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)	ORG-ON-P11
Allerton Project / Game and Wildlife Conservation Trust (GWCT)	ORG-EN-P11	Anonymous Government Ministry – involved with environmental conservation *	ORG-ON-P12

* Four participants requested that their organisation name not be used in the research outputs.
** Two organisations participated in the fifth interview, however their responses have been separated for the analysis.

The second set of interviews was undertaken with farmers, including both farm owners and farm managers, operating within either case area. Interviews were completed over the period of autumn 2016 and winter 2017 with a total of 30 farmers participating in the interviews, including 12 from England and 18 from Ontario (see Table 4-2 for a listing of participants and Appendix 7 for a detailed description). We intentionally sought a diversity of farming operations in our sample, seeking farmers representing different regions, farming models, scales, farm ownership, and products. This decision was partly based on a finding from the stakeholder organisation interviews where

participants commonly emphasised the diversity of the agricultural sector, and correspondingly farming operations, that allowed or prevented some pro-environmental decisions. The pursuit of a diverse sample explains the larger number of participants from Ontario where more recruitment was necessary in order to reach an adequate diversity.

Table 4-2: List of Participating Farm Owners / Operators

England		Ontario	
Participant	**Participant Code**	**Participant**	**Participant Code**
Organic Vegetable Farmer	Farmer-EN-P01	Goat Farmer	Farmer-ON-P01
Mixed Farmer (livestock/arable)	Farmer-EN-P02	Small Vegetable Producer	Farmer-ON-P02
Arable Farmer	Farmer-EN-P03	Alternative Farmer	Farmer-ON-P03
Arable Farmer	Farmer-EN-P04	Mixed Farmer (livestock/arable)	Farmer-ON-P04
Mixed Farmer (livestock/arable)	Farmer-EN-P05	Livestock (Sheep and Pig) Farmer	Farmer-ON-P05
Dairy Farmer	Farmer-EN-P06	Community Supported Agriculture (CSA)	Farmer-ON-P06
Organic Fruit and Vegetable Farmer	Farmer-EN-P07	Community Supported Agriculture (CSA)	Farmer-ON-P07
Mixed Farmer (livestock/arable)	Farmer-EN-P08	Small Organic Farm	Farmer-ON-P08
Mixed Farmer (livestock/arable)	Farmer-EN-P09	Organic Vegetable Farm	Farmer-ON-P09
Community Supported Agriculture (CSA)	Farmer-EN-P10	Mixed Organic Farmer (livestock/arable)	Farmer-ON-P10
Organic Beef Producer	Farmer-EN-P11	Hop Farmer	Farmer-ON-P11
Large Arable Farmer	Farmer-EN-P12	Beef Farmer	Farmer-ON-P12
		Hop Farmer	Farmer-ON-P13
		Mixed Organic (Dairy and Arable)	Farmer-ON-P14
		Arable Farmer	Farmer-ON-P15
		Arable Farmer	Farmer-ON-P16
		Livestock (sheep and cattle) Farmer	Farmer-ON-P17
		Arable Farmer	Farmer-ON-P18
Note: Full details on participating farmers are available in Appendix 7			

Invitations were distributed widely using multiple recruitment methods. An important objective for our recruitment was to avoid the use of gatekeepers, or pre-existing lists of farmer contacts used in previous research, in order to reach farmers who may not usually be invited to participate in research projects and avoid perpetuating

participant fatigue.[11] Invitations were distributed through email using publicly accessible email addresses from various directories (e.g. Open Farm Sunday, commodity groups, and local food listings). In England, an invitation was also included in the NFU newsletter and posted on the NFU website. We also made extensive use of social media, notably Twitter, to reach online farmer communities.

Interviews were semi-structured following a flexible interview protocol to allow for participants to stray from the initial questions and introduce issues or opportunities that may have otherwise been missed. During the interviews, farmers were asked questions about 1) the details of their farming operation; 2) the actions they have taken on their farm specifically to protect or enhance the natural environment and why; 3) the physical make-up of the farm and whether land was being intentionally left out of production, or new land brought into production, and why; 4) and finally farmers were asked about their involvement and experience with agri-environmental schemes/programs as well as government regulations/legislation. Interviews were recorded, with each participants' explicit permission and transcribed verbatim.

In total, therefore, the study included 54 participants from both the stakeholder organisation and farmer interviews, however the sets of interviews were analysed separately to ensure distinctions between groups of actors and jurisdictions could be identified. Analysis was conducted using an iterative, inductive approach whereby themes were developed by aggregating lower order codes, using a thematic analysis process (Braun & Clarke, 2006; Bryman, 2016; Burnard, 1991). Using NVivo 10, transcripts were systematically and rigorously coded, line-by-line, in their entirety through an open-coding exercise. By collapsing codes and removing repetition and redundancy, this large number of open-codes was aggregated into axial codes and then into themes (see Appendix 8 for more details on this coding and theme development). We have organised the findings under the term 'orientations' and depicted them in Figure 4-1. Counts are provided in some cases to demonstrate the weighting of responses, however counts are used sparingly due to the heterogeneous nature of the sample.

[11] We found participant fatigue to be a major problem in the English case where participants felt there was an excess of interview invitations and research studies seeking farmer participation. This was not the case in Ontario where farmers were much more willing to be involved, and were even grateful in some cases to be included in the research project. This serves as both a warning for research being undertaken in England and an opportunity for research in Ontario.

4.6 Results & Discussion

4.6.1 Pro-environmental activities identified by farmers

Before moving on to an examination of the major factors influencing farmers adoption, or otherwise, of pro-environmental behaviours we first thought it instructive to examine what farmers themselves identified as pro-environmental activities. The analysis here was informed by an open-ended question whereby we asked farmers to outline actions they had taken 'specifically to protect or enhance the natural environment' on their farm (see table A in Appendix 8 for details).

Farmers across both cases highlighted a wide range of actions they perceived as enhancing the natural environment. Looking specifically at England, the most prominent examples given were laying hedgerows and establishing margins, buffers, and headlands. Most participants noted that these actions were undertaken as part of cross-compliance obligations or as part of an agri-environmental scheme, such as the Entry-Level Stewardship Scheme (ELS), whereby farmers were compensated for undertaking these activities. In Ontario, participants identified a wide range of pro-environmental actions, with the most commonly repeated action being the adoption of organic principles and practices.[12] Other prominent pro-environmental actions in Ontario tended to serve a dual benefit for both agriculture and the environment (e.g. conservation tillage, wind breaks, cover crops), which may be reflective of the limited incentive-based support system for environmental actions and the types of activities that are promoted as part of the cost-shared programs.

What was interesting to observe here was that farmers in both the England and Ontario samples regularly formulated their own ideas of what constituted a pro-environmental action, which often would not coincide with what others would consider as environmentally beneficial. Examples included removing 'weeds' and killing 'pests', which some farmers constructed as environmentally beneficial, whereas conservationists may construct these actions as environmentally harmful (Darragh & Emery, 2017; McHenry, 1998). We also found that some practices which may appear at first to lack an environmental basis may be rationalised by farmers, rightly or wrongly, for environmental purposes:

[12] This is likely a result of the popularity of the term 'organic' in Ontario as most farmers who stated that they utilised organic practices were not certified organic, and instead had their own interpretation of 'organic principles' typically associated with reducing the use of chemical pesticides.

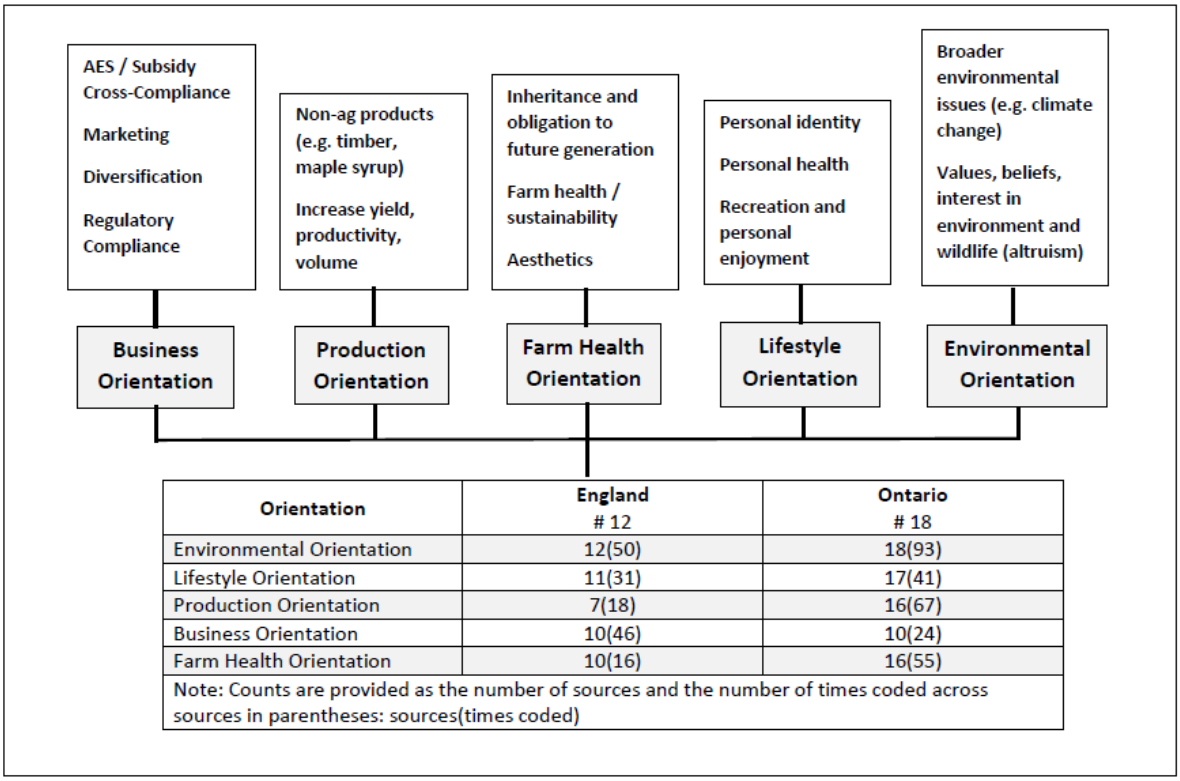
> "*I think it's important from an environmental perspective that we try to clean up the areas on the farm where there's, I call them 'weed nurseries' … so if you're, you know, cleaning up those areas where weeds are, you know, just allowed to run wild it reduces the amount of spraying you have to do on the farm, which is, you know, environmental and economical for the farm.*" (Farmer-ON-P18)

In this case a seemingly non-environmental action is being conceptualised as pro-environmental through a multi-step comparison of alternative on-farm decisions, which may in sum have less environmental impact.

4.6.2 Factors affecting farmers' adoption of pro-environmental activities

Next we look at the factors that encourage, or discourage, the adoption of pro-environmental activities amongst farmers in our sample. Through an open-coding exercise, interviews with farmers identified a multitude of factors which we categorised according to five inductively derived internal orientations representing the values, beliefs, and attitudes of participating farmers. These internal orientations are: Environmental, Lifestyle, Production, Business, and Farm Health (see Figure 4-1). Of note here is that all of these internal orientations, not just Environmental, were important (albeit to varying degrees) in both the English and Ontario cases when it came to understanding pro-environmental actions. We propose that these orientations can serve as a lens through which environmentally beneficial on-farm activities are assessed, and decisions made, depending on their assigned value / weighting within each individual farmer.

Figure 4-1: Factors influencing farmers' adoption of pro-environmental activities



Orientation	England # 12	Ontario # 18
Environmental Orientation	12(50)	18(93)
Lifestyle Orientation	11(31)	17(41)
Production Orientation	7(18)	16(67)
Business Orientation	10(46)	10(24)
Farm Health Orientation	10(16)	16(55)
Note: Counts are provided as the number of sources and the number of times coded across sources in parentheses: sources(times coded)		

In this section we also incorporate the results of the stakeholder organisation interviews. During the interviews, stakeholder organisations were asked what they thought were the main reasons that farmers may, or may not, undertake environmentally beneficial actions on their farm (see tables B & C in Appendix 8 for details). Overall, we found that when compared to the Ontario case, the English participants had a much more uniform, and generally positive, view of farmer motivations when it came to environmental behaviours.

While it is important to understand the views of stakeholder organisations, it is also important to note that stakeholder organisations are not impartial. Indeed, we often observed that organisational objectives were framing participant's views on farmer motivations (e.g. encouraging or discouraging more regulation or on-farm intervention). It was also somewhat evident that stakeholder organisations in England were more politically savvy and more strategic, prepared, and comfortable in conversations of farmers and their motivations. It was clear that this was not the case in Ontario where participants were less practiced, and sometimes less comfortable speaking on farmer motivations, and seemingly less politically minded in their responses.

4.6.2.1 Environmental Orientation

Perhaps unsurprisingly the most prominent orientation amongst both sets of participants, when it came to understanding pro-environmental behaviours, was an *Environmental Orientation* where farmers adopted pro-environmental activities for seemingly altruistic reasons. Specifically, many farmers reported that they undertook actions simply because it 'felt good' or was 'the right thing to do'. For example, one participant states "*I just liked that idea, you know, it felt comfortable with me to be organic*" (Farmer-EN-P11) and similarly another states "*Well I'm just doing my part because I was brought up that way*" (Farmer-ON-P01).

Farmers reported undertaking pro-environmental activities for their own interests, because they care about the environment and enjoy "*nature and the splendour of diversity*" (Olive & McCune, 2017):

> "*we've seen more and more birds and insects coming in since we started being totally organic and the colour of birds that come through is incredible… we just are excited about what we have and the little paradise that we're sitting on here.*" (Farmer-ON-P06)

Importantly, farmers often reported knowingly sacrificing production and/or profits in exchange for environmental benefits. This reflects an internal ranking of Environmental Orientation above other orientations, at least for some specific on-farm decisions:

> "*Nobody has ever come onto my property and said you cannot cut your hay, no. But I am aware and if I see bobolinks [grassland bird] I try to avoid cutting that hay until after the young have fledged. But that means I end up with poorer quality hay and I've taken the hit in my pocket.*" (Farmer-ON-P10)

This theme of engaging in pro-environmental actions without any financial reward held particular importance for farmers in Ontario where financial compensation for pro-environmental activities was very limited: "*I try not to sound negative but it's been a tough haul for us trying to make any money doing this [but] I'm committed to what we're doing*" (Farmer-ON-P07).

The idea that farmers engage in many environmental enhancing behaviours due to altruistic reasons was also emphasised amongst the stakeholder organisations in both England and Ontario. Indeed, amongst stakeholder organisations in both cases, altruism was felt to be the most common motivation for farmers to undertake pro-environmental activities as opposed to purely seeking profit maximisation. As succinctly put by one representative from the Ontario Soil and Crop Improvement Association (OSCIA):

> "*there's a lot of extremely proud people out there, proud of the fact they not only run a successful family farm that's profitable and poised to adopt new practices, that's going to offer stability for their family business into the future, they also take equal pride in having wildlife around.*" (ORG-ON-P06-OSCIA)

This view of farmers as highly environmentally oriented was emphasised not only by agricultural organisations but also environmental organisations:

> "*I know some farmers are motivated just 'cause the fact it's what they want to do, they think it's their role. I've been on farms where that's it they're so passionate about it, it's what they want to do they get no other gain out of it, they want to see as many birds or they want to see, you know, they want to see animals they want to have wildflowers, it's what they care about.*" (ORG-EN-P07-WWF-UK)

Organisational participants also described what they felt was the financial 'irrationality' of farmers' decision-making when undertaking some common pro-environmental activities: "i*t's not purely about money, clearly, because many farmers are undertaking activities that are possibly detrimental to their business operations. They're not making as much money but they do it anyway for whatever motivation*" (ORG-ON-P03-Greenbelt Foundation).

Moreover, organisational participants, in both cases, expressed a view that enrolment in agri-environmental schemes/programs was driven equally, if not more, by environmental values than financial reward: "*there's never enough money to straight pay for them, so all of the farmers that are partaking in those programs have a strong environmental ethic*" (ORG-ON-P08-Farm & Food Care). A similar sentiment was offered by an English participant: "*the money side is important, of course it is, but you know, if it was down to money [farmers] wouldn't be doing this. … It's doing the right thing*" (ORG-EN-P05b-Anon).

Previous research frequently emphasises the importance of farmers' environmental attitudes, associated with their environmental orientation, in influencing pro-environmental decision-making (Best, 2010; Sulemana & James Jr, 2014; Wilson, 1996). However, it should be acknowledged that the level of altruism inherent in environmental or conservationist orientations is debated, with some authors arguing that a purely selfless steward does not exist and environmental actions are still undertaken to gain utility and advance farmers' self-interest (Chouinard, Paterson, Wandschneider, & Ohler, 2008; McHenry, 1998). Similar to our own findings, previous research has found that environmental attitudes alone do not directly result in the adoption of pro-environmental activities, instead acting as one factor influencing farmer decision-making (Thompson et al., 2015).

4.6.2.2 Lifestyle Orientation

Another prevalent orientation across both cases is what we refer to as a *Lifestyle Orientation,* which was important for almost all participating farmers. By *Lifestyle Orientation* we are referring to farmers' pursuit of personal lifestyle benefits from on-farm decisions such as recreation, health, and personal enjoyment from farm work.

Focusing first on the English case, an example of this Lifestyle Orientation in operation was the use of natural features, and areas set-aside from production, for the purpose of field sports. This was a very prominent finding amongst both farmer and stakeholder organisation participants:

> "*we do little things for our own shoot and that, which is for our benefit, for our pleasure if you like, if I can use that word, because I'd rather eat a pheasant that's lived in a wood than eat the chicken that's lived in a shed all its life.*" (Farmer-EN-P02)

Engaging in shooting as a recreational activity can encourage pro-environmental activities amongst English farmers for a completely non-environmental reason (Macdonald & Johnson, 2000; Oldfield, Smith, Harrop, & Leader-Williams, 2003). For example, in order to ensure habitat for game birds, farmers will often voluntarily protect or expand natural areas on their farm without an expectation of compensation.

In Ontario, participants described the influence of age and physical ability on their farming decisions which had environmental repercussions: "*there are certain areas where I would ramp up production if I were younger*" (Farmer-ON-P08). Some farmers reported decreasing the intensity of their operation, leaving viable land out of production, or allowing land to regenerate not necessarily for environmental reasons but due to limited time, interest, or ability. Some farmers in Ontario were also influenced by nostalgia and an attachment to past memories of environmental features: "*And I think it's also because growing up here we used to play in the woods*" (Farmer-ON-P08).

Another important lifestyle related factor, across both samples, with an influence on pro-environment behaviours was in relation to concerns surrounding the farmers' personal or family health, which often had the effect of encouraging farmers to adopt seemingly highly environmentally oriented practices for non-environmental reasons. In our study the most notable example was the adoption of organic practices, more specifically eliminating the use of chemical inputs, which was explicitly raised by multiple participants in Ontario:

"*before I became organic when I was applying pesticides and I used to get very sick, I'd get terrible headaches and nausea and even though I would wear all the appropriate garb and I would have a mask and everything on and between myself and my wife we just said 'what the hell are you doing this for?' So I just quit and as soon as I was able I became certified organic.*" (Farmer-ON-P10)

Coinciding with our findings, previous research has found that lifestyle benefits, or pursuit of quality of life, is an important influence on farmers decision-making (Howley, 2015) including in their decisions to adopt pro-environmental activities (Duesberg, Upton, O'Connor, & Dhubháin, 2014; Greiner & Gregg, 2011; Willock et al., 1999). While research has made the connection in the UK between field sports and farmers' maintenance of environmental features (Macdonald & Johnson, 2000; Oldfield et al., 2003) our findings contribute to expanding the connection between other lifestyle benefits and the adoption of pro-environmental activities.

4.6.2.3 Production Orientation

By *Production Orientation* we are referring to farmers' efforts to increase yield, productivity, and efficiency on the farm as well as extracting other tangible products like firewood or maple syrup. Farmers' inherent attachment to pursuing production increases, including using production indicators as their primary measure of success, has been previously found to be an important influence on their decision-making. Prominent authors such as Burton emphasise the role of farmers' personal identity in influencing decision-making, particularly around decisions in-keeping with a 'good farmer' identity founded in productivism (Burton, 2004; McGuire, Morton, & Cast, 2013). This attachment to production continues to prevail amongst farmers, even in post-productivist contexts such as in Western Europe (Burton & Wilson, 2006). Similar to our work, previous research has also found that productivist attitudes are an important influence on farmer decision-making and are distinct from financial motivations as farmers may pursue production maximisation even when financially irrational to do so (Howley, Buckley, O Donoghue, & Ryan, 2015).

Focusing on pro-environmental activities we found that the Production Orientation deterred the adoption of environmentally beneficial decisions for some participants, across both cases, as they resulted in production losses. For instance, the following participant discussed the drawbacks to production from enrolling land in an agri-environmental scheme:

> "*certainly getting rid of them [grass margins] is a nightmare because once they've been there for ten years of course the tree roots and the hedge roots have all moved out into the field. You've also got all of the weed problems that have arisen from them. And it has sort of taken us probably two cropping years to get them back into the sort of field condition that they were in before.*" (Farmer-EN-P03)

This was reinforced by stakeholder organisation representatives and particularly from those in the Ontario case: "*If we want to grow big corn and big grain, we don't need those insects to pollinate those crops and frankly biodiversity's another name for a critter or pest that's going to eat our crop*" (ORG-ON-P08-Farm & Food Care).

Similarly, an attachment to a certain view of the 'farmer identity' was also associated with certain farming practices, notably production oriented practices, with negative environmental repercussions:

> "*when you tell a farmer that he can't be out there in the field driving his tractor, that's part of the thing that he loves the most about his job, OK? It's part of his identity today, just like an old ploughman liked to walk behind his nice team of horses that he took great pride in…it's no different than today than drivin' a great big shiny piece of kit down the field.*" (Farmer-ON-P16)

For these farmers, attachment to productivist practices were essential for maintaining their own conceptualisation of what it means to be a 'good farmer' (Burton, 2004). Amongst these farmers, their conceptualisation of what is, and is not, part of the 'farmer identity' posed an obstacle to adoption of pro-environmental activities as to do so was not in-keeping with their productivist mind-set. However, this was much less prevalent amongst new farmers, or farmers who did not identify as multi-generational farmers, potentially providing an inlet for change within this group.

While, as one would expect, a conflict between production and pro-environmental behaviours was common, it was not always the case. What was interesting to observe was that within both cases, many farmers also made a positive connection between pro-environmental activities and increases in yield or volume of production, such as by reducing erosion or encouraging beneficial pollinators. Indeed some participants noted that environmental benefits were an unintended by-product of actions to increase production, for instance:

> "*It's unintended because I didn't set out to provide this habitat, OK? My intention was for soil building, I wanna release nutrients into the soil, I want to, you know, make - produce copious amounts of nitrogen fertiliser vis a vis legumes, right?*

> *And so by doing this, that was what my goal was … so I didn't set out to, you know, provide habitat for birds. I didn't set out to provide a habitat for pollinators.*" (Farmer-ON-P16)

Stakeholder organisations also commonly identified seeking production benefits as a driver of pro-environmental activities:

> "*I mean from a practical point of view, for example, if you're farming large fields you have to … look after erosion right? Otherwise it will be a problem for you. So, putting in field windbreaks and grass waterways and sediment control … that would be a logical thing to do from an economic development point of view.*" (ORG-ON-P11-OMAFRA)

This view was common in both cases but particularly emphasised by Ontario participants which perhaps reflects a distinction in the agricultural paradigm between these two cases, as Ontario is more closely aligned to productivism whereas England leans more towards a post-productivist (multifunctional) mind-set (Marr, Howley, & Burns, 2016). Moreover, this notion that environmental enhancing activities can have spin-off benefits when it comes to agricultural production is reflected in the design of agri-environmental programs in Ontario, which are not intended to shift farmers' emphasis on production (Atari et al., 2009). Under these programs, farmers put forward a considerable portion of the cost of the activity, typically more than 50 per cent, the idea being that farmers will absorb the lost revenue or make up the shortfall through production improvements (Ontario Soil and Crop Improvement Association [OSCIA], 2016).

4.6.2.4 Business Orientation

A similar, but distinct orientation to the *Production Orientation* identified in this research is what we refer to as a *Business Orientation*. Authors such as Sulemana and James Jr (2014) and Thompson et al. (2015) also emphasise the influence of a 'business orientation' in farmers' adoption of environmentally beneficial practices, where some farmers identify themselves primarily as businesspeople and focus on economic and financial concerns. This has included the adoption of environmentally beneficial activities (e.g. soil erosion prevention) "*believing them to be 'profitable business decisions'*" (Farmar-Bowers & Lane, 2009, p. 1139).

Within our framework, the *Business Orientation* manifests as farmers choosing whether to adopt pro-environmental activities based on seeking financial benefits to the farm business, either by ensuring regulatory compliance or maximising profitability of the operation. We make a distinction between the Production Orientation described above

and this Business Orientation as we noted that many farmers maintained a productivist mind-set irrespective of financial returns; as in farmers undertook certain practices aimed at increasing production even if it was financially optimal to engage in other activities. However, in contrast we found that other farmers were adopting environmentally beneficial decisions that may reduce production, but increase on-farm profitability, such as enrolment in agri-environmental schemes or pursuing value-added agriculture (e.g. organic certification).

Distinguishing factors of the Business Orientation include pursuing compliance obligations for agri-environmental schemes, subsidy cross-compliance, regulatory compliance, as well as seeking to diversify the farm business or leverage marketing opportunities. We found, for example, that most farmers in the English case were undertaking pro-environmental activities in exchange for financial benefits through subsidy cross-compliance and/or agri-environmental schemes:

> "*it's almost a business decision really … if I grow an arable crop I can make X pounds at this acre and if I go into some scheme I can make Y pounds and you know which is the better? Is almost the approach that we take.*" (Farmer-EN-P12)

Farmers in England also commonly stated that their rationale for pro-environmental activities was due to regulatory demands.

Stakeholder organisations in England also frequently noted the importance of agri-environmental schemes, regulations, and cross-compliance obligations when it comes to understanding influences on farmers' pro-environmental behaviours. However, stakeholder organisation representatives seemed to have downplayed the importance of schemes and regulation / cross-compliance in explaining pro-environmental decision-making, when compared with farmers who placed much more emphasis on this factor. This difference in interpretations between farmers and stakeholder representatives in England perhaps suggests an underlying, or intentionally constructed, view of farmers as highly altruistic.

In contrast, in Ontario there was much less mention from farmers or stakeholder organisations of financial benefits arising from agri-environmental programs, or necessity from cross-compliance obligations, and much less discussion of regulatory compliance thereby reflecting the different policy environment that they operate within. Instead, farmers in Ontario were much more likely to discuss undertaking pro-environmental activities, such as crop diversification and water management, in order to spread or reduce risk and diversify the farm business. Farmers and stakeholder organisations also discussed tax benefits arising from some pro-environmental decisions, such as maintaining woodland, and marketing opportunities arising from such decisions as

obtaining organic certification or capitalising on the "*whole gluten free craze*" (Farmer-ON-P15).

Within both cases, farmers mentioned cost-savings from some environmentally beneficial activities, such as reducing or using precision application of inputs:

> "*As a farmer my objective is not to waste any inputs…if you're pouring chemicals onto the ground and half of it is getting off into the environment and killing things that you don't want, that don't need to be killed, then that is just wasteful.*" (Farmer-EN-P09)

On the other hand, we found that for some decisions the Business Orientation posed a deterrent to pro-environmental activities. For instance, one conventional farmer from Ontario emphasised that investments in equipment and machinery lock farmers into certain practices, making adoption of alternative practices costly and difficult:

> "*we're invested in a certain direction right? We've really specified what it is that we do, so now I'm going to have to go in a totally different direction, so that lends myself to, well, what to do I do with these already existing assets that I have*?" (Farmer-ON-P16)

4.6.2.5 Farm Health Orientation

By the Farm Health Orientation we refer to factors that benefit the farm itself, rather than necessarily the farmer, at least in the short-term. Here the farm is an entity into itself and decisions are influenced by interest in maintaining the farm aesthetic, the overall farm health, as well as an interest and/or obligation to maintain the sustainability of the farm for future generations.

Specifically, we found intergenerational interest and obligation to be an important factor in farmers' decision-making across both samples, and particularly amongst farmers who inherited their farm:

> "*And as a fifth generation farmer I'm hopin' that there's gonna be a sixth generation farmer one day, we're trying to work hard so that, that opportunity is not eroded by my practices. OK? We want this asset that we hand off to our next generation, and that's our whole focus, our whole farm focus is that we want our farms that we manage here to be in better condition for future generations, regardless if they're our kids or they're somebody else's kids.*" (Farmer-ON-P16)

Within the stakeholder organisation interviews, these farm legacy and intergenerational concerns were also frequently reported, particularly amongst the English stakeholders, such as one participant who states: "*it may well be a family farm, you know been in the family for generations, so they want to look after it and leave it in good stead for the kids and so on*" (ORG-EN-P06-FWAG).

Farmers across both samples, but especially in Ontario, were concerned about soil health and soil degradation and the long-term sustainability of the farm. In Ontario, most farmers emphasised that they were taking specific pro-environmental activities that also reduced erosion and/or improved soil health, such as establishing windbreaks, riparian buffers, incorporating cover crops and adopting conservation tillage.

Finally, perceptions regarding farm aesthetics also influenced farmers' adoption of pro-environmental activities in both cases: "*A lot of the stuff that got gapped up was actually main roadside hedgerows and that just, you know, maintains our appearance really…I'm very fond of my hedgerows*" (Farmer-EN-P05).

Similar to farm legacy and intergenerational concerns, farm aesthetics was also expected to be a driver of farmers' pro-environmental activities by stakeholder organisations, and particularly within the English case. For instance one participant states: "*farmers are interested in their farm looking pleasing to the eye*" (ORG-EN-P11-Allerton Project / GWCT) and another who states "*They're doing it because they love it and they wander around their farm and they want to see nice things*" (ORG-EN-P10-PlantLife).

It is interesting to observe that while this interest in improving or maintaining farm aesthetics typically encouraged farmers to undertake pro-environmental activities, it also served as a deterrent for some farmers pursuing a 'tidy' landscape (Burton, 2012):

> *"I didn't push onto the schemes because - well you know to get onto it we're going to have to cut the hedges, is it two years in five years or something like that, and I didn't want great big thorns around stuck all over the place and I like to see what stock I've got in the field, not be peering over an overgrown hedge, and keep things a bit tidy."* (Farmer-EN-P06)

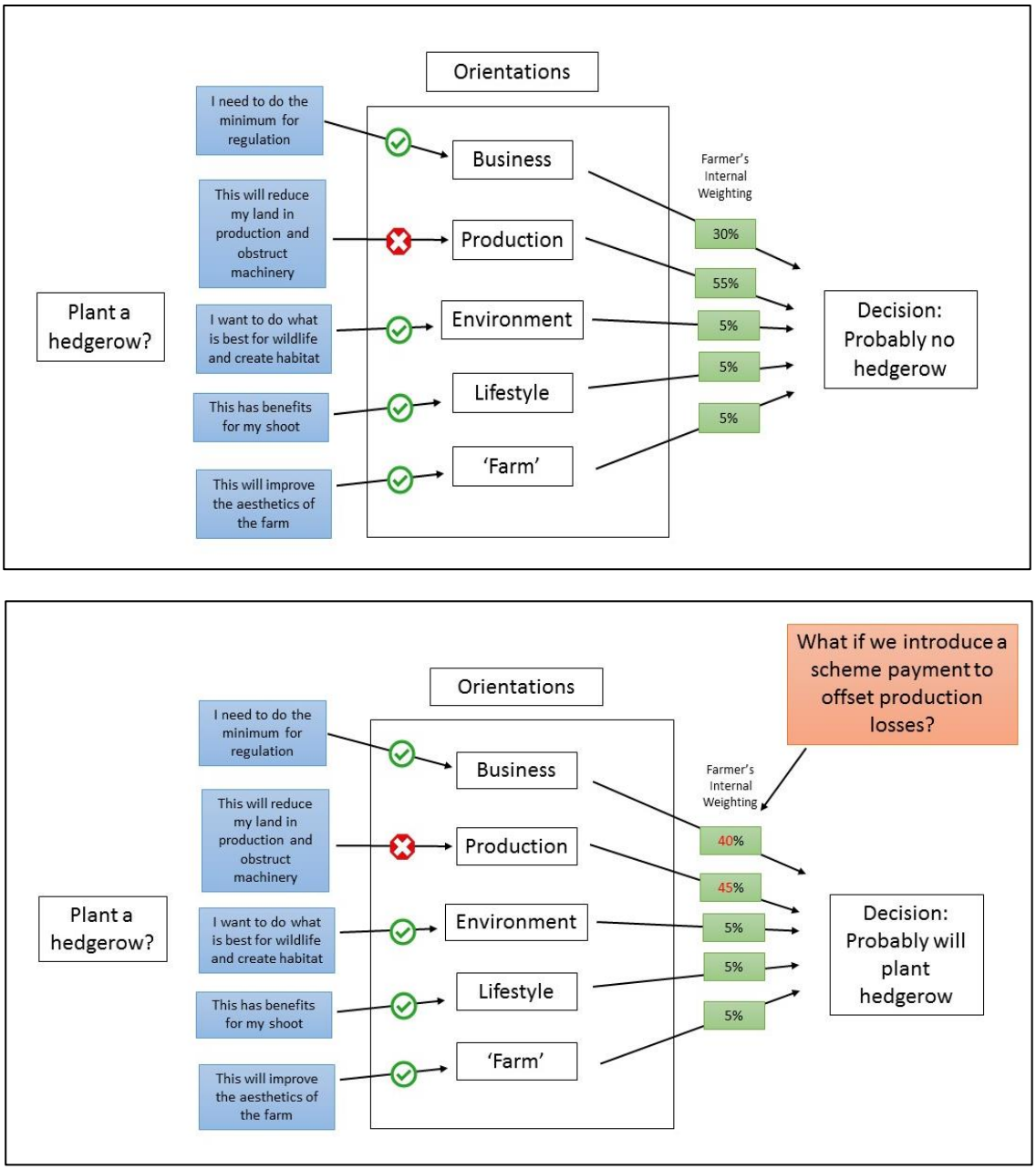
Our findings relating to the importance placed by farmers on protecting the farm for its own sake, rather than exclusively for the sake of the farmer's short-term utility of the farm, has also been identified as a factor influencing farmer decision-making in the literature. The orientation included in our framework has similarities to what Burton refers to as the 'farm identity' where the farm is anthropomorphised and takes on an identity of

its own beyond a single generation (Burton, 2004). Building-on from this, the importance of maintaining the sustainability of the farming operation for future generations has also been identified as an influence on farmers' decision-making, including encouraging pro-environmental decisions (Farmar-Bowers & Lane, 2009; Saxby et al., 2017; Stock, 2007). Moreover, farmers' aesthetic preferences and the maintenance of an attractive farming landscape has also been found to influence farmers' decisions to adopt environmentally beneficial practices (Erickson, Ryan, & De Young, 2002), however not always positively (Burton, 2012).

4.6.2.6 Summary

To summarise, we find that farmers are concurrently influenced by numerous internal interests and motivations when evaluating whether or not to undertake pro-environmental activities. We suggest that farmers each hold a combination of orientations, weighted differently, which forms a frame through which options are assessed and decisions derived. As an illustration of this, in Figure 4-2 we provide a simplified, hypothetical scenario of how each farmer's decision-making is influenced by these orientations, and their internally assigned value, to illustrate how this might operate in practice. In this simple example we provide two scenarios, the first in which a hypothetical farmer is evaluating whether to plant a hedgerow on their farm based on their internal weighting of different orientations. Next, in the second scenario, we depict how an external incentive scheme might influence this farmer's internal evaluation.

Figure 4-2: Farmer pro-environmental decision-making in a hypothetical scenario



4.7 Conclusion

This study contributes to better understanding the disconnect that has been observed between environmental attitudes and pro-environmental behaviour by considering the influence of farmers' non-environmental interests (Nebel et al., 2017; Thompson et al., 2015). A novel feature of our work is that instead of identifying linear connections between internal environmental interests and pro-environmental outcomes, we identify five internal orientations that were important in shaping pro-environmental behaviours across two case study sites, namely England and Ontario. These internal

orientations, many of which have no clear environmental basis, still serve to encourage, or deter, pro-environmental activities. Indeed, we found that participating farmers held a range of nested orientations that influenced their adoption of pro-environmental decisions on a case-by-case basis, depending on their own internal weighting of alternatives.

In practice, this means that farmers who self-identify as caring about the environment may not be undertaking some pro-environmental activities due to the presence of more highly weighted orientations (e.g. lifestyle, production) steering decision-making towards alternative objectives. In contrast, farmers who care less about the environment may become *accidental environmentalists* by undertaking pro-environmental activities for non-environmental reasons, such as shooting, personal well-being, aesthetics or abandoning unproductive land. All of this makes policy intervention quite complicated as numerous, ever-fluctuating, internal and external factors sever the direct link between attitudes and outcomes, resulting in unpredictability in on-farm decisions. Nevertheless, policy interventions targeting various orientations can help to shift their weighting within farmers' internal valuations.

While every participant in our study clearly valued the environment to some extent, it was also clear that priorities differed amongst participants. In Ontario it was very difficult, though not impossible as some participants demonstrated, for a farmer to place environmental stewardship above agricultural production and still be a viable farm, a mind-set that has been succinctly termed "*it is hard to be green when you are in the red*" (Richards, Lawrence, & Kelly, 2005). In contrast, in England latitude in decision-making is provided by direct payments and the stewardship schemes, and so sacrifices for the environment can be made without necessarily jeopardising the financial sustainability of the farm. In Ontario, losses from environmental decisions appear to be balanced by alternative income sources, often with off-farm income.

With this in mind, it is difficult to see how England can maintain the same level of environmental goods and services with a more market-oriented approach to farmer support mechanisms. While some farmers will maintain pro-environmental activities for non-pecuniary reasons, it seems likely that many will abandon practices without financial incentives or due to external pressure from markets, the agri-food sector, or even peers. This represents a difficult trade-off that will need to be considered as England develops a new set of agri-environmental policies following its transition out of the EU.

For Ontario, while many farmers will continue to pursue environmentally beneficial activities regardless of external factors, it seems likely that other farmers will continue to struggle to prioritise pro-environmental activities without increased financial

compensation and/or convincing evidence of short-term production gains from co-beneficial on-farm activities. A clear opportunity seems to be the adoption of some form of cross-compliance as part of a, presumably expanded, farmer support framework. The current review of the Growing Forward 2 agricultural policy framework may provide an opportunity to revise farmer support mechanisms in order to attain greater environmental outcomes.

One further novel feature of this work is the identification of what farmers themselves interpret to be pro-environmental actions. Our results highlight how farmers, conservationists, and academics may not always hold a common understanding of what constitutes pro-environmental activity. We found that farmers may rationalise (rightly or wrongly) activities that may initially appear as non-, or even anti-environmental, for environmental reasons.

It was also interesting to observe what stakeholder organisations felt were the main driving forces behind the farmers themselves when it comes to environmental behaviours. We found in both cases stakeholder organisation representatives seemed to accurately reflect the influential factors raised by farmers, however interpreted the weighting or importance of those factors differently. In some cases this seemed to reflect a genuine difference in the interpretation of farmers' primary motivations, whereas in other cases we suggest stakeholder organisation representatives may have been presenting views of farmer motivations favourable to their own ends.

Reflecting on methodology, we found that it was sometimes difficult to isolate primary orientations among multiple layers of orientations and that it is often challenging to distinguish reasons for decisions *ex post facto*. For instance, a farmer may appreciate seeing wildlife on their farm, but was that a motivation or a secondary result of pro-environmental decisions? This was particularly true in the English case where financial benefits were often interwoven with pro-environmental activities, and may have even 'crowded out' altruistic motivations (Darragh & Emery, 2017; Rode, Gómez-Baggethun, & Krause, 2015). Therefore, we found that the lack of inherent financial reward in exchange for pro-environmental activities made Ontario a 'purer' case and a good comparator for the English context.

Overall, this paper contributes a new data-driven framework to assist in explaining farmers' decision-making when it comes to the adoption of pro-environmental activities within their farming operations. The use of a comparison between England and Ontario was also valuable for drawing out insights that may have been overlooked in the analysis of a single case. The resulting findings contribute to a better understanding of the similarities and differences between the views of comparable groups of stakeholders and

the influence of context on farmers' decision-making as well as highlighting the importance of a multiplicity of influences on farmers' decisions relating to whether, or not, they adopt pro-environmental activities.

Acknowledgements

We wish to thank all of the participants who took time out of their busy schedules to contribute to this study. We would also like to thank Professor Charlotte Burns at the University of Sheffield for her very useful comments on this research project. This research was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC) Doctoral Fellowship program.

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Chapter 5 What next after Brexit? Redesigning agri-environmental policy in England

5.1 Preface

Over the course of this research, agri-environmental policy in England underwent multiple – sometimes unanticipated - changes that provided an opportunity to explore stakeholders' (organisations and farmers) views and preferences on specific policy changes, and the approach to agri-environmental policy more conceptually. These policy changes included the implementation of the 2014-2020 CAP Reform and the associated changes to farmer support schemes. Of particular interest to me here was the introduction of Greening as part of this reform and the resultant shift from the 'broad and shallow' Entry Level Stewardship (ELS) scheme to the 'deep and narrow' Countryside Stewardship (CS) scheme. Moreover, in June 2016 the UK held the United Kingdom European Union (EU) membership referendum (i.e. Brexit referendum) which ultimately resulted in a vote to leave the EU. The decision to leave the EU, and correspondingly the Common Agricultural Policy (CAP), means that the countries that comprise the UK will each need to create a new set of agri-environmental policies.

With these pivotal changes in mind, in this paper I investigate stakeholder perspectives on agri-environmental policy in England. The paper is founded upon two sets of interviews undertaken with agri-environmental stakeholder organisations (12) and farmers (12) based in England. Using these interviews I conducted an investigation of their deeply held views on the design and objectives of policies and schemes. As well, the timing of my farmer interviews coincided with the widespread discussion that occurred, following Brexit, of the future of agricultural and environmental policy in England. This afforded me an unanticipated opportunity to not only discuss with farmers their views on recent shifts in agri-environmental policy as part of the CAP reform but also, by adapting my interview protocol, to more generally ascertain farmers' perspectives on post-Brexit agri-environmental policy.

By capitalising on the policy window presented by Brexit it is my hope that these findings will contribute to improving agri-environmental policy in England and support the development of policies and schemes that are effective for achieving environmental objectives, and efficient for farmers to implement. Within the thesis, the chapter cuts across the various research objectives to discuss both agri-environmental policy and stakeholder preferences. Finally, the findings are mostly empirical however I do include some conceptual findings and observations relating to the way various actors interpret and/or experience policy and how this influences their views on policy effectiveness.

Declaration

I declare that the work submitted is my own. The contribution by co-authors was as follows:

Peter Howley: supervision, review and editing

What next after Brexit? Redesigning agri-environmental policy in England

5.2 Abstract

A series of recent events provide a window of opportunity to reflect on agri-environmental policy in England and revise it to maximise agricultural and environmental benefits in a way that supports stakeholder acceptance. The aim of this study was to gain a deeper understanding of stakeholders' perspectives regarding the objectives, design, suitability, and effectiveness of agri-environmental policy in England. We achieved this aim by undertaking semi-structured interviews with representatives from stakeholder organisations as well as with farmers. By examining the views and experiences of diverse stakeholders the findings demonstrate principles that should underpin a new suite of agri-environmental policies. This includes a series of issues and concerns that policymakers must be cognisant of in order to maximise environmental benefits and stakeholder support. By specifically investigating stakeholders' views on post-Brexit agri-environmental policy in England we found that while farmers were critical of the EU they were also pessimistic about the future of English agriculture outside the union expressing specific concerns surrounding the future of direct payments, expanding international trade, and a perception that a powerful environmental lobby will overshadow their interests. Since the interviews were conducted it would appear that farmers' concerns may be coming to fruition.

Keywords: Brexit; agri-environmental policy; stakeholder perspectives; UK agriculture

5.3 Introduction

Without proper management agricultural production can result in negative environmental effects including impacts on biodiversity, water quality, climate change, soil conservation, air quality, among other environmental dis-services (Foley et al., 2011). In England, where agriculture accounts for approximately 70% of the total land area, unsustainable agricultural practices can pose a particularly high risk to the natural environment (Department for Environment Food & Rural Affairs [Defra], 2016). In order to try and mitigate the potential negative environmental effects of United Kingdom (UK) agriculture, the UK government has implemented a variety of agri-environmental policies incorporating elements of volunteerism, incentives, and regulation (Mills et al., 2017). A series of recent policy reforms at the European Union (EU) level (i.e. through changes

to the CAP) and within the UK itself have the potential to significantly affect the trajectory of agri-environmental policy in England. These forthcoming changes may have a dramatic effect on the English landscape in both aesthetic and functional terms, including potential negative impacts on the natural environment and associated ecosystem services.

With these pivotal changes in mind, in this paper we sought to better understand the perspectives of key players themselves, namely stakeholder organisations and farmers, regarding the suitability and effectiveness of agri-environmental policy in England. This will include an exploration of stakeholders' views on current agri-environmental policy, the recent changes in the CAP reform (i.e. Countryside Stewardship and Greening), and their preferences for post-Brexit agri-environmental policy. With the UK's transition out of the EU, a new suite of agricultural and environmental policies will need to be developed thus offering a policy window through which existing policies may be revised. Our findings contribute to informing this policy development process by investigating the experiences and preferences of agri-environmental actors in England in order to support the improvement of post-Brexit policies more tailored to the English context.

In terms of stakeholders, we conducted interviews with representatives from a broad range of stakeholder organisations with an agricultural and/or environmental mandate. We supplement this analysis of stakeholder perspectives with a series of in-depth semi-structured interviews with farmers to investigate their views and experiences with agri-environmental policy in practice. Stakeholder organisations will ultimately be deeply involved in lobbying for policy changes while, in parallel, farmers will be heavily impacted by policy changes as well as ultimately being responsible for their implementation as land managers. Therefore, it is essential to understand the views of these actors in order to create a new, or revised, set of agri-environmental policies that are palatable to these actors as well as maximising both agricultural and environmental benefits while reducing the risk of policy failure.

5.4 Recent changes to agri-environmental policy in England

Agri-environmental policy in England has experienced multiple significant changes and disruptions in recent years. Firstly, the most recent iteration (2014-2020) of the Common Agricultural Policy (CAP) has seen a shift from a 'broad and shallow' to a targeted 'deep and narrow' approach to agri-environmental agreements with farmers. The 'broad and shallow' approach to AES was introduced as part of the 2003 CAP reform when the Entry Level Stewardship (ELS) scheme was created in England with the

intention of being ‘‘*as simple and easy to administer for farmer and Government as possible*’’ (Policy Commission on the Future of Farming and Food, 2002, p. 84). The scheme was open to all farmers with relatively straightforward environmental measures (e.g. buffer strips, hedgerow management, low input grassland) and the non-competitive nature of the scheme, coupled with the relatively simple measures, led to it being referred to as ‘broad and shallow’ (Darragh & Emery, 2017). Not surprisingly, this resulted in considerable uptake with 72% of England’s utilised agricultural area being enrolled in an agri-environmental scheme in 2015 (Darragh & Emery, 2017).

This ELS scheme was intended to compensate farmers for the environmental benefits they provide as well as potentially introducing “*new farmers into the agri-environment policy world*” (Hodge & Reader, 2010, p. 281). However, ELS was not without its critics with some arguing that it was not cost-effective (Breeze, Bailey, Balcombe, & Potts, 2014) and ineffective at meeting its environmental objectives (Davey et al., 2010). As argued by McKenzie, et al., while the ‘broad and shallow’ approach “*increases participation overall, it may be this very approach that is restricting biodiversity gains*” by focusing on farmer uptake rather than environmental outcomes (McKenzie, Emery, Franks, & Whittingham, 2013, p. 1275).

The latest iteration of England’s agri-environmental scheme framework, as part of the 2014-2020 CAP Reform, has seen the withdrawal of ELS and its replacement with a new Countryside Stewardship (CS) scheme. The CS scheme takes a much more targeted (referred to as ‘deep and narrow’) approach to agri-environmental policy. While the ELS was non-competitive, and relatively simple to access, the new CS scheme is both targeted and competitive, hence the description as ‘deep and narrow’. Due to the reduction in the available opportunities for agreements associated with this new approach, the land enrolled in agri-environmental schemes is expected to decrease from 72% under ELS to around 35–40% of England’s total agricultural land area (Darragh & Emery, 2017, p. 5; Mills et al., 2017, p. 284). This means some 36,100 farmers, previously enrolled in ELS, will need to decide whether to voluntarily maintain stewardship practices previously undertaken as part of the ELS scheme, but for which they will no longer receive financial compensation (Darragh & Emery, 2017, p. 5). It is therefore valuable to better understand the views of stakeholder organisations and farmers on this policy change as well as their interpretation of the expected benefits or drawbacks.

Corresponding to the change in the agri-environmental schemes, the 2014-2020 CAP reform has also led to the introduction of ‘Greening’ as a Cross Compliance

measure for direct payments to farmers. Under Pillar 1[13] of the CAP, farmers in England are entitled to direct payments (Basic Payment Scheme (BPS)), on a per hectare basis, so long as they meet mandatory cross compliance obligations. Initially these cross compliance measures included adherence to Birds and Habitats Directives and maintaining a series of good agricultural and environmental practices such as maintaining watercourse buffers, establishing soil cover, and protecting boundary features (e.g. hedgerows). The Greening measures introduced in the most recent CAP account for 30% of farmers' BPS payments and includes additional cross compliance obligations such as crop diversification (i.e. 'the three crop rule'), permanent grassland, and the creation of Ecological Focus Areas (EFAs).[14] The introduction of Greening measures is hugely controversial in England and is thought to be disliked across both agricultural and environmental stakeholder groups, such as by farmers who oppose the additional restrictions on their land-use, as well as by conservation groups who prefer the use of financial resources for more meaningful interventions under Pillar 2 (Franks, 2016).

The most significant disruption for agri-environmental policy in England occurred in June 2016 when the UK voted to exit the EU in the 'Brexit' referendum. As the UK transitions out of the EU, the countries that comprise the UK will each need to develop a new set of agricultural support policies or maintain the current design associated with the CAP. Recent research and commentary on the impact of Brexit on agricultural policy in the UK, and England, suggests that the former is more likely. Specifically it seems likely that the UK will shift, over time, towards further market liberalization (Whitfield & Marshall, 2017) and a more market-oriented approach to farmer support (Watts, Howarth, Baker, & Swales, 2016). It is anticipated that this, in turn, will likely lead to a reduction of environmental regulations and cross compliance obligations (notably Greening) (Franks, 2016). In this research we provide stakeholders' views on current policy, and preferences for future policy, which may help to inform the development of a new set of post-Brexit agri-environmental policy that also considers their needs and interests.

[13] The Common Agricultural Policy is divided into two 'pillars'. Pillar 1 is production support including direct subsidy payments to farmers (i.e. the Basic Payment Scheme). Pillar 2 is rural development and includes support for environmentally beneficial activities (i.e. the voluntary agri-environmental schemes).

[14] See the UK government website for details: https://www.gov.uk/guidance/bps-2017

5.5 Methods

The results of this paper come from a set of semi-structured interviews completed with 24 distinct actors. First, we conducted 12 semi-structured interviews with representatives from stakeholder organisations in England with an agricultural and/or environmental mandate. We supplemented this first set of interviews with 12 semi-structured interviews with farm owners or managers also based in England (see Table 5-1). We first interviewed 12 representatives from stakeholder organisations with agricultural and/or environmental mandates. Interviews were conducted between the autumn of 2015 and spring of 2016. We used an interview protocol to guide the conversation around participants' general views of agri-environmental policy in England, as well as any specific policies, legislation, or regulations that they had positive or negative views on (see Appendix 2 for details). While most participants independently raised the same policies, in cases where they did not we introduced policies that had been raised in previous interviews in order to encourage the consistency necessary for analysis. The most frequently raised policies among participants were the introduction of Greening and the Countryside Stewardship (CS) scheme.

Following the interviews with stakeholder organisations, we conducted a further set of 12 interviews but this time with farmers (owners or managers). These interviews took place over the period of autumn 2016 and winter 2017. The timing of the interviews - commencing relatively soon after the Brexit referendum (June 2016) - provided a somewhat unanticipated[15] opportunity to discuss farmers' views on Brexit and their preferences for post-Brexit agri-environmental policy in England.

In terms of recruitment we intentionally set out to interview a diversity of farmers with different regions, farming models, scales, farm ownership, and products. This decision to seek diversity was based on a common finding from the stakeholder organisation interviews who emphasised that different farmers would have different experiences with policies depending on their specific contexts and circumstances.

[15] We say that the opportunity to discuss Brexit was 'somewhat unanticipated' since we knew going into the interviews that Brexit would be a topic of conversation however the broader research project was conceived before the EU referendum was announced and so was not the initial objective of the interviews.

Table 5-1: List of Participating Stakeholder Organisations and Farmers

Stakeholder Organisations		Farmers	
Participant	**Participant Code**	**Participant**	**Participant Code**
Linking Environment and Farming (LEAF)	ORG-EN-P01	Organic Vegetable Farmer	Farmer-EN-P01
Natural England	ORG-EN-P02	Mixed Farmer (livestock/arable)	Farmer-EN-P02
National Farmers Union (NFU)	ORG-EN-P03	Arable Farmer	Farmer-EN-P03
Royal Society for the Protection of Birds (RSPB)	ORG-EN-P04	Arable Farmer	Farmer-EN-P04
Wilderness Foundation	ORG-EN-P05a **	Mixed Farmer (livestock/arable)	Farmer-EN-P05
Anonymous Large Farm Business *	ORG-EN-P05b **	Dairy Farmer	Farmer-EN-P06
Farming and Wildlife Advisory Group (FWAG)	ORG-EN-P06	Organic Fruit and Vegetable Farmer	Farmer-EN-P07
WWF – UK	ORG-EN-P07	Mixed Farmer (livestock/arable)	Farmer-EN-P08
Woodland Trust	ORG-EN-P08	Mixed Farmer (livestock/arable)	Farmer-EN-P09
Agriculture and Horticulture Development Board (AHDB)	ORG-EN-P09	Community Supported Agriculture (CSA)	Farmer-EN-P10
Plantlife	ORG-EN-P10	Organic Beef Producer	Farmer-EN-P11
Allerton Project / Game and Wildlife Conservation Trust (GWCT)	ORG-EN-P11	Large Arable Farmer	Farmer-EN-P12

* One participant requested that their organisation name not be used in the research outputs.
** Two organisations participated in the fifth stakeholder organisation interview, however their responses have been separated for the analysis.
Note: Full details on participating farmers are available in Appendix 7

We used multiple recruitment methods to invite farmers to participate in the study. Invitations were distributed through email using publicly accessible email addresses from various directories (e.g. Open Farm Sunday, commodity groups, and local food listings) as well as being included in the NFU newsletter and posted on the NFU website. We also made extensive use of social media, notably Twitter, to reach online farmer communities.

Participating farmers were asked about their general views on current agricultural and environmental policy in England and whether they felt there were any specific policies that helped or hindered their farming operation. Farmers were also asked to

comment on any experience they had with agri-environmental schemes. Similar to the stakeholder organisation interviews, farmers were asked about their experiences and views on Countryside Stewardship and Greening. Finally, farmers were asked a specific question about Brexit, if it did not naturally arise through the conversation, as well as what changes they would like to see following the transition (see Appendix 3 for the interview protocol). Interviews were recorded, with each participants' explicit permission and transcribed verbatim.

Analysis for all 24 interviews was conducted using NVivo 10 whereby transcripts were coded using an iterative, inductive approach and themes were developed by aggregating lower order codes, using a thematic analysis process (Braun & Clarke, 2006; Bryman, 2016; Burnard, 1991). The findings are organised according to three broad themes reflecting participants' views on current agri-environmental policy in general, their views on specific policies that emerged organically throughout the interviews (i.e. Countryside Stewardship and Greening), and finally their views on future agri-environmental policy in England.

5.6 Results

Here we present the results of the semi-structured interviews undertaken with stakeholder organisations in England with agricultural and/or environmental mandates and the interviews with farmers. The aim of this work was to garner participants' preferences for the design, intention, and objectives of agri-environmental policy in England in order to help inform the post-Brexit redesign of these policies. In what follows we present the results according to three broad themes which emerged from a data-driven, inductive coding of the interview transcripts. First, we present the general views of stakeholders on agri-environmental policy in England including the design and objectives of agri-environmental schemes directed at farmers. Second, we present the views of stakeholders on policies and policy changes specifically focusing on two major changes commonly raised across participants: Countryside Stewardship and Greening. Third we present stakeholders views on the future of agri-environmental policy in England, including farmers' concerns and preferences specifically relating to post-Brexit agri-environmental policy in England.

5.6.1 Stakeholder views on agri-environmental policy

Participating stakeholder organisations were divided in their general satisfaction with agri-environmental policy in England, typically split along mandates. As might be expected, most representatives of environmental organisations felt that policy was leaning towards prioritising agriculture and that production takes precedence while the environment is a secondary concern. Contrastingly, representatives of organisations with a more agricultural focus felt that policy was well balanced, or becoming more balanced.

Interviews with farmers found a similar division amongst participants according to size and farming model where small farmers with alternative farming models (e.g. direct sales, agro-ecological focus) were most critical of the current policy environment. These participants often stated that they felt that they were being discriminated against within policy due to their size or model and that it was creating an unfair playing field within the agricultural sector: "*there's a system which encourages big industrial farming, it subsidises it, basically my competitors, my industrial competitors, are being subsidised and we're not*" (Farmer-EN-P10). These smaller operators were, perhaps not surprisingly, particularly critical of the current per hectare funding model of the Direct Support payments and instead favoured a model more in-line with the social and environmental benefits they deliver.

In the following section we look more deeply into stakeholder organisation and farmers' perspectives on the underlying objectives of agri-environmental schemes and their interpretation of the effectiveness of such schemes.

5.6.1.1 Perspectives on the underlying objectives of agri-environmental schemes (AES)

Before we delve into stakeholder organisation and farmer perspectives regarding the overall effectiveness of England's agri-environmental schemes, we first thought it instructive to examine what they felt were the primary objectives of agri-environmental schemes more conceptually. We observed during our analysis of the interview transcripts that stakeholder organisations and farmers did not always share a common understanding of the underlying objectives of England's suite of AES. There seemed to be some disagreement relating to whether the primary focus of agri-environmental schemes was to compensate more altruistic farmers for income foregone (revenue-neutral) or had a wider remit intending to attract pragmatic farmers by paying them for an environmental service (revenue-generating). That is, in the same way that farmers would be paid for their agricultural commodities, they would be paid for the ecosystem

services they deliver. This difference in objectives has ramifications for how scheme effectiveness might be evaluated such as the long-term environmental benefits the schemes deliver, which will be explored further in the following section.

Beginning with the stakeholder organisations, we found that one group of stakeholder organisation representatives (e.g. ORG-P01-LEAF, ORG-P02-Natural England, and ORG-EN-P03-RSPB) felt that the AES are simply intended to compensate farmers for income foregone as a result of any environment enhancing activities. They reported that any payments from AES should be seen as being revenue-neutral to farmers and that they are not meant as a payment for ecosystem services. Rather, these participants described the schemes as allowing farmers to continue improvements without considering lost economic potential and to encourage positive behaviour change and demonstrate good on-farm decisions to be sustained beyond the end of the agreement (e.g. nudging). For instance, the participant from Natural England (ORG-P02) outlined that in some instances, AES are used to temporarily incentivise the adoption of practices with both environmental and financial benefits for the farm (e.g. soil conservation, reduced application of chemicals) in an effort to convince farmers of the benefits of the practice even without the scheme. It was also noted that in some cases schemes are used to compensate farmers for regulatory limitations (takings) on the use of their land, such as the Site of Special Scientific Interest (SSSI) designation, and in these instances the schemes were seen as a means for farmers to be compensated for regulatory limitations.

On the other hand, another group of organisational participants felt that the main objective of the AES is to provide financial incentives to farmers. Here organisational participants referred to farmers being paid to engage in certain types of behaviours that would enhance the environment and that farmers may benefit financially from participation in schemes. These participants' interpretation of the underlying objectives of the schemes more closely resembles *payment for ecosystem services* than *compensation for income foregone*. A primary indicator in this different way that participants framed the objectives of schemes can be described as whether the environmental action comes first or the funding precedes the action.

The divergent views on the objectives of the AES presented by stakeholder representatives was also reflected in the farmer interviews where farmers differed in their use of the schemes and how they incorporated them into their farm management decisions. Specifically farmers utilised schemes differently with some viewing them as a means to gain revenue (e.g. 'something to gain') while others saw them as an opportunity to break-even through compensation for lost revenue resulting from adoption of environmentally beneficial practices (e.g. 'nothing to lose').

For instance, reflective of the ‘nothing to lose’ mentality, some farmers reported that schemes enabled or encouraged the uptake of new practices they wanted to adopt but might not have been able to afford otherwise (i.e. compensation). For other farmers, schemes such as ELS rewarded farmers for the environmental benefits that they already provided: “*ELS rewarded farmers for doing what they may well have been doing already, but were favourable to the environment, without doing too much extra*” (Farmer-EN-P09). Similarly, another farmer reported: “*I would do it in any case, we were laying hedges before the stewardship came in … so we're getting paid for something we'd do in any case*” (Farmers-EN-P01).

Furthermore, farmers were also using the schemes to receive compensation for lost farm revenue resulting from regulatory compliance, as previously described by stakeholder organisations. For example, farmers were enrolling land that they were obliged to leave out of production through regulation, such as buffering watercourses or natural features from chemical application, into schemes as a means to reduce lost revenue associated with regulatory compliance:

> *“it also eases the management of the farm in terms of pesticide applications … some pesticides have, you know, requirements as to how close or not close to watercourses you can go, so most of them up to now have been you shouldn't get closer to than five metres … the various schemes that have been around for probably about the last 15 years have enabled us to be paid for doing that by putting a grass margin down.” (Farmer-EN-P12)*

However, leaning more towards the ‘something to gain’ end of the spectrum other farmers reported that the financial benefits they receive from enrolment in the AES went beyond compensation for lost revenue:

> *“So, the stewardship money was a sort of icing on the cake, it kept us going, and I know it’s not - originally it wasn't really meant for that, it was a sort of top-up for doing environmental work*.” (Farmer-EN-P04)

Similarly, farmers reported how rather than focusing solely on providing environmental benefits they were strategically incorporating the schemes into their farm business, particularly by enrolling low quality land into the schemes where they felt it would be more profitable to do so:

> “*we'll be looking to see how we can make the most, you know, earn the most out of every acre here and if we've got acres that are gonna earn by having wild bird mixes on them or pollen and nectars or woodland or whatever then you know that's*

what we'll be lookin' at… if I grow an arable crop I can make X pounds at this acre and if I go into some scheme I can make Y pounds and, you know, which is the better?" (Farmer-EN-P12)

This was particularly true during times of low commodity prices:

"I think with you know commodity prices where they are … there's plenty of parts of fields and fields that are just not, you know, they're not gonna pay their way if you try and grow wheat on them at £130 a ton, so you know, therefore the, you know, the stewardship options look reasonably attractive." (Farmer-EN-P12)

While times of low commodity prices would, therefore, provide a window of opportunity to encourage enrolment in schemes, times of high commodity prices would in turn provide an obstacle to convincing farmers to enrol land.

5.6.1.2 Perspective on effectiveness of agri-environmental schemes (AES)

Coinciding with this division over the fundamental objective of schemes, participating stakeholder organisation representatives and farmers also held a variety of views on the effectiveness of England's current suite of AES, including some diverging opinions. Firstly, participating stakeholder organisations outlined a variety of challenges associated with the use of agri-environmental agreements in order to effect long-term land-use change. In particular they noted that agri-environmental schemes are in operation for fixed duration and as such any changes to the landscape made in order to qualify for an AES could be reversed at the end of the scheme:

"*In the context of most arable agreements, you know, the change is temporary. You plant a pollen and nectar mix or something or you have a buffer strip, but at the end of the agreement potentially you could plough that out and you could be growing wheat on it again so effectively the payment is linked to the benefits for the duration of the agreement and that's that*." (ORG-02-Natural England)

Apart from concerns regarding the time-frame in which these schemes would be in operation, stakeholder groups also raised some questions regarding the overall long-term sustainability of using voluntary AES to generate environmental improvements. More specifically, there was a concern expressed by many that relying on financial motivations to encourage farmers' behaviour change was costly and fiscally unsustainable for public finance. The voluntary nature of the schemes also results in an inherent fluctuation as farmers enter and leave the schemes making it difficult to sustain permanent environmental practices and features (de Snoo et al., 2013). This is particularly true in times of high commodity prices where farmers may gain more from

production than they would receive in scheme payments thereby deterring them from entering into agreements, particularly if they are locked-in for multiple years:

> *"in some cases [farmers] make more money by being in the scheme than continuing to grow crops at a loss, but kind of the silver lining is always just round the corner and I suspect there's a certain reluctance amongst most farmers to commit land to doing something for conservation when their hope is that next year the price will be up be up by 30% or something, you know, and then they would have land they could be growing crops on*." (ORG-P06-FWAG)

Participating farmers echoed these concerns from stakeholder organisations. For example, some farmers reported that once an agreement ends they intended to revert that land back to production. This was not seen as an anti-environment action by these farmers, rather removing environmental features, such as ploughing margins, reflected farmers' own understanding of how these agreements are meant to end. It remains to be seen what effect the end of agri-environmental schemes such as the ELS will have on farmers' land-use decisions, but it seems reasonable to suggest that nudging farmers towards sustaining environmentally beneficial practices in the absence of schemes or regulations will continue to be a major challenge for policymakers in England and elsewhere (Mills et al., 2017).

Notwithstanding the fact that many farmers reported that the ending of these schemes will likely bring about significant adverse environmental consequences, participants - even some with considerable financial stakes in agri-environmental agreements - were still critical of their overall environmental value or effectiveness:

> "*But it would, you know, sort of these big arable, you know three, four thousand-acre farms that I'm involved with … I think that both farms are gettin' fifty, sixty, thousand a year income from [agri-environmental agreements], but it's still not havin' a huge impact on the landscape that they're in. I woulda said. … we're sort of, I would say, it's almost fiddling…. I don't think it is having much of an impact on the total landscape….if you've got a four thousand acre farm and you put in twenty acres of wild bird mixes, is that really havin' much of an impact? I don't know*." (Farmer-EN-P12)

5.6.2 Stakeholder views on CAP reform: Countryside Stewardship and 'Greening'

In the previous section we discussed stakeholders' high-level views of agri-environmental policy more holistically as well as their views on the objectives, design, and practical impacts of agri-environmental schemes in England. In this section we discuss two specific policy changes that were commonly, and independently, raised as being particularly important across stakeholder organisations, namely the transition from the Entry Level Stewardship (ELS) to the Countryside Stewardship (CS) scheme and the introduction of the Greening cross-compliance obligations. These were also commonly independently raised in the farmer interviews, however to allow for a direct comparison participating farmers were asked about their views and/or experience with these policies where they did not pre-emptively mention them.

5.6.2.1 Countryside Stewardship (CS)

In Section *5.4 Recent changes to agri-environmental policy in England* we highlighted how the CAP has undergone a significant change in the 2014-2020 reform. One such change was the shift from a 'broad and shallow' approach to agri-environmental schemes (ELS scheme) to one that was 'deep and narrow' (CS scheme). We found that overall, organisational participants were generally in favour of this shift in the design of agri-environmental schemes. This was because it was felt that the broad and shallow approach inherent in the ELS scheme did not result in much environmental value, as farmers generally selected so-called 'easy options' that had questionable environmental impact:

> "*And of course the problem was that the farmers selected all the easy options, most of which delivered the least for the environment, and so we weren't getting, as we put it in this country, 'enough bang for our buck' … the idea of doing it that way is to shake off the farmers who quite frankly aren't that interested in doing much for the environment but simply want to be in the scheme and to take the money*." (ORG-P11-Game and Wildlife Conservation Trust)

Previous authors have also questioned the efficacy of these schemes, such as Hodge and Reader, 2010, p.279 who note that "*they may well not represent the options that would be regarded as maximising the environmental benefits or provision of public goods*". Many organisational participants reported that the new CS scheme and the resulting 'deep and narrow' approach to agri-environmental payments would result in more meaningful environmental actions.

Organisational participants also noted that the change to the 'deep and narrow' approach reflected by the new ELS scheme was financially necessary, as the previous scheme was becoming too much of a financial burden to the state/EU. While this shift towards a more targeted and perhaps financially prudent scheme would reduce the overall funding available for environmental improvements on the farm, participants noted that this would at least be partly mitigated by increases in the BPS (Pillar 1 direct payments). On more principled grounds, many participants also agreed with the 'deep and narrow' approach as a means to encouraging farmers who are committed to environmental improvements rather than those "*committed to taking the money*" (ORG-P11-Game and Wildlife Conservation Trust).

However, it is important to note that despite these concerns there was a minority of organisational participants who did prefer the 'broad and shallow' approach inherent in the ELS, or at least felt that there were some advantages to this approach. Specifically, these participants felt that the 'deep and narrow' approach reflected in the CS scheme could be too restrictive and promoted isolated activities from a smaller number of farmers. In contrast, the accessible nature of the ELS scheme was felt to be a particular advantage:

> "*having got people doing conservation work, people who'd never engaged with it before, but doing things on a very simple scale in many cases, it's gotta be a great thing … simple ones that they can understand, that they can implement easily, that they can see some results from, you know surely that's gotta be good.*" (ORG-P06-Farming and Wildlife Advisory Group)

In addition to being accessible for farmers, supportive stakeholder organisation representatives felt that the scheme increased knowledge of environmental measures, that farmers take more actions for the environment having been in the scheme, and that the attempts to nudge farmers towards long-term behaviour change has been successful. Similarly, these participants disagreed with the notion that the ELS options had low environmental value.

Regardless of perceptions concerning the relative merits of the CS scheme in comparison to its predecessor the ELS scheme, participants were concerned that the reduced budget available for the new CS scheme, and its competitive nature, meant that enrolment by farmers in agri-environmental schemes will drop considerably. This in turn would mean a loss in land with environmental features as farmers may return their previously enrolled land to agricultural production when their ELS agreements end.

It was also noted by organisational participants that many farmers were unhappy, and felt disillusioned or alienated with the new scheme as they had been encouraged to participate in the ELS scheme, but many would no longer be enrolled:

> "*I mean I think the current countryside stewardship scheme is actually going to alienate a lot of people. They're gonna turn around and say 'well, you know, we got encouraged to do all this under ELS and now they've just pulled the rug.'*" (ORG-P04-RSPB)

Therefore, it seems likely that the introduction and subsequent withdrawal of the ELS scheme may actually produce resentment amongst farmers and dampen efforts to encourage the widespread adoption of environmentally beneficial behaviour.

In parallel, stakeholder organisation participants also commonly criticised the design of the new schemes and were particularly critical of perceived increases in unnecessary bureaucracy/paperwork. This view of excessive paperwork and bureaucracy was widely held by stakeholder organisation participants regardless of whether they agreed with the changes in principle.

Participating farmers reiterated many of these design and implementation issues associated with the CS scheme and were highly critical of the new scheme. Perhaps not surprisingly participating farmers were generally positive about the 'broad and shallow' approach to AES and the former ELS scheme. Most farmers felt these previous schemes were accessible for themselves and not onerous in terms of paperwork, applications, and general bureaucracy while still providing social and environmental benefits.

The most common criticism of the CS scheme by farmers was related to it being too complicated, too bureaucratic and requiring too much paperwork. For example, one specific bureaucratic related criticism commonly raised by farmers related to onerous mapping and the need for photographic evidence:

> "*You know, every headland has to be to the nearest 0.001 of a hectare, which is about 10 square metres, which is just stupid, bearing in mind that each time they re-map it they vary by more than that [laughs] it's the sort of world we live in…It's Alice in Wonderland but sadly I've got used to doing now…you have to try and do what you want to do that's right for the environment in parallel with doing what's right to comply to claim the money*." (Farmer-EN-P09)

Another participant voiced their concerns more generally with the complications of the scheme: "*my [ELS] agreement runs out in January 2017 and I am not renewing it with anything … the other scheme is just crap. And was gonna take so much time and effort for no reward*" (Farmer-EN-P05). This mirrors previous findings by Palm-Forster et al.

(2016) and Van Herzele et al. (2013) who found that the complexity associated with implementing certain agri-environmental schemes, and the associated transaction costs for farmers, can be an important deterrent to their participation and may even overshadow real financial gains (Palm-Forster, Swinton, Lupi, & Shupp, 2016; Van Herzele et al., 2013).

Some of the specific compliance requirements that farmers took issue with, and associated with the CS scheme, were record-keeping and providing photographic evidence which they viewed as complicated and often detached from environmental outcomes. Indeed, participating farmers felt that they were working to a set of rules as opposed to environmental objectives per se. This form of "*tick box compliance*", with highly prescriptive conditions, may be an impediment to a genuine commitment towards environmental outcomes and can act as a deterrent towards enrolment for environmentally conscious farmers (Mills et al., 2017, p. 284). It was similarly suggested in the stakeholder organisation interviews that highly prescriptive scheme designs may result in a disconnect between environmentally beneficial practices and payments with one participant stating that in some cases scheme payments "*kind of just became a cheque that they got every year and went into the bank account*" (ORG-P06-FWAG).

In addition, farmers felt that particular actions to ensure scheme compliance actually resulted in perverse policy outcomes such as negative effects on the environment, as illustrated in the following example:

> "*hedges were allowed to grow out which you might think is probably not a bad thing, but because of the rules - so you had a hedge and then you had a maybe a six metre grass margin next to it, but once the hedge is more than four metres wide, they would say that any of the hedge that's over the grass margin that's in excess of four metres wide is a hedge then makes the grass margin ineligible … now we had to go with big sawblades and things and chop the hedge back to a suitable width … but you might think well, you know, actually, from a biodiversity and landscape point of view, you know, what was the best outcome?"* (Farmer-EN-P12)

In this quote the participant provides a practical example where scheme requirements came into conflict with what this farmer felt was the right thing to do from an environmental perspective thereby contributing to frustration with the requirements of the scheme as well as impeding their own on-farm environmental activities.

Farmers also took issue with the threats of inspections and associated fines, with some choosing not to participate in schemes rather than risk being fined for a mistake or unintentional infraction:

"*you just sort of live in dread of them coming and back dating the whole lot and saying, you know, you owe us twenty grand because you haven't, you know, you missed out half a metre from here and it, you know, it doesn't count… it's a massive threat. You know, you can't afford stuff like that really*." (Farmer-EN-P04)

It seems reasonable to suggest that, at least for some farmers, loss aversion could therefore be a barrier towards participation in the AES in that the threat of potential financial losses arising from a fine weighed more heavily in their decision-making than the real financial benefits resulting from participation in the scheme (Kahneman, Knetsch, & Thaler, 1991).

As well as perceiving this scheme as being too onerous and bureaucratic in its delivery, farmers also felt that the CS scheme was overly prescriptive especially in comparison to ELS in that the options provided to enrol in the schemes did not match their farming objectives. Similarly, farmers disliked the multi-year length of agreements and associated restrictions and elected not to pursue enrolment in exchange for more freedom of action. This *goodness of fit* between AES prescriptions and on-farm decisions has been found to be a particular challenge for schemes with a 'deep and narrow' approach in the UK (Lobley & Potter, 1998) and elsewhere in Europe such as in Belgium, Denmark, France, Greece, and Sweden (Van Herzele et al., 2013; Wilson & Hart, 2000).

Nevertheless, despite the numerous criticisms of CS, farming participants still commonly expressed interest in the scheme, for some due to their financial reliance on AES payments for farm revenue. This group of farmers have been characterised as "*scheme enthusiasts"* (Van Herzele et al., 2013, p. 118) or, from a more pessimistic standpoint, 'scheme addicts' (Greenfield, 2017). This may lend credence to the oft-observed criticism of the AES schemes where farmers become locked-into dependency on AES payments, rather than nudging farmers towards a long-term shift in farmer behaviour.

5.6.2.2 'Greening'

In addition to the Countryside Stewardship scheme, the other major area of discussion independently raised by organisational participants was around the introduction of Greening as part of Pillar 1 cross-compliance. Greening accounts for 30% of farmers' BPS (direct) payments and introduces additional cross compliance obligations such as crop diversification (i.e. 'the three crop rule'), protection of permanent grassland, and the creation of on-farm Ecological Focus Areas (EFAs) where farmers

must set aside a portion of their land (at least 5% of their arable area) upon which they must carry out environmentally beneficial practices.

General views on Greening were almost uniformly negative across organisational participants. As succinctly put by one participant:

> "*Well probably the way to describe them is universally hated, the green movements think that it's green wash and simply doesn't do enough, the farming community see it as an unnecessary impingement upon their activities*." (ORG-P11-Game and Wildlife Conservation Trust)

Some organisational participants felt it did not go far enough for the environment and earlier proposals were eventually "*watered down*" which participants speculated was due to political reasons:

> "*I personally think it was a lot weaker than it should have been. If the draft of the Greening, sort of pillar 2 measures, particularly in 2012, then it was good. It was looking really strong and it just got watered down consistently*." (ORG-P07-WWF-UK)

These organisational participants felt that most farmers were meeting the necessary conditions already and as such it had limited environmental value: "*I think actually in England we've weakened it so much that for most farmers it doesn't require them to do anything. There's ways around it*" (ORG-P08-Woodland Trust). The leguminous crop option[16], in particular, was frequently mentioned as an example of using Greening for non-environmental purposes, specifically import substitution, while providing a loophole with limited environmental value:

> "*The leguminous crops option within EFA possibly has been subverted somewhat because obviously there's a major import of soya in particular for livestock feed in the EU and by using that measure to make legumes more, you know, producing legumes more attractive, I think there maybe was a bit of a manipulation by the policymakers and the farming sector.*" (ORG-P02-Natural England)

Similarly, the 'three crop rule'[17] was widely disliked by participants from both agricultural and environmental organisations. Organisational participants opposed the complications

[16] The EFA requirement of Greening can be met by five types of features: fallow land, hedges, buffer strips, catch crops and green cover, and/or nitrogen-fixing (leguminous) crops. Leguminous crops include beans, chickpeas, lentils, peas, and soya.

[17] As part of the crop diversification Greening requirements farmers with between 10 and 30 hectares must grow at least two different crops on their farms and farmers with more than 30 hectares must grow at least three different crops in each season.

it added to farmers' operations, while others questioned the environmental benefits. For example, one participant describes their support for the principle of the rule, but opposition for its design/implementation:

> "*the three crop rule again they made a mistake with that and they should have insisted on a good crop rotation of at least three crops, not that each farmer should grow three crops in any one year. That's nonsense. But a good crop rotation of three crops, so not one crop, more than once every three years, would have made a lot more sense. I've no idea why that escaped them*." (ORG-P11-Game and Wildlife Conservation Trust)

Apart from perceived problems relating to its overall effectiveness, some stakeholder organisation participants were opposed to Greening on general principle and felt that environmental objectives should be left under Pillar 2 (voluntary AES). These participants saw Greening as a means to shift environmentally beneficial practices from being voluntary, through an AES agreement, to compulsory as a cross-compliance obligation – what one participant referred to as opting-in or opting-out (ORG-P05b). This shift from a voluntary to a mandatory approach may be seen as a means for policymakers to ask more from farmers in exchange for the direct payments received through the Basic Payment Scheme. However, it was also suggested during the stakeholder organisation interviews that it may create resentment towards the practices if the element of choice is removed.

While stakeholder organisations had strong opinions on Greening we found that participating farmers were largely indifferent to the Greening changes:

> "*The Greening didn't make too much difference because we were growing beans anyway so we were able to use that as the Greening element. Plus these bits of margins that are left over. So wasn't too worried about that*." (Farmer-EN-P03)

This seems to reaffirm criticisms from some stakeholder organisations that the Greening changes were 'watered-down' and had very little effect in practice.

When compared with stakeholder organisation representatives farmers were much less critical of Greening, almost verging on indifference in some cases. This can be seen as a reflection of their differing expectations of policy effectiveness, where stakeholder organisations were more concerned with addressing broader agricultural and environmental objectives, whereas farmers were more concerned with reducing the burden on their farming operation, such as ease of compliance as well as avoiding restrictions on farming practices/decisions. Nevertheless, one shared criticism of

Greening between farmers and organisational participants related to what they almost uniformly interpreted as excessive paperwork and overly complicated compliance obligations (e.g. calculating, measuring and maintaining EFA obligations).

5.6.3 Stakeholder views on Brexit and future agri-environmental policy

In this final section we investigate participants' views and concerns relating to Brexit and the future of England's agri-environmental policy. Due to the timing of the farmer interviews, in addition to investigating views on current agri-environmental policy in England we were able to ascertain their views on Brexit and their preferences for post-Brexit agri-environmental policy.[18]

While questions persist surrounding the impact of Brexit on farmers, such as the availability of farm labour, trade arrangements, and changes to subsidy schemes, an often cited survey from Farmers Weekly states that 58% of farmers supported leaving the EU (11% undecided, 31% wanting to remain) (Clarke, 2016).

In our sample, while most farmers expressed uncertainty or negativity towards the UK leaving the EU, they nonetheless expressed the view that farmers, as a group, were largely in favour of leaving the EU:

> "*I think he's the only other farmer I know who wanted to stay in apart from me… so there's only me and him in the whole country I think who are in agriculture who didn't want to get out*." (Farmer-EN-P04)

Farmers in this sample criticised the EU for not creating what they perceived to be the 'level playing field' that they were promised, and criticised member states for not following EU rules which they felt put UK farmers at a disadvantage:

> "*if you drive around Europe you can see things which as a British farmer we know we're not allowed to do, which are being done. I'm not saying that they're being done with permission, but they're not being stopped from doing them*." (Farmer-EN-P09)

[18] The interviews with stakeholder organisations were conducted before the Brexit referendum, however the interviews with farmers were conducted after the referendum. Therefore, due to the timing of the two sets of interviews, stakeholder organisation representatives did not discuss Brexit or, similarly, their views on post-Brexit agri-environmental policy. Consequently, in this section we only include the views of participating farmers.

While some farmers in this sample voluntarily stated that they voted to leave the EU, participants also frequently expressed concern over the lack of certainty in post-Brexit agri-environmental policy. In particular, participants were hesitant to enter into a new AES agreement due to a concern with the future of payments and the willingness, and ability, of the UK government to uphold the agreements. Also, not surprisingly, participants were concerned about an anticipated decrease in overall funding for agriculture and a reduction in direct support payments:

> "*I think you know the funding coming into agriculture's gonna reduce I would imagine, it can't do anythin' else can it? … agriculture's gonna be competing for funding with other public services you would imagine, like, you know, the NHS and all that sort of thing and, I dunno, the public you know they're probably not gonna be happy to see similar amounts of money coming to farmers*." (Farmer-EN-P12)

Farmers also expressed a concern with future trade agreements outside the EU and a belief that UK agriculture will struggle to compete on the world stage:

> "*the rural economy will go back to the thirties probably in the UK because there'll be cheap lamb and beef coming from New Zealand, Argentina, Canada [and these countries] will be sending every bit of grain in here and I don't think we'll be able to compete with the trade deals."* (Farmer-EN-P04)

Interestingly, participating farmers were also highly critical of the objectives of the UK government when it comes to creating a potential new set of agri-environmental policies. Some participants felt that the government will prioritise large farms and that smaller operations will lose support under a new set of policies. Participants were also distrustful of the UK public service, viewing them as highly bureaucratic and rules focused, and suggested many of their complaints with existing schemes would not be addressed, or may even become worse, outside the EU. Multiple participants were also concerned about a strong environmental lobby in the UK overshadowing agricultural interests and that the government would become more environmentally focused, at the expense of agriculture:

> "*I mean, we've got, I think 55,000 farmers in the UK … and there's I think there's three and a half million members of the RSPB and there's another million or so members of the National Trust and, not that I'm against them at all, I'm quite happy, but once they get their lobbying in to the government I think UK agriculture will be at the bottom of the heap. For everything*." (Farmer-EN-P04)

"*The British government has always sort of pushed the conservation stuff more than the European countries anyway so I'd imagine that the current outfit are gonna be linking it much more*." (Farmer-EN-P03)

Since the interviews were completed, several announcements from the UK government seem to reinforce these concerns raised by farmers. As foreseen by participants, the recent consultation on the future for food, farming and the environment in the UK (27 February – 08 May 2018) has suggested a reduction and eventual phase-out of direct payments to farmers is likely to occur in post-Brexit agricultural policy (Department for Environment Food & Rural Affairs [Defra], 2018). Indeed, the position papers associated with this consultation propose offsetting direct payments with more market-oriented concepts such as farm improvements, efficiency, and diversification in order to boost the competitiveness of English agriculture.

Moreover, again underlining the concerns raised by farmers, the UK government has expressed an interest in increasing international trade in agri-food which has been regularly promoted by both The Rt Hon Michael Gove MP, the Secretary of State for Environment, Food and Rural Affairs and The Rt Hon Liam Fox, Secretary of State for International Trade as well as appearing prominently in the '*Health and harmony: the future for food, farming and the environment in a Green Brexit'* consultation paper. This has also included some revealing discussions of pursuing free trade agreements and subsequently expanding imports from such countries as the United States, popularised in the public backlash against importing chicken disinfected in a chlorine-based solution (Roberts, 2017).

These positions on direct payments and trade seem to reflect the concerns of farmers that they will be less insulated from market forces through direct payments, as well as needing to compete with agricultural products from countries with intensive, highly efficient agricultural systems. The UK government seems to recognise that this may require farmers to scale-up, "*adapt, evolve and embrace change*", or "*leave the industry*" (Gove, 2018). While too early to say for certain, this does reinforce the concerns of small, marginally profitable farmers that their businesses will not survive under a new set of agricultural policies with less financial support and more exposure to market forces.

With regard to post-Brexit agri-environmental policy more specifically the concerns posed by farmers – or framed as opportunities by some environmental organisations – may also be coming to fruition. The UK government has claimed to approach its revised agricultural policy through the lens of a 'Green Brexit'. In agri-environmental policy this includes shifting away from direct payments to farmers to a support model that is founded

upon public money for public goods and "*puts environmental protection and enhancement first*" (Gove, 2017). While these proposals may align with what environmental organisations have long criticised about agricultural policy in England the proposed approach does also reflect the concerns of farmers that environmental interests are being prioritised over agricultural interests and farm financial sustainability.

5.7 Discussion & Conclusion

In this paper we present the views of agri-environmental stakeholders (organisations and farmers) in England on present and future agri-environmental policy. We have organised our findings according to three broad themes, being: their views on agri-environmental policy holistically, their views on specific policy changes (i.e. Countryside Stewardship and Greening), and their views on future agri-environmental policy. This last point is particularly timely given the UK's decision to leave the EU, and correspondingly the Common Agricultural Policy, along with the potential challenges and opportunities associated with creating new agri-environmental policy for each of the countries that comprise the UK. The findings presented in this paper are mostly empirical, however we also present some conceptual findings and observations relating to the way various actors interpret and/or experience policy and how this influences their views on policy effectiveness.

With regard to their general views on agri-environmental policy in England we found that organisational participants differed fundamentally in their view of the underlying objectives of agri-environmental schemes. Throughout the interviews we found that organisational participants differed as to whether they viewed the schemes as a means for farmers to be compensated for lost revenue resulting from the adoption of environmentally beneficial decisions or as a means to 'purchase' the adoption of environmental behaviour. Farmers also shared a mixed interpretation of the intention, or practical implementation, of the agreements in their own operations with some viewing the schemes a means to increase on-farm revenue (i.e. revenue-generating) or as a means to recover lost revenue from environmentally beneficial practices (i.e. revenue-neutral). This is an important distinction as Darragh & Emery have noted, from a cynical perspective, agri-environmental schemes may be used as a means to maintain farm subsidies in a manner more acceptable to the general public and international trading partners, as opposed to principally seeking environmental outcomes (Darragh & Emery, 2017). The distinction between agri-environmental schemes as revenue-neutral or revenue-generating also has important associations with the design of schemes as well as their evaluation. However, this is far from straight-forward due to the more principled

and moralistic questions that surround the use of AES as to whether it is 'right' to reward farmers' opportunistic decisions, just altruistic decisions, or whether outcomes are the only important measure of policy success. In terms of policy design, this fundamental difference in perspectives poses a challenge in decisions whether to target schemes towards those already undertaking environmentally beneficial behaviour, and rewarding their altruism, or targeting those not undertaking these behaviours and encouraging them to do so by appealing to their pragmatism.

This finding of fundamental/philosophical differences within stakeholder organisation representatives was paralleled with a different interpretation of the intention of the schemes as a means to convince farmers to shift their long-term behaviour or act as a perpetual payment for ecosystem services. This was associated with concern about the effectiveness of agri-environmental schemes as a policy tool and the temporary nature of land-use changes. The concerns of stakeholder organisation representatives seemed to be reflected in the way farmers approach / interpret the agreements with several participating farmers intending to cease some environmental activities at the end of their agreement. Nevertheless this finding can be interpreted in two contrasting ways as it can be argued that the ELS scheme may have been effective, in that farmers are not abandoning all the actions previously covered under the scheme (i.e. they have been nudged towards maintaining environmental practices without the scheme) or, in contrast, the scheme was not a good use of public resources as farmers' decisions to maintain practices in the absence of the scheme means that the scheme was paying farmers to undertake practices they would have anyway. This is an interesting heuristic question to be explored in other research, however in our small sample we found that in practice both arguments seem to be valid depending on farmers' specific circumstances.

As well as differing in their views on the objectives of schemes stakeholder organisation representatives also differed in their preferred design for agri-environmental schemes. This was most apparent in conversations around the shift from the 'broad and shallow' approach (ELS scheme) to one that was 'deep and narrow' (CS scheme). Some stakeholder organisation representatives preferred the accessibility and widespread uptake of the ELS scheme, however most stakeholder organisations in our sample preferred the 'deep and narrow' approach and saw it as an opportunity to attain more environmental value from the schemes, and get more "*bang for your buck*" as well as rewarding farmers that were committed to the environment rather than "*committed to taking the money*" (ORG-P11-Game and Wildlife Conservation Trust). It is useful to note that participants preferring the 'deep and narrow' approach seemed to have a combination of practical reasons (i.e. more meaningful environmental outcomes) and more moralistic reasons (i.e. rewarding altruistic behaviour). We observed a potential

association between stakeholder organisations representatives' views on the objectives of the schemes and whether they viewed them to be effective. However, we cannot confidently make this claim based on our study design and sample size suggesting more research would be required.

In contrast to the views of most stakeholder organisations, farmers preferred the former ELS and were frustrated with the new CS scheme for being less accessible, having what they perceived as less value for effort, and having too complicated application and compliance processes. This is perhaps not surprising since farmers would be expected to focus on the practical, 'on the ground' application and experience of the policies rather than their broader environmental outcomes. Nevertheless, all participants (organisational and farmers) acknowledged that the new CS scheme was highly bureaucratic and prescriptive in its design and did not always match the realities of farmers' operations or represent a goodness-of-fit with their farming objectives. Still, we found that some highly critical farmers were still going to apply for the schemes perhaps reflecting an ongoing controversy with the schemes whereby they may encourage reliance on payments for farm financial sustainability, what opponents refer to as "*subsidy addiction*" (Greenfield, 2017).

In addition to the shift from ELS to Countryside Stewardship, participating stakeholder organisations held strong views on the introduction of Greening. Participating organisations were largely negative towards Greening either feeling it was 'watered down' and would result in no real environmental improvements, or that it was an unnecessary extra burden on farmers' operations. Not surprisingly, environmental organisations tended to feel that Greening did not go far enough, with too many embedded loopholes to avoid resulting in any meaningful changes. This seemed to be at least partly true as farmers were largely indifferent to the new Greening requirements. Nevertheless, much like their views on the Countryside Stewardship scheme essentially all stakeholders (organisations and farmers) agreed that the bureaucracy, paperwork, and rigid rules associated with Greening was overly onerous on farmers and detached on-farm activities from environmental outcomes. Previous research on farmers' participation in agri-environmental schemes in England, and elsewhere, have found that paperwork and bureaucracy are important deterrents to participation (Reimer & Prokopy, 2014; Van Herzele et al., 2013; Whitfield & Marshall, 2017). Therefore, while perhaps more easily said than done, a simplified and streamlined design of the post-Brexit agri-environmental schemes would be welcomed by all stakeholders.

With regard to the overall discussion of existing schemes we found that organisational participants were generally in favour of the move towards CS (notwithstanding some concerns surrounding design) and very critical of Greening,

whereas farmers were more in favour of ELS and much less critical of Greening. This could be because organisational participants are much more concerned with effectiveness of schemes whereas concerns surrounding ease of use, labour input needed, effect on farming activity, and other practical/applied aspects of the schemes play more heavily in farmers' minds. This finding suggests that farmers, stakeholder organisations and policymakers are not necessarily on the same page when it comes to the fundamental objectives of schemes, and that all would benefit from clarification. Going forward this could be a source of conflict between farmers and policymakers were policymakers more likely to demand greater effectiveness of these schemes in order to justify their existence in a post-Brexit redesign.

Table 5-2: Areas of disagreement affecting participants' views of policy effectiveness

Objectives of the scheme	Revenue-generating	Revenue-neutral
	Perpetual payment for ecosystem services	Short-term incentive to encourage long-term behaviour change
	Support altruistic famers (reward good behaviour)	Support pragmatic farmers (encourage behaviour change)
Design of the schemes	'Broad and shallow'	'Deep and narrow'
	Accessibility and ease-of-use	Impact and outcomes
	Reduced bureaucracy and paperwork	
Note: these various conditions are not necessarily related and existed within various combinations across different stakeholder organisation representatives and farmers		

When discussing the future of agri-environmental policy in England, following the UK's withdrawal from the EU, participating farmers provided more concerns than ideas for specific improvements. While much of what concerned farmers might be expected, it is interesting to observe how their concerns with future agri-environmental policy reflect their views and expectations of the UK government. As noted earlier, farmers had a long list of grievances with the new AES and cross compliance obligations associated with the CAP, as well as some problems with the EU more directly, thereby in-part explaining their apparent support to leave the EU. However, this was paralleled by concern about the future of financial support for agriculture, concern about unfavourable trade agreements, and a general distrust of the UK government to represent their interests in a domestic re-draft of agri-environmental policies. This paints a complex, and often confusing picture of farmers' preferences for future agri-environmental policy. It also suggests that further, more targeted research will be necessary to get at the root of farmers' concern with current and former agri-environmental policy in order to better understand their preferences for policy changes.

Acknowledgements

We wish to thank all of the participants who took time out of their busy schedules to contribute to this study. We would also like to thank Professor Charlotte Burns at the University of Sheffield for her very useful comments on this research project. This research was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC) Doctoral Fellowship program.

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Chapter 6 Overall Discussion & Conclusion

Chapter summary: In this concluding chapter I briefly reiterate my overall aim and approach, and provide short summaries of the four papers that comprise this thesis. To avoid repetition I do not include comprehensive explanations of each chapter as these are provided within each chapter's preface, abstract, and main body. Following from this, I provide my own critical reflections on the methods used in the thesis, and engage with the literature in order to critically reflect upon the land-sparing / land-sharing framework. Next I discuss opportunities for future research and highlight the significance of the thesis findings for policy development. I conclude with a brief summary of the overall contributions to knowledge offered by this thesis.

6.1 Thesis aim and approach

The overall aim of this thesis was to compare and contrast the policy approaches that Ontario and England have taken in order to manage competition between agricultural and environmental land-uses, and to investigate the agri-environmental land-use preferences of stakeholders in each setting. This aim sought to contribute to a greater understanding of approaches to managing a finite land-base to ensure that demand for agricultural products can be met while also protecting the natural environment.

Different land-management models have been proposed to ensure the sustainable co-existence of agriculture and the environment, either through integration (land-sharing) or separation (land-sparing). Regardless of which approach may be found to be optimal through positivist land-use assessments, numerous actors will be ultimately responsible for implementing changes in policy and practice. Through my research I have investigated the views and preferences of such actors - namely policymakers, stakeholder organisations, and farmers - as well as identifying challenges and opportunities for the pursuit of either land-management approach. This study was conducted in two regions of comparison, the country of England in the UK and the province of Ontario in Canada. Through the use of a comparative approach, I was able to compare and contrast across the cases in order to identify similarities and differences amongst actors operating in different international contexts. I have also identified several opportunities to influence change towards more sustainable approaches to land-use, such as appealing to farmers' non-environmental interests associated with pro-environmental outcomes (e.g. lifestyle, financial, and farm sustainability). I also discuss

the window of opportunity presented by Brexit to improve agri-environmental policy in England during the UK's transition out of the EU.

The thesis is organised as four papers aimed at each set of actors within both of my case jurisdictions. The research approach was inductive, qualitative, exploratory, and incorporated principles of Grounded Theory. Rather than setting out with an established hypothesis or theoretical/conceptual framework, my findings emerged from the research and explanatory concepts and frameworks were identified throughout the research undertaking. The advantage of this approach was that it allowed the research participants to express their views and preferences with minimal influence from the researcher. Similarly, the flexible approach to both the documentary analysis and the semi-structured interviews allowed new insights to emerge from the data (text and discussions) that were not initially considered in the research design. Ultimately the research approach allowed for an effective representation of the views and preferences of actors as they chose to express them. In parallel the *ex post facto* approach to identifying explanatory concepts from the academic literature provided the flexibility necessary to identify the concepts best suited to explaining the research findings.

6.2 Summary of thesis results

Chapter 2 Sparing or sharing? Differing approaches to managing agricultural and environmental spaces in England and Ontario

In Chapter 2 I addressed my first objective by undertaking a thematic analysis of policy documentation, relating to agri-environmental land-use policy within England and Ontario. Here I found that England leans towards an integrative approach to agri-environmental land-use, whereas Ontario typically separates these land-uses into their own distinct spaces. Through an *ex post facto* literature review I found that the theoretical concept of land-sparing / land-sharing was well suited to describing these differing approaches. In parallel, I found that the theoretical framework of productivism vs. post-productivism (multifunctionality) helped to explain this difference in approaches, due to a fundamental attachment by policymakers in each case to contrasting agricultural paradigms and a different philosophical view of the purpose of agricultural land. This chapter provided an original comparison of land-use policy, and policymaker preferences, in England and Ontario as well as a novel application of the land-sparing / land-sharing and productivism / post-productivism conceptual frameworks within the Canadian context.

Chapter 3 Woodlots, wetlands or wheat fields? Agri-environmental land allocation preferences of stakeholder organisations in England and Ontario

Chapter 3 addressed my second research objective seeking to understand the agri-environmental views and preferences of stakeholder organisations in England and Ontario. To achieve this objective I conducted 24 semi-structured interviews with representatives of stakeholder organisations, with agricultural and/or environmental mandates, operating within England or Ontario (12 in each case). Building from Chapter 2 I used the land-sparing / land-sharing framework to organise and contextualise the results. I found that participants across, and within, cases generally agreed with the principle of integrating agricultural and environmental objectives within the same area, reflective of the land-sharing approach. This was somewhat surprising given the clear distinction identified between policy approaches in England and Ontario in Chapter 2. Nevertheless, in spite of the stated preference for an integrated approach, this chapter also identified deeper disagreements between, and within cases, which may pose challenges for the pursuit of a widely agreed upon approach to agri-environmental land allocation. In the end, I found that in practice participants did not prefer one approach to the other, but rather a mixed approach, combining elements of land-sharing and land-sparing. The findings provide a valuable contribution to the land-sharing / land-sparing literature and the application of the framework in social science research.

Chapter 4 The accidental environmentalists: factors affecting farmers' adoption of pro-environmental activities in England and Ontario

In Chapter 4 I pursued my third objective, which was to understand farmers' motivations and preferences regarding the adoption of pro-environmental activities on their farms. In this chapter I presented the findings from semi-structured interviews completed with 54 distinct actors, including the 24 stakeholder organisations from Chapter 3, and 30 farmers from the cases of England and Ontario. By analysing this combination of actors I was able to investigate the views of both farmers, who are ultimately responsible for the management of agricultural land, as well as the organisational stakeholders who affect the policy environment in which farmers operate. The results of this chapter demonstrated that farmers were often becoming 'accidental environmentalists' by undertaking pro-environmental activities for non-environmental reasons (i.e. Production, Business, Lifestyle, and Farm Health). I refer to these sets of interests as 'orientations' and find that they are nested together and form a frame, or

lens, through which options are internally analysed and decisions derived depending on their weighting and subsequent ordering within individual farmers. Through comparison, I found that these factors were common, albeit to varying degrees, in both case study regions. The results of this chapter contribute to a better understanding of the disconnect that has been observed between environmental attitudes and pro-environmental behaviour by considering the influence of farmers' non-environmental interests. In addition, this chapter also includes interesting findings relating to the ways in which representatives from stakeholder organisations interpret farmer motivations, and how this interpretation compares with farmers' own depiction of their motivations. Finally, the findings also demonstrate what farmers understand to be environmentally beneficial actions and how this interpretation might differ from what conservationists and academics might see as environmentally beneficial.

Chapter 5 What next after Brexit? Redesigning agri-environmental policy in England

Chapter 5 resulted from an unanticipated opportunity to investigate stakeholder preferences for post-Brexit agri-environmental policy that emerged over the course of the research. In this chapter, I investigate stakeholders' perspectives regarding the objectives, design, suitability, and effectiveness of agri-environmental policy in England. The results are drawn from semi-structured interviews with representatives from agricultural and environmental stakeholder organisations (12) supplemented with interviews with farmers (12). I found that stakeholders held different interpretations of the primary objectives of agri-environmental policy, and particularly agri-environmental schemes directed at farmers. Stakeholder organisations and farmers expressed a variety of views on the effectiveness of schemes with specific focus on recent policy changes (i.e. Countryside Stewardship (CS) and Greening). I also found that while farmers had more concerns than solutions for post-Brexit agri-environmental policy, they had particular concerns with the future of direct payments, expanding international trade, and a perception that a powerful environmental lobby will overshadow their interests. The results of this chapter present issues and principles that should be considered in a post-Brexit re-design of agri-environmental policy in England to ensure that this new suite of policies is suited to the needs and interests of stakeholders.

6.3 Critical reflections on methods

6.3.1 Reflections on the photograph elicitation exercise

During the interviews with stakeholder organisations I utilised a relatively standard approach to semi-structured interviewing with a flexible interview protocol. The interviews were driven by participants, with the researcher steering the conversation to cover each topic in the protocol, as well as to ensure enough consistency across the interviews for analysis. Embedded within this familiar approach to semi-structured interviewing, I also utilised a photo elicitation exercise to virtually draw participants into real-world landscapes in order to elicit their views on agri-environmental integration or separation (see Chapter 3 for details on this method).

I found that the combination of both of these techniques improved the research findings. I found that the use of pre-existing questions, even if they were not strictly adhered to, was familiar to participants and gave structure to the conversation. I felt that the familiarity of this approach put participants at ease, as opposed to a more novel and unfamiliar research method that may have deterred participation or impeded the rapport-building necessary to proceed with the interview, particularly amongst participants who were sometimes hesitant to discuss controversial subject matter.

Coinciding with this familiar method, the use of a photo elicitation exercise was found to be effective as a data-collection tool, as well as having practical benefits for the interview process itself. Photograph elicitation is commonly used in interviews pertaining to landscape research in order to virtually draw participants into real-world landscapes as well as allowing the researcher to elicit participants' conceptual and practical preferences (Arriaza, Cañas-Ortega, Cañas-Madueño, & Ruiz-Aviles, 2004; Howley, Donoghue, & Hynes, 2012; Kaltenborn & Bjerke, 2002; Wherrett, 2000). The results of the photo elicitation exercise demonstrated that participants held different interpretations of what an integrated or separated landscape looks like in practice as well as different views on the scale at which integration/separation should occur in the pursuit of a sustainable landscape. This was a valuable finding that would not have been apparent without the use of the photographs. Moreover, during the interviews, the photo elicitation exercise was well liked by participants, with multiple participants stating that they enjoyed the exercise. This also provided an opportunity to 'spice up' the interviews to add interest, and perhaps even some entertainment, for participants who might regularly participate in standard interviews.

While, overall, I found that the use of this tool improved the interviews with stakeholder organisations and allowed me to gain a deeper understanding of participants' preferences and interpretations with regard to agri-environmental land-use

it is valuable to critically reflect upon my experience in order to support future researchers utilising the tool. One particular area to reflect upon is the horizon at which photographs were taken and how this might affect the elicitation exercise. Harper (2002) argues that aerial photographs are best suited to 'break the frame' of farmers' normal day-to-day views of their farms. In this research I did not conduct a photograph elicitation exercise in the farmer interviews, however I found comparable findings to Harper within my interviews with stakeholder organisations. In my experience I found that Picture 1, which was not an aerial photograph, elicited slightly different responses from Pictures 2 through 4 which were aerial (see Figure 3-1).

I had intentionally chosen Picture 1 as an extreme example of a heavily altered landscape, as the image depicts a landscape that is completely agricultural, with no evidence of environmental features, which I intended to contrast with the other photographs that were more mixed. This image also seems to depict a healthy grain crop suggesting it is a successful agricultural operation. Overall I found the image to meet the needs of the research exercise where participants generally offered contrasting opinions, such as by commenting positively on the health and quality of the crop:

> "*I see what appears to be a good looking wheat field stretching to the horizon, from a production standpoint it looks like a wide open field which is very workable. I don't see steep slopes, I don't see watercourses, so it paints a very good picture from a production standpoint*." (ORG-ON-P06-OSCIA)

In contrast other participants expressed discomfort due to the lack of environmental features and the presumption that it was part of a large-scale, conventional, 'industrial', farming operation:

> "*Barren landscape, monoculture, no biodiversity, very poor landscape, lots of food production, bad balance ... Kind of what gives industrialised farming a bad name because it's got no relationship to nature at all*." (ORG-EN-P05a-Wilderness Foundation)

I also found that the angle of the image and the artistic quality of the photograph elicited some more emotional or cultural responses where some participants liked the image itself, regardless of what it represented, such as by calling it 'beautiful' or evoking attachment to a familiar agrarian cultural landscape:

> "*I love the open space and that's one of the things that Canadians love, that we have that open space and you always know that if you really want to get away from crowds you can, somewhere in this country. So there's the beauty of peace and quiet here*." (ORG-ON-P05-Food and Water First)

This latter evocation of emotional responses was unintended but interesting to observe.

Nevertheless, in future research I would agree with Harper (2002) and ensure each photograph uses the same aerial horizon. While it did not detract from the objectives of this research it was more difficult for participants to provide a detailed assessment of the wider landscape and the context of Picture 1. Some participants also commented on this challenge, either by imposing potentially undue criticism of the image and its landscape by assuming it is part of an anti-environmental operation or by defending the image, such as one participant who stated the following:

> "*maybe it's the perspective of the photo, but it doesn't show any boundary features, but it doesn't mean to say that there aren't any in that field, it's just because the picture doesn't capture any. ... so it doesn't necessarily mean to say that, that farmer is bad or that he is not maintaining or protecting the environment, it could be that actually just behind the photographer there's a fantastic hedge*." (ORG-EN-P04-NFU)

Future researchers discussing agri-environmental landscapes with stakeholders should take this into consideration since, while interesting for identifying potential underlying biases or agendas, these responses may distract participants from the original objectives of the exercise.

Within my research the photograph elicitation exercise was used as a secondary tool in order to further the conversation with participants and to understand both participants' conceptual and practical agri-environmental land-use preferences. However, in research intended to systematically evaluate stakeholders' landscape views and preferences in greater detail (for examples see Arriaza et al. (2004) and Wherrett (2000)) it would be essential to ensure all images use the same horizon as well as containing other characteristics that ensure their comparability such as landform variables, photograph and colour resolution, and image size (Wherrett, 2000).

6.3.2 Reflections on interview recruitment

As part of the research exercise with farmers I had multiple reflections and observations that may be beneficial for future research. During the recruitment of farmers in England and Ontario I made extensive use of social media, notably Twitter, to reach online farmer communities. This novel approach was very successful in reaching a large

number of potential participants[19], and generating interest in the research, but was ultimately unsuccessful as a recruitment tool with only two participants being recruited from this method. I would nonetheless encourage other researchers to attempt this method in the future, as it is a useful way to reach a large number of potential participants who may not usually be invited to participate in research projects. Upon reflection, I found that use of social media may be best suited to more passive research methods, such as surveys that farmers may complete on their own time without the need to schedule an interview with the researcher.

I also faced recruitment challenges in both cases, but for very different reasons. In England, numerous invitees declined to participate citing an excess of interview invitations and research studies seeking farmer participation. I was also advised, through discussions with representatives from the NFU, that farmers in England receive a huge number of invitations to take part in research. This was indeed a major challenge to my study, where recruitment of farmers in England took much longer compared with the Ontario case, and required many different angles (e.g. emails, newsletters, social media) to reach an adequately diverse sample.

In Ontario the challenge was much different. Here I found a great deal of interest in participating amongst the farmer population, however predominantly amongst those with small-scale, ecologically driven, or 'alternative' farm models. These participants generally expressed interest, even gratitude in some cases, for the invitation to participate and share their experience, often stating that they felt ignored within the agriculture community in Ontario. In contrast, it required much more time and effort to recruit larger, more conventionally oriented participants. Farm organisations were also much more reluctant to provide advice or assistance around recruitment, when compared to the English case. Interestingly, during the stakeholder organisation interviews, this divergence was also acknowledged by some participants, who described a segmented marketplace between those focused on sustainable practices, such as organic producers, and the mainstream producers who are focused on growth in size and scale and who "*just want to get in, and plant the crop, and get out*" (ORG-ON-P11-OMAFRA).

[19] Along with being able to track retweets (shares), likes, and replies the Twitter platform also includes statistics on Tweet activity including the number of times people saw the tweet (impressions) and the times people interacted with the tweet (engagements).

6.3.3 Reflections on case comparison and issues of language

In comparative research it is essential to acknowledge and address linguistic similarities and differences between cases in order to avoid cross-cultural misunderstandings (Lowe, 2012). This includes comparisons between cases with a common language, such as Ontario and England, which speak a very similar form of English. However, it has been argued that this common language may actually mask differences and meanings associated with the same terminology (Gkartzios & Shucksmith, 2015, p. 55). Indeed, over the course of this research I found that while Canadian-English and English-English utilise different terms, perhaps more importantly these dialects do have divergences in meaning amongst commonly used terms (Lowe, 2012).

A particularly important divergence for this research is that the North American concept of 'wilderness' and British concept of 'countryside' are distinctly different reflecting on different constructions of the relationship between society and nature (Lowe, 2012). Indeed, in North America 'wilderness' tends to refer to areas seemingly devoid of human influence and impact whereas in Britain the concept of 'countryside' includes landscapes clearly altered by humans (e.g. farmland) and rural communities (e.g. villages) alongside areas of 'natural' environment (Haigron, 2017).

As a clear example, the differing construction of society's relationship with nature is reflected in each case's different approach to creating 'national parks' with contrasting approaches to ownership, governance, and interpretations of appropriate land uses (Lowe, 2012). This common language but different understanding is important and is particularly addressed in the comparative policy analysis found in Chapter 2. In this chapter I discuss the policy discourse used and the common terms, but different meaning, surrounding the actors who utilise agricultural land (i.e. farmer, producer, steward) as well as the common language but different interpretation of the intention of 'national parks' and 'green belts'. I found that these different interpretations of similar language had parallels with different approaches to managing agricultural and environmental land-uses reflective of the land-sparing / land-sharing framework as well as seemingly being related to contrasting agricultural paradigms (i.e. productivism / post-productivism).

Another area of different use of common language pertains to the term 'rural policy', which was particularly relevant for the policy analysis in Chapter 2. England and Ontario have very different interpretations of what constitutes 'rural policy' which necessitated a broad consideration of agricultural, environmental, and other areas of policy relevant for managing competition for rural land. In Ontario, there is no explicit

'rural policy' and instead rural issues are handled by multiple areas of government. The approach tends to be more topic focused, such as agriculture, natural resources, and the environment having their own distinct ministries. Rural Affairs is housed within the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and tends to focus on rural communities, economic development, and other rural resident focused issues rather than broader land-use issues (e.g. agri-environmental competition) that tend to be handled by other ministries.

In England, while historically mostly associated with agricultural production, modern rural policy tends to be more multifunctional with a more comprehensive approach to rural issues / topics such as rural development, agriculture, and the natural environment (OECD, 2011; Wilson, 2001). This is particularly reflected in rural governance including the 2001 dissolution of the Ministry of Agriculture, Fisheries and Food (MAFF) and creation of the Department for Environment, Food and Rural Affairs (Defra) which "*provided an opportunity to bring policy on agriculture, the environment and rural affairs under one roof*" (OECD, 2011, p. 111). This is quite different from Ontario's approach to rural policy which tends to operate in 'silos' and where agricultural, environmental, and rural policies are largely distinct. Based on this different meaning behind the term 'rural policy' in England and Ontario I have avoided the use of the term instead finding the term 'agri-environmental policy' to be more effective for discussing competition for rural land between agricultural and environmental land-uses.

Moreover, during the interviews with stakeholder organisations and farmers different terminology was used, however I found it was easier to work with clearly different terms with similar meaning as opposed to similar terms with different meaning. As well, unlike in the policy analysis, during the interviews it was possible to probe participants' responses for explanation and clarity. Examples of distinct terms used during the interviews included 'catch crops', 'shooting', 'woodland', and 'schemes' which were used by English participants whereas participants in Ontario used comparable terms such as 'cover crops', 'hunting', 'wood lots' or 'forest', and 'programs'. In most cases these terms held identical meanings, however in other cases it was important to identify and discuss the nuance associated with different terms. For instance, 'shooting' of game birds was particularly important culturally to English farmers as well as having financial implications for some farmers who receive revenue by operating a 'shoot'. This is quite different from 'hunting' in Ontario where few farmers participated and where there was far less cultural or financial attachment to the activity. It was also important to understand and discuss the important difference between 'agri-environmental schemes' in England and 'agri-environmental programs' in Ontario as these operate very differently

in either case in terms of eligibility, financial compensation, participation levels, and objectives (see Chapter 5 for more discussion of this distinction).

6.3.4 Reflections on the use of Skype for online synchronous interviewing

As with all research tools, the use of Skype for conducting interviews comes with several benefits and drawbacks that are useful to reflect upon in order to support future researchers utilising the method. I used Skype to conduct online synchronous interviews with stakeholder organisations and farmers operating within the jurisdictions of England and Ontario. Like other researchers I found it to be an effective, efficient, and cost-effective method of reaching diverse and dispersed stakeholders that was convenient for both the researcher and participants (Deakin & Wakefield, 2013; Hanna, 2012; Janghorban, Roudsari, & Taghipour, 2014; Lo Iacono, Symonds, & Brown, 2016; Weller, 2017). However, also like other researchers, I found limitations with the tool that must be considered when deciding whether it is suitable for the research objectives.

In terms of benefits, I found that most participants were receptive to using Skype, either Skype-Skype with video or audio only, or Skype-Telephone. Participants seemed to find this to be convenient for themselves in terms of scheduling and logistics. Like Hanna (2012), I found it to be particularly useful for participants who may have difficulty scheduling or committing to an interview by providing them the opportunity to easily cancel and reschedule the interview if necessary without greatly inconveniencing either the researcher or participant. Similarly, I found that some participants were happy to participate immediately following the invitation and I received several responses such as "*sure, I can talk right now if you are free*", avoiding the need to schedule a time or arrange logistics altogether.

The use of Skype also dramatically enhanced my ability to engage with a dispersed research sample – essential for rural research – that would not have been possible were physical travel required for face-to-face interviews. This was particularly important for this comparative research study undertaken with a dispersed rural sample across two large areas that are themselves very far apart. Moreover, while rarely acknowledged in literature discussing online interviewing, this method also has the potential benefit of improving accessibility for some researchers who may have limitations or other responsibilities that impede travel or limit flexibility. For instance, this method is beneficial for researchers with carer responsibilities, physical limitations, and – as was my case – parallel employment outside their studies.

Using online interviews also offers a series of practical benefits that are useful to discuss. For instance, one benefit for conducting online interviews with farmers is the opportunity for farmers to participate in the interview (through the audio-only option) while still continuing farm work or driving farm vehicles. Were this option advertised it may be a means to increase participation by farmers during particularly busy periods, such as planting or harvesting, particularly when considering the increasing ubiquity of mobile phones, improvements in hands-free technology, and advancements in semi-autonomous farm vehicles (e.g. GPS aided steering).

On a similar practical note, I also found that rates for calls to mobile or land-lines using Skype were quite reasonable.[20] These practical logistical considerations can be particularly important for increasing the sample size of a research study with limited financial resources. A final practical benefit of using Skype was that the audio recordings were high quality which improved transcription accuracy. This has been identified by other researchers who noted the improved quality of Skype recordings over those from Dictaphones (Hanna, 2012).

While I found that the use of Skype was the correct choice for this research exercise it is important to acknowledge that it is not without drawbacks, some of which may make it unsuitable for other research projects. Importantly, in instances where video is not possible, or is declined by participants, audio-only interviews lose non-verbal cues such as facial expressions and body-language (Deakin & Wakefield, 2013; Seitz, 2015). Similarly, visual cues such as age, gender, and ethnicity may not be apparent (Deakin & Wakefield, 2013; O'Connor & Madge, 2017). This can be a challenge for certain research, though may be largely overcome through the use of video calling (O'Connor & Madge, 2017). While I did not find this to be an issue with my research findings, I did find this to be apparent in my own interviewing experience where I offered participants the option to participate in audio-only interviews where it suited their preferences or technological limitations. A specific drawback of audio-only calls for this research was the inability to see participants' farms in order to contextualise participant responses and include observation data.

A related drawback associated with online interviewing is the potential obstacle it poses for building rapport with participants, which is important for establishing trust and putting participants at ease in order to elicit candid responses and rich narrative as well as building a research relationship founded on respect (Weller, 2017). This has been identified as a particular challenge with audio-only interviews which lack the visual cues

[20] 2.2p / minute between the UK and Canada or £2.40 / month for unlimited minutes as of July 2018.

of face-to-face interviewing as well as the inability to construct a relaxed physical environment (O'Connor & Madge, 2017). When using online interviewing it may also be more difficult to build rapport and elicit detailed answers around sensitive or emotional topics (Seitz, 2015). However, researchers reflecting on their experience with online interviewing through video have found that, while requiring different techniques, it was possible to build rapport to a level comparable to face-to-face interviews (Deakin & Wakefield, 2013; Weller, 2017). Some methods for building rapport in online interviews that I utilised in my research included sharing personal information and self-disclosure (O'Connor & Madge, 2017) as well as engaging in informal conversations and small-talk prior to the interview along with maintaining "*mundane interactions such as the 'greetings' and 'leavings' that encase the interview*" (Weller, 2017, p. 623). Similar to Weller (2017), I also found that the physical absence of the researcher and invisibility of documents and recording equipment inherently put participants at ease when compared with face-to-face interviews.

Some researchers have found that the need to have the correct software and maintain a stable, high-speed interconnection can be a challenge for online interviewing (Hay-Gibson, 2009; O'Connor & Madge, 2017) and that "*some participants are excluded due to the need to have technological competence required to participate, obtain software and to maintain Internet connection for the duration of the discussion*" (Deakin & Wakefield, 2013, p. 605). This can be a particular challenge in rural research where internet speed and bandwidth limitations are likely to be more prominent. In my own research I avoided this challenge by offering participants the option of Skye-to-Telephone/Mobile interviews where it was their preference. However, as noted earlier, it is important to acknowledge the trade-offs inherent in audio-only interviews with the loss of visual cues and non-verbal observations.

A final potential drawback of Skype interviewing that is important for researchers to acknowledge is, what I call, the 'technology problem'. No matter how many times a researcher tests their system they must be prepared for the technology to fail. For instance, Hanna (2012) describes a faulty webcam requiring an interview to be rescheduled and both Deakin & Wakefield (2013) and Seitz (2015) discuss '*drop outs*' where video or audio connections froze or were lost. I experienced several 'technological glitches' that complicated what was usually a very simple and streamlined process, including being late to an interview because Windows and Skype demanded updates in order to function, an internet service outage, as well as freezing or lagging connections that occurred in the midst of multiple interviews. There is also potential for audio recordings to fail, or be lost/deleted, which I was lucky to avoid. Nevertheless, all forms

of interviewing have potential for technological or logistical obstacles and so this should not inherently deter researchers from using online synchronous interviews.

In sum, Deakin and Wakefield (2013) argue that "*the online interview should be treated as a viable option to the researcher rather than as an alternative or secondary choice when face-to-face interviews cannot be achieved*" and that online synchronous interviews should be considered equal to face-to-face interviews (Deakin & Wakefield, 2013, p. 604). Through my experience with this research project I would further argue that Skype, or other form of online synchronous interview, can actually be superior to face-to-face interviews in some research projects when recording quality, convenience – for researcher and participant - and resource savings are taken into consideration. I would encourage future researchers, and especially those engaging in research with a rural focus, to consider the benefits of online synchronous interviews even in cases where face-to-face interviewing would be possible.

6.4 Critical reflections on the land-sparing / land-sharing framework

The land-sparing / land-sharing framework was frequently used in this research to organise and contextualise the inductive research findings *ex post facto*. This framework has been most commonly applied in studies within the fields of conservation, ecology, and agronomy as well as being more recently used in economic research (Salles, Teillard, Tichit, & Zanella, 2017). Here I have attempted to use the framework in a qualitative, social science study exploring the preferences of stakeholders in agri-environmental land-use, which to my knowledge has not been previously attempted.

I found the framework to be a useful tool in this regard, as its structure, relative simplicity, and "*analytical elegance*" (Fischer et al., 2014, p. 155) allowed me to utilise it across multiple levels of analysis and within diverse contexts. However, it is not without its drawbacks, and while I found it to be a useful heuristic concept, in practice it was found to not accurately reflect the nuanced preferences of stakeholders in real-world land-use. In particular, previous authors have criticised the framework for presenting a strict dichotomy of a heavily segregated landscape, or one that is highly integrated, neither of which is desirable in practice (Bennett, 2017; Butsic & Kuemmerle, 2015; Kremen, 2015). I also found this to be partly true in my research: whilst useful for characterising the overall approach to land-use policy in England or Ontario (Chapter 2), I ultimately found in Chapter 3 that the dichotomous nature of the framework did not accurately reflect the more nuanced preferences of stakeholders. Nevertheless, I did find it to be a useful starting place for organising a large amount of inductive qualitative research from which to understand stakeholder preferences for agri-environmental land

allocation. This included contrasting the dichotomous positions of land-sparing / land-sharing in order to identify what stakeholders preferred, but also what they did not prefer (e.g. discomfort with the segregation of land-uses proposed by land-sparing).

Similarly, the framework has been also criticised for over-simplifying real-world landscapes, which often require heterogeneous approaches depending on context (Bennett, 2017; Fischer et al., 2017; Fischer et al., 2014; Grau, Kuemmerle, & Macchi, 2013; Kremen, 2015). Again, I also found this criticism to be partly true within my findings. In particular, within the interviews with stakeholder organisations it became clear that context was important and preferences shifted with the specific conditions of the area to be spared/shared. For instance, participants in England were often supportive of sharing areas of low agricultural capability (e.g. the uplands), but were more hesitant to support a sharing model in areas of high agricultural capability (e.g. East Anglia). Similarly, participants were more interested in creating and protecting large blocks of habitat (sparing) in more sensitive ecosystems.

Critics of the land-sparing / land-sharing framework also point to the inconsistent interpretation and application of scale (Fischer et al., 2014; Kremen, 2015; von Wehrden et al., 2014). I found scale to be a challenge in conversations about land-use preferences and ultimately found that stakeholder organisations held different assumptions about the scale at which agriculture and the environment should be integrated or separated. This was most apparent in the photo elicitation exercise (see Chapter 3), where it became clear that stakeholders held different ideas about what integration and separation looked like in practice, at which scale it was preferable, and what visually constitutes a 'sustainable landscape' regardless of their stated preferences.

The land-sparing / land-sharing framework has been also criticised for presenting agriculture and the environment as dualistic concepts and for neglecting or downplaying the co-benefits for agriculture and the environment from certain practices and land-uses (Brussaard et al., 2010; Kremen, 2015; Wittman et al., 2016). I found parallels to this critique in the interviews with stakeholder organisations and with farmers where some participants were uncomfortable with the idea of agriculture and the environment as being in opposition to one another. However, I also found that other participants did view the land-uses dualistically and did identify practices/land-uses as agricultural or as environmental, including being aware of embedded trade-offs resulting from pursuit of either objective. From this basis I believe the framework was useful for conceptualising the inherent views of some stakeholders, as well as drawing out instances where participants did not agree with the framework in principle, a finding that may not have been apparent in the absence of the framework.

Ultimately, though the framework has its flaws, I still found it to be a useful means for organising and drawing meaning from a large amount of qualitative data, derived from an exploratory, inductive research approach. Interestingly, while the approach has been widely used (and critiqued) in natural science research for being too conceptual and not accurately depicting the realities of biodiversity, species conservation, and agriculture, it is also its conceptual nature that makes it particularly useful as a tool for social science research. As I moved through the various levels of analysis from the policy landscape to farmer's motivations I found the framework to be less effective, however I did find it to be useful for analysing land-use policy as well as a helpful starting point for organising the preferences of stakeholder organisations. As a result, I would encourage future social science research to continue exploration of the usefulness of the framework within this field.

6.5 Integrative reflections and opportunities for future research

There are several avenues for future research stemming from my findings. In Chapter 2 I demonstrated that Ontario seems to lean more towards a productivist approach to agri-environmental policy, whereas the post-productivist / multifunctional agricultural paradigm seems to be more prevalent in England. Similarly, in Chapter 4, I found that farmers in Ontario held more attachment to productivism when compared to English farmers. This may suggest that if a post-productivist transition were to occur within Ontario's agri-environmental policy, farmers might shift away from an attachment to productivism, as they may be attached to productivism more for necessity than due to an inherent attachment to the paradigm. Future research exploring this topic might include an investigation as to whether years of multifunctional policies, including agri-environmental schemes and cross compliance, have nudged English farmers towards being more accepting of exchanging production for environmental services and whether we might expect the same for Ontario farmers were production more detached from farm financial sustainability.

As emphasised in Chapter 5, it will continue to be important to investigate potential changes to England's agri-environmental policy in a post-Brexit scenario and the effect of such changes on actors. I found that the Ontario case exemplifies that it is very difficult for farmers to undertake extensive pro-environmental activities in the absence of financial incentives or adequate compensation (see Chapter 4). The UK has multiple different paths to take in post-Brexit agri-environmental policy and it would seem from my preliminary findings (see Chapters 4 and 5) that more interest in international trade and free-market competition, coupled with reduced direct support to farmers, would

result in a significant reduction in farmers' ability to undertake on-farm pro-environmental activities. However, at this point there is too much uncertainty on this topic and further research on the effect of proposed changes on the ability of farmers to pursue pro-environmental activities will be necessary.

With regard to influencing farmer decision-making through public policy approaches, from what I have observed over the course of this research it seems likely that more financially oriented farmers / farming businesses will have a relatively predictable response to the financial incentives associated with agri-environmental schemes. In other words, they are likely to participate in schemes so long as it is financially optimal to do so. This makes this group relatively straightforward to influence, though also costly, which poses a challenge when the public sectors of many countries are looking to reduce their budgets. An alternative or supplemental approach arising from my observations is that while farmers do need to be financially sustainable, beyond that point they may be encouraged and enabled to adopt environmentally beneficial decisions through non-pecuniary influences. Indeed, as discussed in Chapter 4, while some farmers may primarily still seek to maximise profit, others will seek a minimum financial threshold from which to pursue other interests (e.g. lifestyle, recreation, personal/family well-being). Therefore it will be valuable for future research to continue to explore non-pecuniary influences that encourage farmers to adopt pro-environmental activities, such as those discussed in Chapter 4. In parallel, it would be valuable for future research to continue to investigate creative methods whereby various public and non-governmental actors may encourage or enable farmers to adopt pro-environmental activities without the need to dramatically increase expenditure.

6.6 Significance for policy development

This thesis also provides valuable applied findings with policy significance. The findings contribute to a better understanding of the similarities and differences between groups of actors, operating at different levels within a jurisdiction, in order to identify ways to encourage sustainable land management that also aligns with their interests and preferences. Through this multi-layered approach, a comparison of England and Ontario supports the identification of transferable policy approaches that would correspond with the preferences of stakeholders. It seems that in Ontario many stakeholders would accept or even welcome a move towards a more land-sharing style approach, at both the landscape and farm-scale, perhaps suggesting aspects of England's approach to agri-environmental land-use policy would be transferable. Nevertheless, in Chapter 3 I also found that more nuanced differences amongst stakeholder organisation preferences

means that no approach is likely to be unanimously accepted and that an English-style land-sharing approach would be welcomed by some, but not others (e.g. production-focused farm organisations).

Moreover, I have found in Chapter 4 that attachment to productivism would impede a land-sharing model by deterring some Ontario farmers from adopting more pro-environmental decisions, particularly where they result in production losses. In Ontario, English-style financial incentives or (expanded) compensation could support farmers to make environmentally beneficial on-farm decisions, and may shift the productivist attachment, were financial sustainability more detached from production. Indeed, it is difficult to predict whether stakeholder organisations and farmers with productivist views are attached to the paradigm due to identity or financial necessity, with the latter suggesting that if farmer support mechanisms were to change, productivist views may change in tandem.

In England it appears that there is little support for an Ontario-style land-sparing approach, aside from some stakeholders who would welcome it in order to support 'rewilding' efforts. Indeed, more stakeholders, including both agricultural and environmental organisations, seemed to have internalised or accepted a land-sharing and post-productivist (multifunctional) approach to agri-environmental land-use. Moreover, it seems likely that a move to a more market-oriented approach to farmer support, similar to that of Ontario, would result in a reduced uptake of pro-environmental decisions, though perhaps with less reduction than expected due to other non-pecuniary influences encouraging farmers to maintain pro-environmental activities (see Chapter 4). Nevertheless, as I have shown with the case of Ontario, if England were to reduce farmer support, it would make the land-sharing approach more difficult to maintain, as farmers would be required to push production limits in-order to maintain financial sustainability. One partial solution that I identified in the interviews with stakeholder organisations and farmers was that benefits to agricultural production from pro-environmental activities were being promoted much more in the Ontario context when compared to the English case. This could be an opportunity to increase uptake of pro-environmental activities amongst English farmers, particularly if financial incentives are reduced, such as might occur in post-EU agri-environmental policy.

With regard to influencing farmer decision-making more generally, the findings from Chapter 4 suggest that the multiple internal factors and diversity among farmers' *frames / lens*es creates a challenge for consistent policy design and application. Indeed, this makes policy intervention quite complicated as numerous ever-fluctuating internal and external factors sever the direct link between farmers' attitudes and outcomes, resulting in unpredictability in on-farm decisions. Nevertheless, to encourage and enable

pro-environmental decisions it is possible to target the internal orientations identified in Chapter 4 through incentives, or disincentives, in order to create conditions whereby farmers' internal evaluations will result in pro-environmental decisions. This includes encouraging farmers to become 'accidental environmentalists' by undertaking activities with environmentally beneficial spin-offs for non-environmental reasons. Examples of interventions will include encouraging farmers towards pro-environmental decisions by targeting their Business Orientation through regulation, Financial Orientation through incentive schemes, and could even include appealing to the Lifestyle Orientation by encouraging recreation and field sports. Other non-pecuniary options could also include acknowledging the influence of peers and leveraging the opportunity for influential individuals within the farm community to champion pro-environmental decisions (so-called "*famous farmers*" according to participating Farmer-ON-P03). Ideally a suite of policies intended to influence farmers' decision-making towards pro-environmental activities would target each orientation simultaneously in order to reach farmers with differing prioritisations and maximise the effectiveness of interventions and outreach.

6.7 Overall conclusions and contributions to knowledge

This thesis represents a substantial original contribution to knowledge in multiple ways and across a diversity of subject areas such as rural studies, comparative policy, land-use studies, and farmer behaviour and psychology.

Firstly, the thesis provides a valuable contribution to land-use studies with a novel application of the land-sparing / land-sharing theoretical framework in social science research. This has been rarely attempted in previous research and so this thesis contributes to filling a gap in the literature by exploring the effectiveness of this theoretical concept in social science studies.

Secondly, in addition to this novel application, this thesis also presents a novel exploration of the land sparing / land sharing and productivist / post-productivist frameworks in the Canadian context which, to my knowledge, has not been applied in previous research. This is a valuable contribution to knowledge in that it helps to understand the transferability of the land sparing / land sharing and productivist / post-productivist frameworks in different contexts as well as the appropriateness of the frameworks for explaining phenomena within the Canadian context. This should help to spur further research utilising these frameworks in Canada in order to better determine their usefulness for Canadian researchers, as well as test their robustness as theoretical frameworks.

In addition, the use of a comparative approach between the cases of Ontario and England is novel within the academic literature. In particular, the comparison of these cases was found to be an effective way to draw out findings that may have been overlooked in the analysis of a single case. Indeed, the findings from each level of analysis were improved through comparison with an alternative context. For instance, within agri-environmental land-use policy, Ontario's leanings towards land-sparing and productivism, and correspondingly England's leanings towards land-sharing and post-productivism / multifunctionality would not have been apparent without comparison to the other, alternative, approach. This method allowed me to overcome pre-existing assumptions and increase my awareness of alternative approaches / conditions that may not have been considered without the comparison of cases.

Moreover, in Chapter 4 I present a new data-driven framework to explain farmers' decision making when it comes to the adoption of pro-environmental activities on their farms. The results of this research with stakeholders provides a new appreciation of the non-environmental influences on farmers' pro-environmental decision-making that helps to explain the disconnect between environmental attitudes and actions that has been identified in previous research (Nebel, Brick, Lantz, & Trenholm, 2017; Thompson, Reimer, & Prokopy, 2015). It also provides a novel conceptual and empirical contribution to our understanding of farmer decision-making as it relates to the uptake of environmentally beneficial land-use decisions. Furthermore, particularly with comparison to the English context, there is a stark lack of research on farmer motivations and decision-making in Canada, particularly with regard to adoption of pro-environmental activities. This research helps to begin addressing this important gap in the literature and it is my hope that this contribution will help to stimulate further research into this under-researched area within the Canadian context.

From a methodological perspective, other important contributions include integrated reflections on the methods used across the various chapters including commentary on their usefulness as a research tool and practical advice for future research. This included the use of a photograph elicitation exercise embedded in my interview protocol used during my semi-structured interviews with stakeholder organisations, as well as reflections on the use of social media as a recruitment tool, and my mixed experiences with recruitment through Twitter.

Finally, in this thesis I also present an early look at stakeholders' preferences for post-Brexit agri-environmental policy in Chapter 5. While not anticipated in the research design, outside influences made it an important point of conversation during the interviews with farmers. In this chapter I propose principles, and identify issues raised by stakeholders, that should be considered in a post-Brexit redesign of agri-environmental

policy in England. This includes stakeholders' issues with current policies and how they might be improved, as well as identifying specific concerns that farmers have with future agri-environmental policy. This unanticipated output adds additional value to the research findings and makes a useful contribution to this essential, and timely, research topic.

6.8 References

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Appendix 1: Summary of theoretical concepts

In what follows I have included a summary of the theoretical concepts of land-sparing / land-sharing and productivism / post-productivism which are commonly discussed at various points in the thesis.

Land-Sharing and Land-Sparing

Land-sharing and *land-sparing* are two approaches to balancing agricultural production and environmental protection[21] in the spaces where these land-uses compete. These two approaches represent opposing endpoints on the "*Land Allocation Continuum*" with land-sparing on one end of the spectrum and land-sharing on the other (Wentworth, 2012). Fundamentally, the key question underpinning this debate is "*the spatial scale at which farming and nature should be integrated*" (Wentworth, 2012, p. 1). The land-sparing / land-sharing framework may also be described as a partial trade-off analysis and "*essentially an economic [framework] because it is interested in the efficient allocation of a scarce resource, namely land*" (Fischer et al., 2014, p. 150).

The land-sparing and land-sharing framework has been widely used in natural science research in conservation and ecological sciences. However, much less has been written on the applicability of the framework in social science research and the usefulness of the framework in such areas as governance, policy, and stakeholder preferences (Firbank, 2005; Jiren, Dorresteijn, Schultner, & Fischer, 2017; Mascia et al., 2003). Indeed, Renwick & Schellhorn argue that:

> "*social values are unaccounted for in the LSLS [land sparing / land sharing] framework. … Despite the relevance of this observation, to date no data on these social elements have so far been incorporated to the LSLS framework. Incorporating social values is essential to achieving successful conservation actions, whether land sparing or sharing is identified as being the best management option*." (Renwick & Schellhorn, 2016, p. 123)

Therefore, it is essential to understand the applicability of the land-sparing and land-sharing framework from both positivist (natural science) and constructivist (social

[21] Sources in the literature often describe the debate as being between agricultural production and biodiversity or wildlife habitat. Broader terminology has been intentionally used here to reflect the range of environmental benefits associated with land left out of agricultural production such as carbon capture (Durán, Duffy, & Gaston, 2014).

science) approaches to ensure that the land-use approach deemed environmentally and agriculturally optimal is also accepted by the stakeholders who will ultimately implement/adopt it. At the same time, it is essential to understand whether stakeholders prefer a land-use approach that positivist research may ascertain is sub-optimal or contrary for achieving both agricultural and environmental objectives. This leaves a clear gap in the literature that this research identifies and contributes to filling.

Land-Sparing

Land-sparing can be succinctly described as "*separating land for conservation from land for crops, with high-yield farming facilitating the protection of remaining natural habitats from agricultural expansion*" (Phalan, Onial, Balmford, & Green, 2011, p. 1289). This approach rests on a traditional view that agricultural land-use and environmental conservation are incompatible and should therefore be separated land-uses (Durán et al., 2014). Similarly, land-sparing is also associated with a worldview in which agriculture and 'wild-nature' are separate and sometimes suggests that agricultural production is not part of the natural environment (Fischer et al., 2014).

The origins of land-sparing are often attributed to Norman Borlaug, the architect of the Green Revolution, with those in favour arguing that by allowing for a dedicated and more intensive use of agricultural land, production objectives may be attained on a smaller land base (Kremen, 2015; Salles, Teillard, Tichit, & Zanella, 2017). This would allow for other areas to be dedicated (spared) for environmental purposes and allow for larger, higher quality habitats (Green, Cornell, Scharlemann, & Balmford, 2005; Wentworth, 2012). Land-sparing has also been described as "*fundamental to reducing emissions from de-forestation and forest degradation*" (Phalan et al., 2011, p. 1289). Concerns about land-sparing have arisen due to the anticipated conversion pressure placed on 'spared' land arising from human needs or economic potential (Wentworth, 2012). The approach has also been criticised for neglecting the benefits to agricultural production from the presence of biodiversity (Tscharntke et al., 2012). Land-sparing has been rarely supported by conservationists and is more commonly supported by agriculturalists, presumably because it represents a more traditional approach to farming and concentration on production in agricultural spaces (Green et al., 2005; Wentworth, 2012).

Land-Sharing

Land-sharing, sometimes used interchangeably with the term *wildlife-friendly farming*, can be described as "*integrating biodiversity conservation and food production on the same land*" (Phalan et al., 2011, p. 1289) the result of which means that "*less land is set aside specifically for conservation, but less intensive production techniques are used to maintain some biodiversity throughout agricultural land*" (Fischer et al., 2014, p. 149). The land-sharing approach promotes the creation of heterogeneous agricultural landscapes and so may be associated with the concept of *multifunctionality* (Tscharntke et al., 2012; Wentworth, 2012). Land-sharing also shares many similarities with other concepts such as *ecoagriculture* (Brussaard et al., 2010) and *agroecology* (Perfecto & Vandermeer, 2010).

A land-sharing system attempts to integrate natural areas into the farm itself thereby encouraging a context where agriculture and environmental areas co-exist in the same space. In practice, land-sharing includes the intentional set aside of land on farms for environmental purposes and thereby assumes that the land has agricultural potential otherwise intervention would be unnecessary. Examples of these set-aside areas include woodlots, wetlands or hedgerows that may otherwise be brought into production.

Land-sharing is often, though not always, associated with decreased agricultural yields as described as follows: "*it is frequently observed that the biodiversity value of farmland declines with increasing yield, which suggests that maintaining high wild-life interest on farmland often requires foregoing opportunities for high crop yields*" (Green et al., 2005, p. 551). This poses a challenge for land-sharing in the face of population growth and may suggest that more 'intact' natural landscapes would need to be brought into production, through extensification, in order to achieve necessary production levels (Garnett & Godfray, 2012). However, this has been challenged by authors such as Tscharntke et al., 2012 who emphasise the ecosystem services for agriculture provided by the natural environment. Moreover, land-sharing has been associated with a high costs of implementation, commonly through direct payments to landowners in order to achieve environmental objectives or financial compensation for lost production (Garnett & Godfray, 2012; Green et al., 2005).

Productivism and Post-Productivism

A secondary conceptual framework frequently referenced throughout this thesis is productivism / post-productivism. The terms *productivism* and *post-productivism* have been used to describe two different paradigms of agricultural production and their associated ideologies. Fundamentally, the ideological views expressed by *productivism* and *post-productivism* represent a differing view on the purpose of agricultural land. These differing views can be expected to influence, if not directly result, in different approaches to land-use policy and the management of agricultural land.

The concepts of *productivism* and *post-productivism* are generally considered to be UK-centric and have been derived from the UK experience (Wilson, 2001). Nevertheless, the concept has been applied outside the UK to other developed countries such as Australia, New Zealand and the United States (Wilson, 2007). Discussions surrounding productivism and post-productivism typically describe it as a transition, however this concept has been challenged in the literature and a re-emergence of productivist discourse surrounding food security raises questions about the temporal nature of the concept (Lobley & Winter, 2009; Wilson, 2007; Wilson & Burton, 2015). Regardless of whether a transition is occurring, or has occurred, we can still acknowledge the ideological views of productivism and post-productivism and for the purposes of this research, the ideological stance associated with the purpose of arable land.

Productivism

Productivism can be conceptualised as "*a commitment to an intensive, industrially driven and expansionist agriculture with state support based primarily on output and increased productivity*" (Lowe, Murdoch, Marsden, Munton, & Flynn, 1993, p. 221). As the name implies, a central tenet of productivism is the maximisation of agricultural production with the founding principle being the maximisation of food production (Wilson, 2007). Indeed, the productivist era is generally associated with the end of the Second World War and is deeply rooted in memories of wartime hardships and food shortages (Wilson, 2001). These memories prompted several decades of dramatic increases in productivity and modernisation. The mind-set of the era is described as agricultural exceptionalism whereby agriculture is seen as having a "*pre-emptive claim on the use of rural land*" and where a strong belief exists that farmers are the best protectors of the countryside and the greatest threats to the countryside are "*perceived to be urban and industrial development – not agriculture itself*" (Wilson, 2001, p. 79). This agricultural exceptionalism has important parallels with North American

agrarianism and the agrarian ideal deeply rooted in the political culture of the United States and Canada (Bunce, 1998, p. 240).

Within a productivist system of agriculture the role of the farmer is the provider of agricultural products. As Burton (2004) describes, under this model the degree to which a farmer is considered a 'good farmer' is measured in terms of their profits and their ability to increase the production of commodities on their farm. Indeed, Burton's study provides an actor's perspective that can help succinctly describe the goals of a productivist system which attempts to "*get three heads of corn where there used to be two, or three blades of grass where there used to be two*" (Burton, 2004, p. 203). This farming identity also has important implications for environmental conservation, including efforts associated with land-sharing, whereby farmers may need to sacrifice productivist achievements (e.g. increased yields) in order to meet environmental objectives.

Ultimately the productivist landscape is one in which production maximisation is encouraged, impediments to production (e.g. woodlots, hedgerows) would be discouraged on farms, and agricultural land is protected from incompatible land uses for the explicit purpose of production (Wilson & Burton, 2015). The primary approach to agricultural spaces would be to encourage agricultural production as the primary, or only, purpose of arable land emphasising a fundamental belief that 'farms are for farming'.

Post-Productivism / multifunctionality[22]

Post-productivism is most commonly described as being a transition from productivism and has been conceptualised originally within the UK and European context. The productivist paradigm is considered to have dominated from the end of the Second World War until the 1980's where agricultural policy shifted from "*encouragement of food and farm products to one that also attempts to deliver other environmental and consumer-based benefits*" (Marsden, 1995, p. 289).[23] From this period the UK and Western Europe experienced decreasing food prices enabling what Marsden (2013) calls the 'post-productivist compromise' "*whereby environmental protection, amenity pressures, as well as food production demands on agricultural land,*

[22] The term *post-productivism* is contested in the literature and particularly the notion that it is a transition from productivism. Alternative terms have been proposed by some authors, including multifunctionality and *non-productivism* (Wilson, 2007), where others have defended the use of the term (Mather, Hill, & Nijnik, 2006). This distinction is less relevant for this research as each term recognises a shift from a purely production based view of arable land to one that provides a multitude of services.

[23] Note that Ilbery and Bowler (1998) argue that post-productivism has not replaced productivism and rather the two may co-exist.

could be assuaged by increasingly cheap imports of both temperate and exotic foodstuffs from outside the EU" (Marsden, 2013, p. 123). Marsden argues that this context enabled the export and distancing of environmental and social externalities therefore allowing for countryside policies and protections that create a both a "*culture of plenty and pastoralism*" (Marsden, 2013, p. 123).

Within a post-productivist context the role of the farmer and/or landowner is expanded beyond the traditional role and instead "*should be rewarded as both a producer and an environmental steward*" (Brussaard et al., 2010, p. 37). The result is a changing farming occupation from the grower of food, or other agricultural products, to becoming "*shopkeepers, leisure providers, foresters, nature conservers and public custodians of the countryside*" (Burton, 2004, p. 195).

In research specifically on post-productivism and rural land-use Mather, et al (2006) describe post-productivism in a similar way as Marsden (1995), defining it as a shift "*away from policy concerned with increasing material production, and towards the provision of environmental services*" (Mather et al., 2006, p. 443). Therefore, from a spatial perspective, post-productivist land-use is characterised by a diverse and multifunctional landscape comprised of both agricultural production and other environmental or social benefits derived from the land. Within the ecosystem services framework this can be viewed as expanding the purpose of agricultural land from a focus on provisioning services to also provide supporting, regulating, and cultural services. In many ways the post-productivist ideology represents a fundamental change in the beliefs surrounding the purpose of agricultural land. This mind-set is manifested in policies that encourage farmers and/or landowners to achieve non-production objectives that include maintaining the cultural landscape and, probably most notably, working towards environmental objectives often at the expense of agricultural productivity.

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Appendix 2: Interview protocols for interviews with stakeholder organisations

Interview Guide for England

Q1: What is the mandate of your organisation?

Agriculture and the Environment

Q2: What do you see as the main environmental challenges resulting from agricultural production?

Q3: What do you think is the best way to increase agricultural production without harming the environment? For instance, is it intensification of the existing agricultural land base or extensification, more land in production but farmed less intensively

Q4: What are your thoughts on the conversion of agricultural land for the purpose of environmental conservation?

Q5: Is it best to have agriculture and environmental features co-exist on farms or is it better to separate these land uses into their own, dedicated, spaces?

Role of Farmers

Q6: What are some reasons that motivate farmers to take up, or carry on, farming?

Q7: In general, do you see farmers as being good environmental stewards? Can the roles of food producer and environmental steward come into conflict?

Q8: What do you think motivates farmers to maintain environmental features on their farms?

Current Policy Context

Q9: Do you think food production and environmental conservation are fairly balanced in the current policy context? Does one take precedence over the other?

Q10: Do you have any ideas for improving land use policies in England to better balance agricultural and environmental land uses?

Landscape

Q11: Looking at the attached pictures, what is your immediate impression of this landscape? (pictures to be provided at interview)

Interview Guide for Ontario

Q1: What is the mandate of your organisation?

Agriculture and the Environment

Q2: What do you see as the main environmental challenges resulting from agricultural production?

Q3: What do you think is the best way to increase agricultural production without harming the environment? For instance, is it intensification of the existing agricultural land base or extensification, more land in production but farmed less intensively

Q4: What are your thoughts on the reforestation/'rewilding'/restoration of arable land?

Q5: Is it best to have agriculture and environmental features co-exist on farms or is it better to separate these land uses into their own, dedicated, spaces?

Role of Farmers

Q6: What do you think motivates farmers to take up, or carry on, farming?

Q7: In general, do you see farmers as being good environmental stewards? Can the roles of food producer and environmental steward come into conflict?

Q8: What do you think motivates farmers to maintain environmental features on their farms?

Current Policy Context

Q9: Do you think food production and environmental conservation are fairly balanced in the current policy context? Does one take precedence over the other?

Q10: Do you have any ideas for improving land use policies in Ontario to better balance agricultural and environmental land uses?

Landscape

Q11: Looking at the attached pictures, what is your immediate impression of this landscape? (pictures to be provided at interview)

Appendix 3: Interview protocols for interviews with farmers

Interview Guide for England

Introduction

Q1: Could you tell me about your farming operation?

Land Management

Q2: Have you taken any actions on your farm specifically to protect or enhance the natural environment?

Q3: Do you have environmental features (e.g. woodlot, wetland, hedgerows, grassland/meadow) or areas intentionally left out of production on your farm?

Q4: Have you recently brought any new land into production on your farm?

Experience with Policy

Q5: What do you think of current agricultural policy in England? What about environmental policy?

Q6: With the UK transitioning out of the European Union, what changes would you like to see from the current design of the Common Agricultural Policy?

Q7: Have you participated in any agri-environmental schemes?

Q8: In some agri-environmental schemes extra consideration is given to applications that include multiple farms. Would you consider cooperating with your neighbouring farms to submit a joint funding application?

Interview Guide for Ontario

Introduction

Q1: Could you tell me about your farming operation?

Land Management

Q2: Have you taken any actions on your farm specifically to protect or enhance the natural environment?

Q3: Do you have environmental features (e.g. woodlot, wetland, hedgerows, grassland/meadow) or areas intentionally left out of production on your farm?

Q4: Have you recently brought any new land into production on your farm?

Experience with Policy

Q5: What do you think of current agricultural policy in Ontario? What about environmental policy?

Q6: Have you participated in any agri-environmental programs?

Q7: In some agri-environmental programs in England extra consideration is given to applications that include multiple farms. Would you consider cooperating with your neighbouring farms to submit a joint funding application?

Appendix 4: Notes from the thematic analysis of land us policy documentation

Supplemental Materials for Chapter 2: Sparing or sharing? Differing approaches to managing agricultural and environmental spaces in England and Ontario

The following table provides notes from the thematic analysis of land us policy documentation from Ontario, Canada and England in the United Kingdom. The initial findings, including major excerpts directly from the texts, are provided in the *Findings (Data Items)* column and the themes that emerged from these findings are provided in the *Findings (Themes)* column.

Documentation from Ontario and Emergent Themes

Document	Description/Purpose	Findings (Data Items)	Findings (Themes)
Planning Policy			
Planning Act, 1990	Sets out the ground rules for land use planning in Ontario and describes how land uses may be controlled, and who may control them.	S.2(a) sets out matters of provincial interest including: • Protection of ecological systems, including natural areas, features and functions • Protection of the agricultural resources of the Province	• Value of both agricultural and environmental spaces • Agriculture and environment as separate land uses
Provincial Policy Statement (PPS), 2014	The primary land use policy document in Ontario, which sets out the province's objectives and expectations for planning across all municipalities.	• Includes policies to protect both *prime agricultural land* s.2.3 and *natural heritage* s2.1 • s.2.3.1 prime agricultural areas "shall be protected for long-term use for agriculture" • s.2.1.5 "development and site alteration shall not be permitted" in significant natural features • s.2.1.9 "nothing in policy 2.1 is intended to limit the ability of agricultural uses to continue" • Use of term *significant* when describing the protection of natural features • Permitted uses on prime agricultural land are restricted to those that provide economic benefit or support to the farm operation, either directly related to agricultural production or by providing supplemental income without inhibiting the farming operation from continuing • Different policies apply in different *Ecoregions* and different classes of agricultural land (more	• Value of both agricultural and environmental spaces • Threat of development and urbanisation • Agriculture and environment as separate land uses • Protection of 'significant' environmental features • Protection of 'agricultural land' • Agriculture viewed from an economic lens • Recognition of vast, diverse geography

		protection of agricultural land and environmental features in south of province where most prime agricultural land is located and where conversion pressure is high) • Some derivation of the word *agriculture* is used 90 times in 50 pages	
Greenbelt Plan, 2005	The Greenbelt Plan identifies where urbanization should not occur within the Golden Horseshoe area of central Ontario in order to provide permanent protection to the agricultural land base and the ecological features and functions occurring on this landscape.	• s.1.2.1 vision of the Greenbelt Plan, 2005 states that it intends to "protect against the loss and fragmentation of the agricultural land base and support agriculture as the predominant land use" • Protects the agricultural system (s.3.1) and natural system (s.3.2) within the Greater Toronto Area • Goal of ensuring "*expansive areas*" where either agriculture or natural areas "*predominate*" (s.3.1.1) • s.3.2.2.1 "existing and new agricultural, agricultural-related and secondary uses and normal farm practices are permitted" in the natural heritage system • s.3.2.2.2 New buildings or structures for agriculture, agricultural-related and secondary uses are not subject to all Natural Heritage System policies	• Value of both agricultural and environmental spaces • Threat of development and urbanisation • Agriculture and environment as separate land uses • Each protected in large, dedicated blocks • Limited support for environmental features on farms • Protection of 'significant' environmental features • Agriculture viewed from an economic lens • Agriculture has pre-eminent claim to arable land • Protection of 'agricultural land'
Oak Ridges Moraine Conservation Plan, 2002	The Oak Ridges Moraine Conservation Plan is an ecologically based plan established by the Government of Ontario to provide land use and resource management direction for the 190,000 hectares of land and water within the Moraine (north of Toronto).	• Predominantly an environmental conservation plan – notably protection from urban expansion and development – with the overall objective to "*maintain, and where possible improve or restore, the ecological integrity of the Plan Area*" • Protection of "ecological and hydrological integrity" of the area and particularly the protection of Key natural heritage features	• Value of both agricultural and environmental spaces • Threat of development and urbanisation • Agriculture and environment as separate land uses • Protection of 'significant' environmental features • Protection of 'agricultural land'

		• Attempts to limit agriculture in the *Natural Core Areas* restricting it to the *Countryside Areas* (where agricultural land is protected)	• Agriculture permitted but deterred from some environmental spaces
Niagara Escarpment Plan, 2005	The Niagara Escarpment is a significant, 725 kilometre long landform in southern Ontario that was designated an UNESCO World Biosphere Reserve in 1990. The Niagara Escarpment Plan provides direction on the use or management of land within the *Plan Area* as well as criteria for development of permitted uses.	• Intended to protect a major landform, and its vicinity, explicitly for the purpose of natural environment conservation, recreation and scenery - *Compatible farming* is permitted • *S. 1.3 Escarpment Natural Area*s are intended to maintain natural features in relatively undisturbed areas – existing agricultural operations are permitted but new agriculture deterred • Environmental and agricultural spaces may co-exist in some designations where significant landscape modification has already taken place (e.g. s.1.4 *Escarpment Protection Area,* s.1.5 *Escarpment Rural Area*) • Additional provisions for the protection of specific features: s.2.6 New Development Affecting Water Resources, s.2.7 New Development Within Wooded Areas, s.2.8 Wildlife Habitat • S.10 Agriculture: “The objective is to encourage agricultural uses in agricultural areas, especially in prime agricultural and specialty crop areas, to protect such areas, to permit uses that are compatible with farming and to encourage accessory uses that directly support continued agricultural use.” • S.10 includes limitations on building new structures for agricultural uses • Part 3 The Niagara Escarpment Parks and Open Space System: opportunities for public access and recreation – use of Parks and Reserves	• Value of both agricultural and environmental spaces • Threat of development and urbanisation • Agriculture and environment as separate land uses (may co-exist in some designations yet are discussed separately) • Protection of 'significant' environmental features • Protection of 'agricultural land' • Agriculture has pre-eminent claim to arable land (prime agricultural land and speciality crop areas) • Agriculture permitted but deterred from some environmental spaces

Minimum Distance Separation (MDS)	The Minimum Distance Separation (MDS) Formulae is a land use planning tool that determines a recommended separation distance between a livestock barn or manure storage and another land use. The objective of MDS is to prevent land use conflicts and minimize nuisance complaints from odour.	• Indirectly protects land from development by creating a radius around livestock facilities within which development is not permitted	• Threat of development and urbanisation • Protection of large, contiguous blocks where agriculture predominates
Growth Plan for Northern Ontario, 2011	The Growth Plan for Northern Ontario, 2011 is a high-level document intended to guide provincial decision-making and investment. The overall aim is to strengthen the economy of Northern Ontario.	• 2.2.2 Agriculture is listed as a sector in which to focus economic development • 2.3.3 The Provincial government will make efforts to expand agricultural production in the north • 6.1 “Climate change will also result in new economic opportunities, such as longer growing seasons for agricultural producers”	• Seeking new agricultural land • Agriculture viewed from an economic lens
MMAH Mandate Letter (2014)	Mandate letters are written by the Premier to each Cabinet Minister, outlining the key priorities for their ministry. This letter pertains to the Ministry of Municipal Affairs and Housing (MMAH).	• Protect the environment and agricultural lands is listed as an overall priority for the Ministry • Working to protect prime agricultural lands is listed as one priority for the Ministry’s mandate – particularly as part of the review of the four provincial plans	• Agriculture and environment as separate land uses • Protection of 'agricultural land'
Agricultural Policy			
Growing Forward 2	Growing Forward 2 (GF2) is a five-year (2013-2018) policy framework for Canada's agricultural and agri-food sector. GF2 is a $3 billion dollar investment by federal, provincial and territorial (FPT) governments and the foundation for government agricultural programs and services.	• “GF2 programs will focus on innovation, competitiveness and market development to ensure Canadian producers and processors have the tools and resources they need to continue to innovate and capitalize on emerging market opportunities.” Source: Growing Forward 2 webpage • Use of term *producer* throughout materials • Use of application based, cost-shared programs to achieve agri-environmental objectives	• Production Support • Voluntary, cost-sharing agri-environmental programs • Agri-environmental programs should not decrease production • Recognition of trading agreements and export development interests

	Due to the size and nature of the policy framework a wide range of materials fall under this heading. Reviewed materials include: • Webpages from the Federal and Ontario governments as well as Ontario's delivery partner (Agricorp). • The original FPT framework agreement - Growing Forward 2: A Federal - Provincial – Territorial Framework Agreement On Agriculture, Agri-Food And Agri-Based Products Policy • Program documentation from Agricorp • Information from the Ontario Soil and Crop Improvement Association (OSCIA) on the Canada-Ontario Environmental Farm Plan and the Canada-Ontario Farm Stewardship Program (COFSP)	• FPT Agreement pg. 15, Operational Principles, including: "programs shall be in conformity with Canada's international trading obligations and should minimize countervail risk" and "will not distort production or other business decisions that would otherwise be based on market considerations" • Interest in reducing barriers to international trade • Production Insurance plan from Agricorp "You are expected to use good farm management practices at all times. If you use practices that contribute to a production loss, you may lose some or all of your insurance coverage" • Clear emphasis on increasing production levels throughout documentation – such as the *good farm management practices* and *reasonable yields* described in Agricorp's *Contract of Insurance – Terms and Conditions*	• Agriculture viewed from an economic lens • Discourse: 'Producer' Identifier
The Farming and Food Production Protection Act (FFPPA), 1998	The Farming and Food Production Protection Act (FFPPA), 1998 provides protections to farmers by limiting nuisance complaints and liability arising from nuisance complaints. The Act also limits the ability of municipal by-laws to restrict normal farm practices.	• "It is desirable to conserve, protect and encourage the development and improvement of agricultural lands for the production of food, fibre and other agricultural or horticultural products." • Protection of *Normal Farm Practices* – but does not provide an outright exemption from environmental legislation	• Importance of agricultural protection • Agriculture directly, and exclusively, linked to production • Protection of 'agricultural land'

Environmental Farm Plan (EFP) program	Environmental Farm Plans (EFP) are assessments voluntarily prepared by farm families to increase their environmental awareness in up to 23 different areas on their farm. Through the EFP local workshop process, farmers will highlight their farm's environmental strengths identify areas of environmental concern, and set realistic action plans with time tables to improve environmental conditions. Environmental cost-share programs are available to assist in implementing projects. The Ontario Soil and Crop Improvement Association (OSCIA) delvers the EFP program on the behalf of the government. The program includes 23 infosheets on the areas eligible for implementation support. This research concentrated on Infosheet #22 (Wetlands and Wildlife Ponds) and Infosheet #23 (Woodlands and Wildlife) as these deal with environmental features.	Actions resulting from EFPs are at the discretion of farmers. Therefore it relies on environmentally conscientious farmers or actions that are expected to result in increased profits. This seems to be in part driven by efforts to allow farmers to select projects that do not interfere with their operations. Infosheet #22: • Guidance on natural buffer strips between wetlands and croplands • Encourages landowners to leave forested wetlands undisturbed – use appropriate harvesting practices • Avoid contamination and excessive water takings • Tone is a mix of environmental and monetary benefits to establishing buffers (e.g. “Lowlands (treed swamps) offer potential for timber, fuel wood, income in-kind, as well as important environmental and wildlife benefits.”) Infosheet #23: • Encourages landowners to develop a forest management plan • Minimize the impact of harvesting and livestock access • Monitor invasive species • Implement buffers and shelterbelts • Tone is a mix of environmental and monetary benefits to establishing buffers	• On-farm environmental features are encouraged, but limited regulation and incentives provided • Voluntary, cost-sharing agri-environmental programs • Agri-environmental programs not looking to decrease production • Stay within the realm of farming and less into environmental stewardship
Species at Risk Farm Incentive Program (SARFIP)	The Species at Risk Farm Incentive Program (SARFIP) supports farm businesses interested in completing habitat creation and production based projects on the agricultural landscape. Using Best Management Practices	• Provides application based, cost-shared funding to support 18 best management practices in four categories (Forest, Grassland, Wildlife, and Water) • Includes a mix of environmental features (e.g. reforestation, buffer strips) and practices (e.g. rotational grazing)	• Importance of environmental conservation • Recognition of vast, diverse geography • Voluntary, cost-sharing agri-environmental programs

	(BMPs) identified through the Environmental Farm Plan (EFP) workbook, farmers can implement practices that are beneficial for species listed as at-risk in Ontario. Cost-share funding is available at four levels (40%, 50%, 60% and 80%) to implement BMPs	• Funding is cost-shared to a maximum of CDN$20,000 for a 'Level 4' project • Increased funding support in southern portion of province when compared to northern portion	
OMAFRA Mandate Letter (2014)	Mandate letters are written by the Premier to each Cabinet Minister, outlining the key priorities for their ministry. This letter pertains to the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).	• "I ask that you support the Premier's Agri-Food Challenge, which calls on the province's agri-food industry to double its growth rate and create 120,000 jobs by the year 2020." • "Creating and implementing the new Farms Forever Program. The program will help preserve the productive capacity of agricultural land close to major urban centres" • "Working with other ministers and partners to explore opportunities to develop the agricultural sector in the North."	• Threat of urbanisation and development • Seeking new agricultural land • Agriculture primarily economic development • Protection of 'agricultural land' • Agriculture and environment separate ministries
Local Food Act, 2013	The Local Food Act, 2013 is intended to promote the purchase of local food in Ontario as well as allowing for targets to be set for local food purchasing in public institutions. This review included the original bill along with the News Release.	• Discusses local food predominantly in economic terms (e.g. market development) • Tone of bill/news release suggests that local food should be part of an absolute increase in production, not a shift from export oriented production • First line of act: "Ontario has…a highly productive agricultural land base" • News Release: "build Ontario's economy by making more local food available in markets, schools, cafeterias, grocery stores and restaurants. This will create jobs and expand the province's agri-food sector."	• Agriculture primarily economic development • Promoting the increase of agricultural production

		• News Release: “If we increase demand to homegrown food, we will create jobs and boost the agri-food sector’s contributions to our economy”	
Environmental Policy			
Natural Heritage Reference Manual (2010)	The Natural Heritage Reference Manual provide technical guidance for implementing the natural heritage policies of the Provincial Policy Statement. The most relevant section of the manual for this research is S.2.3.2 Agricultural Uses. At the time of this research the manual had not yet been updated for the PPS, 2014. However, it is not anticipated that the reviewed section will change dramatically given the minimal changes in the agriculture-environment relationship between PPS 2005 and PPS 2014.	• Pg. 10 “Prime agriculture designations limit non-agricultural uses and thus benefit natural heritage protection and other interests. Protecting prime agricultural areas not only supports agriculture and farming (food, fibre and fuel), but also enables Ontario’s farms to contribute societal benefits such as clean air, clean water, groundwater recharge, wildlife and wildlife habitats.” • Pg. 10: “Farmers acting as stewards of the land understand the benefits of natural heritage features and areas as demonstrated by initiatives such as implementing environmental farm plans and best management practices.” • Pg. 10: “Farmers’ voluntary stewardship efforts are supported by technical assistance and cost-share funding provided by groups such as stewardship councils; conservation authorities; Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA); Agriculture and Agri-Food Canada; and other agencies;. As a result, farmers will be better able to manage their agricultural operations to protect natural heritage resources.” • Pg 10: “Planning for agricultural areas and uses does not preclude the need to plan for the long-term protection of natural features and areas.” • Pg 11: “Wetland evaluation and identification are not meant to limit existing agricultural uses.” • Tone: careful not to interfere with farming operations. Very positive tone when discussing the stewardship interests of farmers and appears	• Value of both agricultural and environmental spaces • Agriculture and environment as separate land uses • Protection of 'significant' environmental features • Protection of 'agricultural land' • On-farm environmental features are encouraged, but limited regulation and incentives provided • Voluntary, cost-sharing agri-environmental programs are sufficient • Avoid interference with agricultural operations • Agriculture has pre-eminent claim to arable land

		willing to trust that farmers will maintain environmental features based on altruism or cost-shared programs	
Provincial Parks and Conservation Reserves Act, 2006	The purpose of the act is stated as follows: "The purpose of this Act is to permanently protect a system of provincial parks and conservation reserves that includes ecosystems that are representative of all of Ontario's natural regions, protects provincially significant elements of Ontario's natural and cultural heritage, maintains biodiversity and provides opportunities for compatible, ecologically sustainable recreation."	• Focus of the act is protecting spaces for the purpose of maintaining ecological integrity: s.3.1 "Maintenance of ecological integrity shall be the first priority and the restoration of ecological integrity shall be considered" • Includes other objectives including recreation/ economic development, public education and scientific research • Appropriate land uses are considered to be those that are ecologically sustainable, including "*traditional outdoor heritage activities and associated economic benefits*" (s.2.2) • S.5.2: "Ecological integrity refers to a condition in which biotic and abiotic components of ecosystems and the composition and abundance of native species and biological communities are characteristic of their natural regions and rates of change and ecosystem processes are unimpeded." • S.16 deals with prohibited uses. Agriculture is not explicitly named as a prohibited use though other sections suggest that it would not be an appropriate land use in Provincial Parks and Conservation Reserves • Agriculture/farming is never addressed in the Act	• Value of spaces explicitly for environmental conservation • Dedicated spaces for environmental conservation • Agriculture and environment as separate land uses: Each protected in large, dedicated blocks
Endangered Species Act, 2007	The Endangered Species Act, 2007 provides for a science based assessment of species status and protection of those species determined to be threatened. The act protects both species and their habitats.	• S.9.1.a "No person shall kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species" • S.10.1.a "No person shall damage or destroy the habitat of a species that is listed on the Species at	• Protection of environmental features and wildlife based on presence, not based on predetermined 'significance' • Agriculture has pre-eminent claim to arable land (within Reg. 242/08)

	Ontario Regulation 242/08 provides important exemptions applicable to specific species. Most notably for this research, it provides exemptions for agriculture with regard to the Bobolink and Eastern Meadowlark (grassland birds).	Risk in Ontario List as an endangered or threatened species" ONTARIO REGULATION 242/08 • 4.1 (1) Clause 9 (1) (a) of the Act does not apply to a person who kills, harms or harasses a bobolink or an eastern meadowlark while carrying out an agricultural operation. • (3) Subsection 10 (1) of the Act does not apply to a person who damages or destroys the habitat of a bobolink or an eastern meadowlark while carrying out an agricultural operation if the area of habitat damaged or destroyed remains suitable for an agricultural operation.	
MNRF Mandate Letter (2014)	Mandate letters are written by the Premier to each Cabinet Minister, outlining the key priorities for their ministry. This letter pertains to the Minister of Natural Resources and Forestry (MNRF).	• "You will continue to work with other ministers and partners to advance measures aimed at further strengthening and protecting Ontario's biodiversity." • "Working with other ministers, municipalities and partners to conduct a review of Ontario's broader wetland strategy. Your goal is to strengthen wetland policies and stop the net loss of wetlands." • "Implementing the Endangered Species Act. I ask that you continue to implement the act in a way that protects and promotes the recovery of species at risk in Ontario." • Overall, mostly vague requests with the exception of no net loss of wetlands.	• Protection of 'significant' environmental features • Agricultural and environmental spaces under different ministry mandates • Some priorities at odds with OMAFRA priorities (e.g. protect wetlands, implement endangered species legislation, yet increase production)

Documentation from England and Emergent Themes

Document	Description/Purpose	Findings (Data Items)	Findings (Themes)
Planning Policy[24]			
Town and Country Planning Act, 1990	Consolidated previous planning legislation and gets out the regulation of development.	• s. 55.2(b) – agriculture and the use of buildings for agricultural purposes are not considered to be development	None identified
Planning and Compulsory Purchase Act, 2004	Addresses development control, compulsory purchase and the application of the Planning Acts to Crown land.	• s.99.3(1A) – "But a local authority must not exercise the power under paragraph (a) of subsection (1) unless they think that the development, redevelopment improvement is likely to contribute to the achievement of any one or more of the following objects— (c) the promotion or improvement of the environmental well-being of their area."	None identified
Planning Act, 2008	Sets out the framework for the planning process for nationally significant infrastructure projects and provides for the community infrastructure levy.	Important background material but no specific agricultural or environmental themes identified	None identified
National Planning Policy Framework (NPPF)	The National Planning Policy Framework (NPPF) sets out the government's planning policies for England and how these are expected to be applied by local planning authorities.	• Value of the natural environment – but not agriculture – emphasised in Ministerial foreword: "Our natural environment is essential to our wellbeing, and it can be better looked after than it has been. Habitats that have been degraded can be restored. Species that have been isolated can be reconnected. Green Belt land that has	• Agriculture and environment are rarely differentiated • Agriculture, environment and other uses combined as 'open space' • Agriculture exists equally, or even less so, alongside

[24] The following resource provides a useful summary of the planning system in England: Cave, S., Rehfisch, A., Smith, L., & Winter, G. (2013). Comparison of the planning systems in the four UK countries: Inter-Parliamentary Research and Information Network (IPRIN).

		been depleted of diversity can be refilled by nature – and opened to people to experience it, to the benefit of body and soul." • S.7 "There are three dimensions to sustainable development: economic, social and environmental." • S.8 "These roles should not be undertaken in isolation, because they are mutually dependent. Economic growth can secure higher social and environmental standards, and well-designed buildings and places can improve the lives of people and communities. Therefore, to achieve sustainable development, economic, social and environmental gains should be sought jointly and simultaneously through the planning system. The planning system should play an active role in guiding development to sustainable solutions." - Unclear under which dimension agriculture would fit • S.9 "Pursuing sustainable development involves seeking positive improvements in the quality of the built, natural and historic environment, as well as in people's quality of life, including (but not limited to): moving from a net loss of bio-diversity to achieving net gains for nature" • Core planning principles, S.17: "contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of	other rural and environmental purposes • Protection of 'open space' and 'countryside • Within the balance of agriculture and environment, leaning seems to be towards environmental conservation • Urban containment (through Green Belts)

		lesser environmental value, where consistent with other policies in this Framework"; "promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions (such as for wildlife, recreation, flood risk mitigation, carbon storage, or food production)" • S.28: "Planning policies should support economic growth in rural areas in order to create jobs and prosperity by taking a positive approach to sustainable new development. To promote a strong rural economy, local and neighbourhood plans should: promote the development and diversification of agricultural and other land-based rural businesses" • Part 9: Protecting Green Belt Land – s.79: "The Government attaches great importance to Green Belts. The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open; the essential characteristics of Green Belts are their openness and their permanence." • Researcher observation: Part 9 deals less with what land uses should exist in Green Belts and rather focuses on what land uses should not exist (e.g. development) • Part 11: *Conserving and enhancing the natural environment* – addresses agricultural land and the natural environment	

		• S.109 includes protection for quality soils and valued environmental features – also includes recognition of the wider benefits of ecosystem services • S.112: “Local planning authorities should take into account the economic and other benefits of the best and most versatile agricultural land. Where significant development of agricultural land is demonstrated to be necessary, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality.” • S.115: “Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty. The conservation of wildlife and cultural heritage are important considerations in all these areas, and should be given great weight in National Parks and the Broads.” – protection of cultural and scenic landscapes aside from production or intrinsic environmental value • S.117 - specifically addresses the need to ensure biodiversity is protected at a landscape-scale • Researcher observation: agricultural land and environmental conservation are rarely separated in the NPPF. • Terminology: *open space* is used to capture a range of uses that are not	

		development; any variation of the term *agriculture* is only used 6 times in the 49 pages prior to the glossary • S.143: agricultural land should be restored following mineral extraction	
Planning Practice Guidance (8) Natural Environment	Provides guidance on the application of planning policy within the theme area of natural environment	• Paragraph 001: "One of the core principles in the National Planning Policy Framework is that planning should recognise the intrinsic character and beauty of the countryside." • Paragraph 007: "The National Planning Policy Framework is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution." • Paragraph 8: Local Planning Authorities "should consider the opportunities that individual development proposals may provide to enhance biodiversity and contribute to wildlife and habitat connectivity in the wider area" – agriculture is not considered development under the Town and Country Planning Act • Paragraph 26: "The National Planning Policy Framework expects local planning authorities to take into account the economic and other benefits of the best and most versatile agricultural land." – High quality agricultural land should be protected from development – does not address competition with	• Agriculture exists alongside other rural and environmental purposes – promotion of a range of ecosystem services • Value of landscape beyond production, biodiversity or other tangible benefits (e.g. cultural landscape and aesthetics) • Planning should not only minimise harm to nature but actively work to enhance the natural environment – biodiversity embedded across decision-making • Agriculture and environment are rarely addressed separately

		natural spaces – notes economic value of agriculture but not exclusively • There is no separate guidance document dedicated to agricultural land	
Agricultural Policy			
Common Agricultural Policy (CAP) • Pillar 1 (direct support payments) and Pillar 2 (rural development)	The Common Agricultural Policy (CAP) is the main agricultural policy of the European Union and is the framework for implementing a variety of subsidies and other financial program. The current iteration of the CAP is the 2014-2020 program. The CAP is fundamentally separated into two *Pillars*, Pillar 1 being direct support payments to farmers and Pillar 2 being more broad rural development. A range of documents pertain to the CAP within the EU and UK. Key sources include: • UK Government, Common Agricultural Policy Reform website, Link • European Commission, Agriculture and Rural Development website, Link Note: during the time this research was being completed the CAP was being reformed and transitioned to a new program. This review focused on the 2014-2020 CAP reform while drawing on previous documentation only when it was felt to be contextually useful.	• Decoupling: Pillar 1 of the CAP provides payment to farmers, through the Basic Payment Scheme (BPS), so long as they follow standards of good agricultural and environmental condition (GAECs) – financial support is not linked to increased production • Depicts farmers as 'managers of the countryside' or stewards rather than as producers: "Farmers manage the countryside for the benefit of us all. They supply public goods – the most important of which is the good care and maintenance of our soils, our landscapes and our biodiversity" Source • Increased production is not encouraged as part of direct payments to farmers – instead farmers are paid to provide a range of ecosystems services – in some ways the CAP pays farmers to reduce production levels for such benefits as environmental stewardship	• Decoupling - support for diverse objectives not exclusively production • Direct payments not linked to increased production

CAP Cross Compliance: • Statutory Management Requirements (SMRs) • Good agricultural and environmental condition (GAEC) standards	In order to receive direct payments, farmers/landowners must comply with a range of cross-compliance requirements. Cross compliance is made up of 'Statutory Management Requirements' (SMRs) and 'Good Agricultural and Environmental Conditions' (GAECs). Primary documents include: • "The guide to cross compliance in England" • "The new Common Agricultural Policy schemes in England: August 2014 update Including 'Greening: how it works in practice'"	• 'Statutory Management Requirements' (SMRs) and 'Good Agricultural and Environmental Conditions' – long list that include several requirements that will limit, or reduce, production levels (e.g. GAEC 7a: protection of boundary features, SMR2 Wild birds protection, SMR3 habitat and species protection) • *Greening* is a new cross-compliance mechanism introduced in the CAP reform. Greening includes rules on permanent grassland, crop diversification and Ecological Focus Areas (EFAs). • EFAs are of particular relevance for this research. If a farmer has more than 15 hectares of arable land, they will need 'Ecological Focus Areas' on their arable land. • "EFAs need to be equivalent to at least 5% of the total arable land declared on the BPS application." Pg. 28 - August Update 2014 • EFAs will include land intentionally left, or in other cases transitioned, for environmental purposes	• Environmental features required through cross-compliance • Priority of environmental stewardship – acceptance, if not intentionally, decrease production • Some existing agricultural land transitioned into environmental stewardship

Environmental Policy			
Hedgerows Regulations, 1997	The Hedgerows Regulations, 1997, protects important hedgerows in England and Wales through the planning process.	• The regulation prevents the removal of hedgerows on agricultural land, without proper approval from the local planning authority • Schedule 1: Hedgerows are valued for Archaeology and history as well as wildlife and landscape	• Regulations restrict removal of environmental features on agricultural land
Wildlife and Countryside Act, 1981	The Wildlife and Countryside Act, 1981 is the principal legislation for the protection of wildlife in England.	• The act provides protection to wild birds, their nests, and their eggs – some exceptions are provided for agriculture such as 4.1(a), 4.3(c), 5.4A • The act provides protection to (certain) wild animals (prevention of killing, injuring or taking wild animals) – some exceptions are provided for agriculture such as 10.1(a), 10.4, and 11.6 • The act provides protection to certain wild plans and restricts introduction of new species • S.28 permits Natural England to designate Sites of special scientific interest • S.42 (2) restricts agricultural operations in National Parks including restricting the conversion of moor or heath into agricultural land	• Protection of wildlife on-farms • Agricultural expansion discouraged (in some areas)
Countryside and Rights of Way Act, 2000	The Countryside and Rights of Way Act 2000, provides for public access on foot to certain types of land, amends the law relating to public rights of way, increases measures for the management and protection for Sites of Special Scientific Interest (SSSI) and	• S.74 – duty of Government departments to have regard for conserving biological diversity and publish a list of organisms and habitat that are of principal importance	• Protection of wildlife and environmental features across a wide landscape (including on-farms) • Establish recreational trails on private land –

	strengthens wildlife enforcement legislation, and provides for better management of Areas of Outstanding Natural Beauty (AONB). Part 3: Nature Conservation and Wildlife Protection and Part 4: Areas of Outstanding Natural Beauty are most relevant to this research.	• S.77 – clarification on the protection of Ramsar sites / wetlands • S.82,83 – clarification on the designation of AONB's • Schedule 9: Sites of special scientific interest – added powers for the protection of Sites of special scientific interest which protect areas with significant flora, fauna, or geological or physiographical features • Schedule 12: Amendments to the Wildlife and Countryside Act, 1981 – strengthens the protection of wildlife under the act with particular protections for threatened species	may limit or inconvenience agricultural operations
Natural Environment and Rural Communities Act, 2006	The Natural Environment and Rural Communities Act, 2006 addresses a range of issues relating to the natural environment including biodiversity, pesticides, the protection of birds and invasive species.	• S. 40.1: Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity. • S.43: limits the use of pesticides harmful to wildlife • S.99: land used for agriculture may be considered an area of natural beauty	• Protection of wildlife and environmental features across a wide landscape • Limits the use of pesticides for the purpose of environmental protection – may sacrifice production levels to protect the environment • Agriculture permitted as a prevailing use in 'environmental' landscapes
The Natural Choice: securing the value of nature – Natural Environment White Paper, 2011	*The Natural Choice: securing the value of nature* is a whitepaper published in 2011 which outlines the government's vision for the natural environment. The paper places an emphasis on a systems approach to achieving a range of ecosystem services. It also emphasis that a landscape-scale approach	• Includes the intrinsic value of environment as well as the ecosystem services it provides to humans • Farmed land is included within the definition of the *natural environment*	• Agriculture and environment are addressed together • Recognition of geographic/historic differences

	should be taken rather than addressing land use objectives on an individual basis. The document includes numerous commitments that have since been built into other policies/legislation.	• "In England our natural environment is the result of thousands of years of interaction between people and nature." Pg. 7 – geographic/contextual difference where agriculture and nature are difficult to differentiate • S.1.10: "Society expects the environment to provide multiple benefits. A growing global population, for example, increases pressure on food production. But food increases must be achieved sustainably in order to protect the ecosystem services (such as pollination and the water cycle) on which food production relies. An increase in the production of energy crops is also necessary to address dangerous climate change; more woodland cover is required for carbon storage and climate regulation." • S2.11 "Making Space for Nature emphasised the need to restore natural networks across the country, working at a range of geographical scales from local networks of small urban parks and green spaces, to major schemes operating over thousands of hectares. There is a growing consensus among conservationists and land managers that integrated action at a 'landscape scale' is often the best way to achieve multiple benefits." • S.2.45-2.52 addresses agricultural land – "Food security is a long-term challenge; farming needs to be supported in building capacity for	• Decoupling - support for diverse objectives not exclusively production • Some existing agricultural land transitioned into environmental spaces (e.g. afforestation) • Agri-environment programs include both voluntary and cross-compliance measures • New features encouraged through incentive schemes • Agriculture exists alongside other rural and environmental purposes • Agriculture should provide environmental benefits, even if it reduces production levels • Integration of agriculture and environment at a wide, landscape scale

		sustainable production both in the UK and globally. However, the food chain has major impacts on climate change, biodiversity and the wider environment, which require management" • S.2.46: "One of the major continuing challenges is to increase food production while improving environmental outcomes… We need a flourishing natural environment and a competitive, resilient farming and food industry to contribute to global food security. We acknowledge that potential tensions exist between improving the environment and increasing food production, and this requires all interested parties to work together" – clear emphasis on improving environmental performance on farms • S.2.48: "Land managers are often best-placed to identify their own local environmental priorities. The Government is supporting the industry-led Campaign for the Farmed Environment and the Greenhouse Gas Action Plan. Should the goals of the campaign not be achieved, or if progress on the action plan is insufficient, government intervention will be considered instead." – mix of voluntary and regulatory measures • S.2.53-2.56 addresses afforestation of previously deforested landscape, including those used for agriculture • S4.2 emphasises the educational value of farms	

		• S.5.19 “Our priorities for influencing the EU include: achieving competitive agriculture, fisheries and food sectors which use and protect natural resources in a sustainable way and meet the needs of consumers” • S.5.20 – expresses a view that CAP funding should be shifted away from direct payments towards achieving ‘environmental public goods’ under Pillar 2	
Biodiversity 2020	Biodiversity 2020 provides a comprehensive picture of how England will implementing its international and EU commitments. The strategy builds on the Natural Environment White Paper sets out the strategic direction for biodiversity policy until 2020 on land (including rivers and lakes) and at sea.	• S.14: “Effectively establishing coherent and resilient ecological networks on land and at sea requires a shift in emphasis, away from piecemeal conservation actions and towards a more effective, more integrated, landscape-scale approach.” – emphasis on integrating conservation with other land uses • S.20: “Agriculture – We will improve the delivery of environmental outcomes from agricultural land management practices, whilst increasing food production by, for example, reviewing how we use advice and incentives, and how we use agri-environment schemes.” • Pg. 13: “Ecological networks are considered to be an effective means to conserve ecosystems and wildlife in environments, such as England, that have become fragmented by human activities. Some work on ecological restoration is already underway, but we need to extend this approach much	• Protection of wildlife and habitat across a wide landscape (including on farms) • Integration of agriculture and environment at a wide, landscape scale • Some existing agricultural land transitioned into environmental spaces (e.g. habitat restoration) • Recognition of geographic/historic context

		more widely" – recognition of a long history of human impact on the environment as well as an emphasis on restoration • Pg. 19: encourage new, and larger, priority habitats • Pg.25: "Over 70% of England is farmed and therefore agricultural land management practices are one of the most important influences on our biodiversity and ecosystem services." • Pg.25: "Farmers and land managers play a vital role, not only as food suppliers, but also as the stewards of our countryside." • Pg. 25 "Expenditure in a significantly smaller CAP Budget should tackle the key objectives of encouraging a competitive, sustainable EU agriculture sector, reducing reliance on subsidies and focusing resources on the provision of environmental public goods." - CAP funding should be shifted away from direct payments towards achieving 'environmental public goods' under Pillar 2	
English national parks and the broads: UK government vision and circular, 2010	The purpose of this circular is to provide updated policy guidance on the English National Parks and the Broads ('the Parks'). It sets out a vision for the English National Parks and the Broads for 2030. The circular also provides guidance on the National Parks and Access to the Countryside	• S.2.6: "The 1949 Act defines the National Park purposes as being to conserve and enhance natural beauty, wildlife and cultural heritage and to promote opportunities for the understanding and enjoyment of the special qualities of the National Parks by the public"	• Agriculture permitted as a prevailing use in 'environmental' landscapes • Recognition of geographic/historic context – farming not

	Act 1949 – therefore, this legislation was not reviewed separately.	• The vision contained within the circular includes the following statement: “By 2030 English National Parks and the Broads will be places where: There are thriving, living, working landscapes notable for their natural beauty and cultural heritage. They inspire visitors and local communities to live within environmental limits and to tackle climate change. The wide-range of services they provide (from clean water to sustainable food) are in good condition and valued by society.” – this emphasises that farming is an important component of the National Parks in England • S.4.1A(20) “The Government continues to regard National Park designation (together with that for Areas of Outstanding Natural Beauty (‘AONBs’)) as conferring the highest status of protection as far as landscape and natural beauty is concerned. The Parks represent an important contribution to the cultural and natural heritage of the nation. The Parks are living and working landscapes and over the centuries their natural beauty has been influenced by human activity such as farming and land management activities.” • S.4.3(56-57) recognise the value of agriculture within the Parks and encourages sustainable increases in resilience and productivity – also	necessarily separate from nature

		encourages participation in agri-environmental schemes	
English Woodland Grant Scheme (EWGS)	The English Woodland Grant Scheme (EWGS) is a funding program which offers grants to farmers and other rural landowners to increase benefits from existing woodlands and invests in creating new woodlands. The scheme is composed of a series of grants including: Woodland Planning Grant, Woodland Assessment Grant, Woodland Regeneration Grant, Woodland Improvement Grant, Woodland Management Grant as well as the Woodland Creation Grant. Note: The EWGS has recently been replaced with the Countryside Stewardship scheme as part of the CAP reform. While the details have changed, the basic premise of the EWGS has been transitioned to the new program.	• The EWGS is comprised of a series of payments that aim to maintain, improve, regenerate and create woodlands – notably on farms • The Woodland Creation Grant provides financial incentive for the creation of new woodlands. • According to the EWGS summary: "Payment rates are £1800/ha Broadleaf, £1200/ha Conifer and £700/ha Special Broadleaves. An Additional Contribution of £2000 will be paid for all applications that meet national or regional priorities. Farm Woodland Payments (FWP) can be paid on top of WCG to compensate for the loss of agricultural income as a result of creating woodland on agricultural land. They are payable for up to 15 years and farmers can continue to claim Single Farm Payments as well."	• New environmental features encouraged through incentive schemes • Some existing agricultural land transitioned into environmental spaces (e.g. afforestation)
Environmental Stewardship Scheme	Environmental Stewardship is a land management scheme that provides funding to farmers and other land managers in England to deliver effective environmental management on your land. There are 3 levels to the scheme: • Entry Level Stewardship (ELS) – includes Uplands ELS (UELS): simple and effective land management agreements with priority options • Organic Entry Level Stewardship (OELS) – includes Uplands OELS:	• The Environmental Stewardship Scheme provides financial incentives for farmers to improve or conserve the natural environment on their farms • The scheme includes a multitude of options for achieving environmental objectives on farm, depending on the level. For instance, under Entry Level Stewardship options include hedgerow management, protection of in-field trees, and planting wild bird mixture.	• Voluntary agri-environment scheme – high proportion of costs • Priority of environmental stewardship – acceptance, if not intentionally, decrease production • Farmers framed as land stewards – encouraged to go well beyond the realm of farming

	organic and organic/conventional mixed farming agreements • Higher Level Stewardship (HLS): more complex types of management and agreements tailored to local circumstances Key documents include: • Look after your land with Environmental Stewardship (NE290) • Environmental Stewardship: funding to farmers for environmental land management Note: The Environmental Stewardship Scheme has recently been replaced with the Countryside Stewardship scheme as part of the CAP reform. While the details have changed, the basic premise of the Environmental Stewardship Scheme has been transitioned to the new program.	• Under the Higher Level Stewardship option a very wide range of options are funded, often at 100% of cost. Examples include stonewall restoration, fencing, planting fruit trees, wildlife boxes, and gates. • Of particular note is that many of the options are unrelated to increases in production, such as windbreaks that reduce soil erosion, and instead actively remove arable land from agriculture. This emphasises that the ELS scheme is focused on the intrinsic value of the environment, even where it reduces production. • Moreover, many of the funding options go beyond the realm of agriculture and into environmental stewardship – such as wildlife boxes, badger gates, otter holts. These go well beyond encouraging farmers to avoid harm to the environment through farming practices/land management decisions but actually encourage them to become stewards themselves.	• New environmental features encouraged through incentive schemes

Appendix 5: Agricultural and Agri-food Sector Information for England and Ontario

Supplemental information for Chapter 2: Sparing or sharing? Differing approaches to managing agricultural and environmental spaces in England and Ontario

There is additional agricultural information that is important to consider in order to frame this comparison, though it is also important to note that due to differing definitions and collection methods, these figures are not directly comparable between cases. In terms of total agricultural area, England has a total *Utilised Agricultural area* of 8.9 million hectares and a *Croppable area* of 4.8 million hectares (Defra, 2015a). Ontario's total farm area is 5.13 million hectares with a total cropland of 3.6 million hectares (Kulasekera, 2012). Main crops by area in England are wheat, barley, and oilseed rape, whereas in Ontario main crops by area are soybeans, hay and fodder crops, grain corn, and wheat (Defra, 2015a; Kulasekera, 2012). While specific crops differ, we see a similar focus on grains and oilseeds suitable to a temperate climate.

Table A.1: Agricultural Statistics for England and Ontario

	England	**Ontario**
Total agricultural area	8.9 million ha	5.13 million ha
Total cropland	4.8 million ha	3.6 million ha
Primary crops by land area	wheat, barley, oilseed rape	soybeans, hay and fodder crops, grain corn, wheat
Number of farms	102,893	51,950
Average farm size	87.8 ha	98.7 ha
Sources: Defra, Farming Statistics: Final Land Use, Livestock Populations and Agricultural Workforce - England; Numbers of commercial holdings and land areas / livestock numbers by size group: England at 1 June 2015; OMAFRA, Ontario Farm Data, Census of Agriculture, 1996, 2001, 2006 and 2011		

In terms of economic contribution from agriculture, total income from farming in England was £4,197 million in 2014, accounting for 78% of the value of total income from farming in the UK (Office for National Statistics, 2015). In Ontario, primary crop and animal production contributed $4,163 million, in chained 2007 Canadian dollars (approx. £2,236 million), to the provincial GDP as of 2013 (Staciwa, 2015). While important industries, neither contributes a large proportion to the total GDP of either jurisdiction. In terms of imports and exports, the UK (England specific figures not available) imported £39,555 million in food, drink and animal feed in 2014 and exported £18,881 million worth

(Office for National Statistics, 2015). In 2013, Ontario exported $4.05 billion CDN (approx. £2.18 billion) and imported $5.39 billion CDN (approx. £2.9 billion) in primary agricultural products as well as importing $21.12 billion CDN (approx. £11.35 billion) and exporting $11.86 billion CDN (approx. £6.37 billion) in total agri-food trade (Industry Canada, 2013; OMAFRA, 2014). A clear trade deficit exists in both cases with imports exceeding exports of agri-food products.

Appendix 6: Description of participating stakeholder organisations

England	Ontario
ORG-EN-P01 **Linking Environment and Farming (LEAF)** LEAF promotes sustainable food and farming by working directly with farmers and through public education. LEAF operates a network of demonstration farms as well as their own environmental standards through the LEAF Marque programme.	**ORG-ON-P01** **Anonymous** Ontario Participant 1 requested that their organisation name not be included in the research outputs. This organisation is a general farm organisation, representing a range of agricultural interests. It is involved directly with farmers as well as in advocacy/lobbying.
ORG-EN-P02 **Natural England** Natural England is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs. Natural England operates as a statutory consultee on land-use in England as well as being the main delivery body for Agri-Environmental Schemes in England.	**ORG-ON-P02** **Anonymous** Ontario Participant 2 requested that their organisation name not be included in the research outputs. This organisation is an environmental NGO representing a range of environmental interests, particularly through advocacy. The organisation operates across Canada but this participant was responsible for the organisation in Ontario.
ORG-EN-P03 **National Farmers Union (NFU)** The NFU is a general farm organisation with 55,000 members across England and Wales. The NFU represents farmers across all sectors and across England and Wales. The NFU advocates on behalf of the farming sector as well as providing advice and services to members.	**ORG-ON-P03** **Friends of the Greenbelt Foundation** The Friends of the Greenbelt Foundation is a charitable grant-making organisation promoting the objectives of the Greenbelt Plan (2005) to “keep farmers successful, strengthen local economies, and protect and grow natural features.”
ORG-EN-P04 **RSPB** The Royal Society for the Protection of Birds (RSPB) is a large environmental charity operating across the UK. In England, the organisation owns and operates numerous nature reserves as well as advocating on behalf of habitat conservation and restoration. Agriculture is one of the top priorities for the organisation in England where they promote, and provide advice on, on-farm stewardship.	**ORG-ON-P04** **Nature Conservancy of Canada (NCC)** The NCC is Canada’s largest national land conservation organization. Particularly in Ontario, a key component of the NCC’s mandate is land acquisition, through purchase or donation, in order to create or protect habitat and support biodiversity. The organisation is particularly interested in conserving sensitive ecosystems.
ORG-EN-P05a **Wilderness Foundation** The Wilderness Foundation pursues preservation of wild spaces and operates programmes to promote access to the environment for adults and youth. The organisation also promotes knowledge of food, farming and nature through the Chatham Green Project demonstration farm in England. This interview also included a second organisation, EN-P05b.	**ORG-ON-P05** **Food & Water First** Food & Water First is a committee of NDACT (North Dufferin Agricultural and Community Taskforce) based in southern Ontario. The organisation promotes the protection of prime agricultural land and water resources in Ontario, and particularly from aggregate operations and urbanisation. The organisation is highly active in advocacy, particularly in the area around Toronto.

ORG-EN-P05b **Anonymous** England Participant 05b requested that their organisation name not be included in the research outputs. This participant was included in the same interview as the Wilderness Foundation. The organisation is a large commercial farm business operating in East Anglia.	**ORG-ON-P06** **Ontario Soil and Crop Improvement Association (OSCIA)** The OSCIA is an agricultural organisation that aims to facilitate responsible economic management of soil, water, air and crops through development and communication of innovative farming practices. The organisation is the delivery partner for numerous government programs for farmers, most notably the Environmental Farm Plan. The organisation differs from other agricultural organisations in that it is focused on education and program delivery and not advocacy/lobbying.
ORG-EN-P06 **Farming and Wildlife Advisory Group (FWAG)** FWAG is a non-governmental membership organisation that provides independent advice to farmers and landowners on environment and wildlife conservation. The organisation attempts to integrate sustainability with the business of farming. The specific participant represented the Suffolk FWAG.	**ORG-ON-P07** **Carolinian Canada Coalition** Carolinian Canada is a non-governmental charity with particular interest in preserving, protecting and restoring the flora and fauna of the Carolinian Life Zone in southwestern Ontario. An important aspect of the organisations work is the promotion of the 'Big Picture' restoration strategy for southern Ontario.
ORG-EN-P07 **WWF – UK** The WWF is a major conservation organisation with a comprehensive interest in a wide range of environmental challenges. WWF-UK was the first National Organisation in the WWF network. This interview included a participant from the England office specialising in agriculture and food related environmental issues.	**ORG-ON-P08** **Farm & Food Care** Farm & Food Care in an NGO based in Ontario, it represents a whole-sector coalition made up of representatives from all farming types and associated businesses, and positions itself as the helpful expert on Canadian agriculture. The common goal is to build public trust in food and farming in Ontario and across Canada. It works on a variety of animal welfare, environmental and public trust topics.
ORG-EN-P08 **Woodland Trust** The Woodland Trust is the UK's largest woodland conservation charity. The Trust's mandate includes the protection, restoration and creation of woodland. The Trust works with farmers to encourage tree planting as part of their operation or as an alternative crop. The organisation also has a lobbying and advocacy role.	**ORG-ON-P09** **Ontario Federation of Agriculture (OFA)** The Ontario Federation of Agriculture (OFA) is Canada's largest voluntary farm organization representing more than 36,000 farm families across Ontario. The OFA is the leading advocate for Ontario farmers, championing their interests through government relations, lobby efforts, community representation, media relations and more.

ORG-EN-P09 **Agriculture and Horticulture Development Board (AHDB)** The AHDB is a statutory levy board, funded by farmers, growers and others in the supply chain. Their purpose is to equip levy payers with independent, evidence-based information and tools to grow, become more competitive and sustainable. The AHDB works across a variety of commodity groups. The participant for this interview represents the Potato division.	**ORG-ON-P10** **Alternative Land-use Systems (ALUS)** ALUS is a non-governmental, community-developed, farmer-delivered program that provides financial support to farmers and ranchers to enhance and maintain nature's benefits. ALUS pays farmers to retain and reconstruct natural areas such as wetlands, grasslands, riparian areas and trees with the intention of delivering a range of ecosystem services.
ORG-EN-P10 **Plantlife** Plantlife is a wild plant conservation charity promoting the protection of wild flowers, plants and fungi. The organisation manages a series of nature reserves including an arable farm. It also plays a role in campaigning and lobbying government on various policy areas, including agriculture.	**ORG-ON-P11** **Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)** The Ministry of Agriculture, Food and Rural Affairs is an Ontario government ministry responsible for the food, agriculture and rural sectors of Ontario. Areas of interest include growth of the agri-food sector, sustainability of agriculture, providing business supports to farmers, expanding agriculture in the north, and fostering vibrant rural economies.
ORG-EN-P11 **Allerton Project / Game and Wildlife** Conservation Trust (GWCT) The GWCT is a conservation charity with the aim of having a thriving countryside rich in game and other wildlife. A main focus of the organisation is on research and influencing policy with evidence. The organisation also works with farmers and other land owners in an advisory capacity. The Allerton Project is a demonstration farm of the GWCT which aims to demonstrate the compatibility of commercial agriculture with environmental stewardship.	**ORG-ON-P12** **Anonymous** Ontario Participant 12 requested that their organisation name not be included in the research outputs. This organisation is a government ministry involved with environmental conservation.

Appendix 7: Description of participants from the farmer interviews

Participants from England

Participant	Description
EN-P01-Organic Farmer	Organic farmer located in Dorset. The farm has 60 acres of owned land primarily made up of organic vegetable production and woodland. She has participated in multiple agri-environmental schemes and has conducted considerable tree planting and hedge laying both in and outside the schemes.
EN-P02-Mixed Farmer	Mixed farmer in Herefordshire. Approximately 300 acres of which 250 is owned and 50 rented. Primarily beef production (60 beef cows) but also sheep (300 ewes) and some arable – approximately 75% grass and 25% is in arable cropping. Arable crops include wheat, barley, oats, beans and whole crop (barley, spring barley and peas mixture) most of which is fed back to the animal side of the operation. Has participated in multiple agri-environmental schemes (ELS, HLS, ES, etc.).
EN-P03-Arable Farmer	Arable farmer based in Wiltshire. Total farm area is 1,250 acres comprised of 700 rented, 100 owned, and the remainder contract farmed. Main crops are wheat, oilseed rape, oats, and beans. The farm has a small SSSI on the property. Has participated in multiple agri-environmental schemes in the past but most are ending or have ended with little interest in further participation.
EN-P04-Arable Farmer	Arable farmer based in south Yorkshire. Total farm area is about 400 acres of relatively low-quality soils producing wheat, barley, oilseed rape, beans and oats. Farm area includes a variety of natural features, including woodland, hedgerows, wild bird mix, and a bridle path. Has participated extensively in agri-environmental schemes (Countryside Stewardship, ELS, HLS, etc.) with considerable farm income resulting from agreements. Farm income is supplemented with off-farm income and holiday cottages.
EN-P05-Mixed Farmer	Mixed farmer based in east Yorkshire. Produces wheat, oilseed rape, malting barley, potatoes and raises a small herd of cattle. Total farm area is about 500 acres owned and 180 acres rented. Has planted 6 acres of trees and approx. 1,500 of metres of hedgerows, as well as several acres of wild bird cover along with grass margins and field corners left out of production. Has participated in the ELS scheme with agreements ending in 2017 and no intention to pursue another agreement.
EN-P06-Dairy Farmer	Primarily dairy farmer with 113 dairy cows and 200 acres of land based in north Yorkshire. Arable crops include about 40 acres of maize, and about 20 acres of cereal, mainly winter wheat, primarily for feed / silage. Owns 70 acres and rents the remainder. Has some area of wild bird cover, hedgerows, and a pond area as well as areas of fallow, primarily for BPS cross-compliance (Ecological Focus Area). Has never participated in an agri-environmental scheme.

EN-P07-Organic Farmer	Small certified organic fruit and vegetable producer on 12 acres located in south Yorkshire. Has laid hedges and created shelterbelts outside of schemes as well as leaving wet areas, woodland, a large pond, and meadows out of production mainly for personal reasons. Has participated in the Organic Entry Level Stewardship (OELS) scheme for five years with actions including reduced hedge cutting, creating buffer strips and reduced grassland mowing. Is interested in joining the Countryside Stewardship scheme when current agreement ends, but is reluctant to commit due to uncertainty with the future of the scheme. Ineligible for enrolment in the Basic Payment Scheme (BPS), and OELS payments make-up a small proportion of farm income.
EN-P08-Mixed Farmer (beef and arable)	Mixed beef and arable operation with 109 hectares and 70 head of cattle based in Nottinghamshire. Arable crops include wheat and barley. Farm has no woodland but is made-up of 26 fields divided with hedgerows. More than half the farm is in grassland, hay farming, and permanent pasture. Has been involved with agri-environmental schemes for 25 years, with recent actions including fallow, low input cereals, hedge planting and arable reclamation. Is currently enrolled with the new Countryside Stewardship scheme but with less land enrolled than in the previous E/HLS schemes.
EN-P09-Mixed Farmer (beef and arable)	Mixed beef and arable operation with 150 hectares, 20 cows, and more than 100 store cattle based in Berkshire. The farm has 46 hectares in annual arable crops, 7 hectares of perennial arable crops, and the remainder in grassland/permanent pasture. Arable crops include maize, rye and miscanthus. The farm has 80 hectares leased from the National Trust which supports environmentally beneficial actions on the farm. The farm includes areas of woodland, hedgerow, grass headlands, grass margins, and a Stone-curlew plot, much of which is the result of agri-environmental schemes and cross-compliance obligations. Has participated in multiple agri-environmental schemes, including E/HLS but is not interested in enrolling in the Countryside Stewardship scheme when his current agreement ends.
EN-P10-CSA Producer	Small 12 acre farm, using a Community Supported Agriculture (CSA) model, based in Suffolk. The farm produces vegetables and some fruit on 2.5 acres of the farm, as well as incorporating a few cows, pigs and chickens. The farm uses organic principles but is not certified. She has planted some woodland and established hedgerows, as well as using pasture for cattle grazing. Has never been enrolled in direct payment or agri-environmental schemes primarily due to eligibility (size) limitations.
EN-P11-Organic Beef Producer	Organic, predominantly beef, farm located in Devon. The operation is 250 acres of which 30 are in arable production, specifically spring barley. The farm is a mix of owned land and a tenancy agreement. Much of the farm area is intentionally left out of production in woodland, hedges, margins, footpaths, field corners, etc. and enrolled in an extensive Organic Entry Level / Higher Level Stewardship agreement. Would be interested in enrolling in the Countryside Stewardship scheme when current agreement ends.

EN-P12-Large Arable Farmer	Farm manager employed by a very large farm business responsible for over 45,000 acres across the UK. This specific participant manages 2,500 acres in Yorkshire. The farm is a mix of arable crops, grassland and land left out of production as part of stewardship schemes. Main arable crops are winter wheat, winter barley, spring beans, spring barley, spring wheat, oilseed rape, and miscanthus. The farm is situated on a large estate that also includes several hundred acres of woodland and moorland distinct from the farming operation. Have left large areas of the farm in fallow and green manure crops for rotational purposes. Also have around 300 acres of permanent pasture, a small scheduled monument, and about 100 acres of game cover crops outside the schemes. The farm has participated in numerous agri-environmental schemes, including ELS and HLS, with agreements ending in 2021. As part of the schemes the farm has large areas of grass margins buffering ditches and watercourses, as well as having planted extensive hedgerows, around 15,000 kilometres, also as part of various schemes.

Participants from Ontario

Participant	Description
ON-P01-Goat Farmer	Small 21 acre farm located in Eastern Ontario. The farm is located in an area of lower quality soil, in the Canadian Shield area. About half the farm is in pasture, mostly unimproved, while the remainder is wooded area and wetland. The main production is goats, sold as breeding stock, with some chickens as well as horses, however dairy, eggs and poultry are not sold due to regulatory limits. This farmer is retired from an unrelated occupation and does not rely on the farm income. Has fenced livestock out of natural areas, as well as undergoing some tree planting, and is interested in pursuing a 'restoration agriculture' model. Is too small to be classified as a farm and has not pursued any support for environmental activities.
ON-P02-Small Vegetable Producer	A small scale vegetable producer located Northeast of Toronto in Haliburton County – not typically known as an agricultural area. Has around 6 acres under vegetable production, including greenhouses and 35 acres in hay production which is slowly being transitioned into vegetables. Uses organic principles but is not certified organic. The farm has 25 acres of 'bush', which is a wet area unsuitable for production. Expansion of the farmed area is limited by low quality soils and unconducive climate. Produce is sold at farmers' markets, through a CSA, and at farm-gate. The farm does not make a net profit and so this farmer works off farm in an unrelated occupation. Has receive local economic development funding for a greenhouse expansion project. The farmer has participated in the Environmental Farm Plan but has not pursued any agri-environmental funding programs.
ON-P03- Alternative Farmer	Participant 3 represents an alternative / innovative farming model located in an urban-adjacent area northwest of Toronto. The farm model is based on selling memberships, who undertake individual projects, rather than a set of specific products. The model incorporates business incubation principles and also offers workshops/training as well as selling farm-related technology and kits. The total farm area is 65 acres, on land less attractive for conventional arable production, and uses an agroecological approach. The farmer has participated in the Environmental Farm Plan and applied to agri-environmental programs, but has had little support from agricultural or conservation organisations, actually discussing more opposition than support from these groups. The farmer is relatively young, with an urban background, coming to the farm from a previous career in the tech sector, and tended to identify more with technology firms in Silicon Valley than with the conventional agri-food sector.
ON-P04-Mixed Farmer (beef and arable)	Mixed cattle and arable operation located in Perth County. The total farm area is around 350 acres which includes area for grazing, hay production, and around 100 acres in arable crops (wheat, corn, soy). The farm has a 10 acre nursery, a small maple grove (tapped for syrup), and a small woodlot, that has been left out of production, and is being expanded by the farmer. Around 35 acres of productive land have also been converted from crop production to permanent pasture. The farm has extensive windbreaks planted around the fields. The farm has no real marginal areas, being located in a very highly productive area of the province. Has participated in the Environmental Farm Plan but has not pursued any grant programs for several years.

ON-P05-Livestock (Sheep and Pig) Farmer	Livestock operation focused on raising sheep and pigs in the Niagara Region. The farm totals 75 acres of entirely rented land of which 60 acres are pasture and 15 are forested. The entire farm area, including the forested area is used, on a rotational basis, for grazing the sheep and pigs. The operation is relatively new and currently has around 80 sheep (plus 135 lambs) and 5 pigs (plus 80 piglets), with intention to grow in the near future. The operation sells to local restaurants, at farmers' markets, and directly to customers. The farmers do not work off-farm. The farm is located within the Niagara Escarpment protected area. Have participated in the Environmental Farm Plan but no other agri-environmental programs.
ON-P06-Organic CSA	Small-scale farm located an urban-adjacent area north of Hamilton, to the west of Toronto, and within the Greenbelt Plan area. Total farm area is 51 acres, half of which is 'bush'. The area in production includes 3 acres of garden vegetables and a few acres of orchard trees. The farm has incorporated a 'hugelkultur' model in its vegetable gardens and uses organic practices but is not certified. The farm operates on a CSA model – varying between 50 and 100 members - as well as selling at farmers' markets and at the farm gate. The farm is run by three people who work the farm as their full-time occupation. They have not explored or pursued any agri-environmental programs.
ON-P07-Organic CSA	A certified organic farm located in Wellington County, west of Toronto. The farm area is 78 acres and produces vegetables, chicken, eggs, some fruit, and an apiary. Produce is sold through a CSA model, at a farmers' market and from a small on-farm store. The area in production is very small, around 6 acres, along with a hay field. The majority of the farm area is in woodlot, fallow, a stream and a pond. The farmer has also planted more than 10,000 trees on the property and has received some grant funding to support the tree planting as well as establishing Barn Swallow structures as part of the Species at Risk Farm Incentive Program (SARFIP). The farmer is retired from an unrelated occupation and is planning to sell the farm in the near-term.
ON-P08-Small Organic Farm	Small 10 acre certified organic farm located in an urban-adjacent area, north of Hamilton (south-west of Toronto) within the Greenbelt Plan area. The farmed area is about 6 acres with the other 4 acres being a wet area not suitable for production. Produce from the farm includes a wide variety of vegetables, fruit, herbs and fruit trees. The farm model focuses on a diversity of products including more comment varieties, such as raspberries, blackberries, apples and pears as well as less-common products such as hascaps and Saskatoon berries. The farmer also sells native plants and edible flowers harvested from the orchards. Products are sold at farmers' markets and restaurants throughout the area. The farm is considered supplemental income for the operator. Has participated in the Environmental Farm Plan and has considered, but not pursued, related agri-environmental programs. Has received some support for tree planting on the farm from the local Conservation Authority.
ON-P09-Organic Vegetable Farm	A certified organic vegetable farm located northeast of Toronto and within the Oak Ridges Moraine protected area. The farm is 85 acres of which 60 acres are in production on a 15 acre rotation, and 25 are 'bush', protected by regulation. Products are sold through a CSA, farmers' markets, and wholesale to restaurants. The farm operators work the farm full-time as well as hiring additional employees. The farmers have participated in the Environmental Farm Plan but felt the agri-environmental grants were not suited to their operation. Have researched grant support for aquatic habitat creation but have not found any programs available.

ON-P10-Mixed Organic Farmer	Certified organic mixed farm located in Eastern Ontario, near Ottawa. The farm area is 180 acres of which 60 are in permanent woodland. The farmer also finishes grass fed cattle. Arable crops include certified organic sunflower, spelt, and soybeans. Parts of the farm are quite wet and have been reforested as well as a poor quality pasture which has been abandoned for natural regeneration. The farmer is retired from an unrelated occupation. The farmer has participated in the Environmental Farm Plan and received grant support for fuel storage several years ago. The farmer has not pursued any other agri-environmental programs.
ON-P11-Hop Farmer	Small hop farm located northwest of Toronto with a total farm area of 28 acres. The area in hop production is currently around 2 acres with intention to expand. Much of the farm is fallow or used for small-scale hay production. The farm also produces other beer ingredients (e.g. barley, honey, maple, coriander) on a small scale with intention of supplying a future brewery on the premises. Have received grant support from the local conservation authority to undertake extensive tree planting (2,200 trees). The farmers work off-farm in unrelated occupations as the farm is not currently financially self-sustaining. Has participated in Environmental Farm Plan but not pursued agri-environmental programs.
ON-P12-Beef Farmer	A 150 acre grass fed beef farm located in Perth County. The productive area of the farm is entirely grassland. The farm model is unusual for Perth County which has highly productive soil. The farmer has planted around 10,000 trees to re-establish windbreaks around the farm. Has participated in the Environmental Farm Plan and received a cost-share grant to fence cattle out of a wetland on the property. The farmer is retired from an unrelated occupation.
ON-P13-Hop Farmer	A small hop farm located in Norfolk County in southwestern Ontario. The total farm area is 41 acres of which half is woodland, 4 acres are in hops production, and the remainder is fallow. The longer term goal would be to expand the hops production into the fallow land. The farm uses organic principles but is not certified. The farmers work off-farm in unrelated occupations. Have never participated in any agri-environmental programs or other government program.
ON-P14-Mixed Organic (Dairy and Arable)	Certified organic farm located in Lambton County in southwestern Ontario. The farm has 75 dairy cows and a total area of 900 acres. Arable crops include: corn, soybeans, wheat, spelt, hay, vegetable peas, and green beans. The farm area includes pockets of woodlots but none were identified as protected. The farmer has established windbreaks and left riparian buffers and steep slopes out of production. The farmer has participated in the Environmental Farm Plan as well as receiving some cost-share support for projects such as putting in a catch basin and improving manure storage.
ON-P15-Arable Farmer	Arable farm with 250 acres located outside of Ottawa producing soybeans (for export) and specialty grains. Have created fence lines by planting 300 native tree species with financial, cost-share, support from the Growing Forward 2 program and the Conservation Authority. Have also retired approximately 1 acre for a pollinator project with fruit trees, low shrubs, native grasses and perennial flowers with financial support from the ALUS program. Have participated in the Environmental Farm Plan.
ON-P16-Arable Farmer	Arable farm with 1,300 acres located in Chatham-Kent producing corn, soybeans and winter wheat. The entire farm area is in production with no marginal land, woodlots, or wetlands. The farmer emphasises the importance of incorporating cover crops, and uses a no-till system. Has participated in the Environmental Farm Plan and received cost-share support for cover crop seeds and other on-farm purchases.

ON-P17-Livestock (sheep and cattle) Farmer	A livestock farmer with 207 acres in Eastern Ontario. The farm is recovering from a barn fire and currently has 12 cattle and 11 sheep. The farm has 52 arable acres, used for hay, mostly for feed. Rotational grazing on the farm's pasture is an important part of the farm model. The farm uses organic principles but is not certified. Much of the farm area is woodland with around 5 acres of wetland. The wetland is part of a voluntary project with the Ducks Unlimited organisation. The farmer has been actively involved in replanting woodland on marginal areas of the farm with cost-share support, mostly from the local Conservation Authority. The farmer has participated in the Environmental Farm Plan program and is interested in pursuing funding for such projects as fencing livestock out of the woodland and wetland parts of the farm.
ON-P18-Arable Farmer	Arable farm located in Huron County with 2,600 acres, of which 1,835 are in production, and an additional 185 acres are rented. Primary crops include corn, soybeans and wheat. The remainder of the farm area is woodland and waterways with associated riparian buffers. Have seeded large grass buffers along watercourses, and established windbreaks around fields, without external support. Have brought some new land into production by removing small stands of trees and concentrations of 'weeds' on the farm in recent years. The farmer has participated in the Environmental Farm Plan program and the Great Lakes Agricultural Stewardship Initiative (GLASI). Have also unsuccessfully pursued grant support from the local Conservation Authority, Trees Ontario, and other programs to assist with tree planting as windbreaks.

Appendix 8: Supplemental Materials for Chapter 4: The accidental environmentalists

Table A: Farmer Interviews – Pro-environmental actions identified by participants			
England		Ontario	
Laying hedgerows	10(15)	Organic principles, practices	12(16)
Field margins, grass margins, field corners, buffer strips, headlands	7(11)	Tree planting	11(18)
Permanent pasture, meadows	5(6)	Low-till, no-till management	8(11)
Wild birdseed plots, wild bird mix	5(5)	Cover crops	7(11)
Trimming hedges less frequently	4(5)	Wind breaks	7(10)
Encouraging pollinator habitat, pollen mixture	4(4)	Wooded areas out of production	7(7)
Fallow land	4(4)	Improved water management, ponds	7(9)
Reduced nitrogen use, precision application	3(4)	Grassland, improved pastures, permanent pasture, fallow fields	6(7)
Wild bird cover	3(4)	Crop rotation	6(7)
Tree planting	3(3)	Use livestock to improve soil health	5(11)
Organic practices, no use of chemicals	3(3)	Rotational grazing	5(7)
Cutting hay less frequently	2(2)	Late hay cutting for ground nesting birds - bobolinks and meadowlarks	5(6)
Carbon Sequestration	1(3)	Created pollinator habitat	5(6)
Beetle Banks	1(1)	Fence livestock out of woodlot, wetland, streams	5(6)
Cover Crops	1(1)	Field margins, buffers, riparian buffers	5(5)
Created ponds	1(1)	Sustainable, efficient buildings, structures	4(6)
Game Strips	1(1)	Wetland out of production	4(5)
Manure spreading plan, do not spread near watercourses	1(1)	Raise grass-fed sheep, grass-fed beef	3(3)
Seed harvesting plot	1(1)	Creating habitat, nest boxes for species at risk	3(3)
Overwinter Stubble	1(1)	Use of guardian dogs, llama, to deter predators, pests	3(3)
Reducing runoff	1(1)	Plant based mulch, use hay for mulch	2(3)
Stone curlew plots	1(1)	Planting native plants and trees	2(3)
Uses a no-till management system	1(1)	Reducing fuel use	2(2)
Uses rotational grazing	1(1)	Renewable energy use	2(2)
Wind shelterbelts	1(1)	Limit livestock numbers to reduce impact on the land	1(2)
		Maintaining seed genetics, heritage varieties	1(2)
		Tractor attachment to warn wildlife during hay cutting	1(2)
Note: Counts are provided as the number of sources and the number of times coded across sources in parentheses: sources(times coded) Note: We have kept the terminology used here the same as was used by participants as closely as possible.			

Table B: Stakeholder Interviews - Reasons farmers adopt pro-environmental decisions			
England		Ontario	
Care about the environment, environmental values, right thing to do, altruism, proud, passionate	11 (25)	Personal beliefs, values, right thing to do, altruism, pride	8 (11)
Legacy of farm, for next generation	5 (7)	Benefits for production	7 (9)
Shooting, hunting, recreation	4 (5)	Culture of land stewardship	3 (5)
Financial security from schemes, 'nothing to lose'	4 (5)	Business connected to the wider environment	3 (3)
Aesthetics	4 (4)	Financial incentives & agri-environmental programs	3 (3)
Efficiency, farm improvements, business resilience, production benefits	4 (4)	Personal connection to the land	3 (3)
Financial benefits from schemes, 'playing the system'	3 (4)	Personal interest e.g. breathes the air, drinks the water	3 (3)
Regulation, BPS, cross-compliance	3 (3)	Regulation	2 (3)
Marketing opportunities	2 (3)	For next generation	2 (2)
CSR, Public Relations	2 (2)	Marketability	2 (2)
Cultural attachment to countryside, maintain traditional imagery	1 (1)	Influence of family, friends, and peers	2 (3)
Morals	1 (1)	Feeling of appreciation, being a 'good guy'	1 (2)
Peer Pressure, farming community	1 (1)	Consumer demand	1 (1)
Retailer expectations, industry standards	1 (1)	Hunting	1 (1)
Note: Counts are provided as the number of sources and the number of times coded across sources in parentheses: sources(times coded)			

Table C: Stakeholder Interviews - Reasons farmers may not adopt pro-environmental decisions			
England		Ontario	
Market, retailer, consumer pressure for low prices	2 (4)	Financial gain	6 (9)
Crop volatility	2 (2)	Short-term thinking	3 (3)
Does not fit with modern, intensive agriculture model	1 (1)	Financial necessity	3 (3)
Lack awareness, information	1 (1)	Farmers unaware of environmental impact	2 (2)
Paperwork (agri-environmental schemes)	1 (1)	Peer pressure, 'farming culture'	1 (3)
Poor weather	1 (1)	Losing control of farm through environmental agreements	1 (2)
'Waste of time'	1 (1)	Fear of regulation (e.g. Species at Risk)	1 (2)
		Farmers cannot afford to address environmental concerns	1 (2)
		Ecosystem already fragmented, changed	1 (1)
		Removing habitat in anticipation of not being able to later	1 (1)
		Unintentional	1 (1)
		Lower priority	1 (1)
Note: Counts are provided as the number of sources and the number of times coded across sources in parentheses: sources(times coded)			

Farmers' Pro-Environmental Decision Making: Coding and theme development

England

Results of Stakeholder Organisation Interviews

	Category	# of sources (times coded)
Motivations for farming (general)	Attachment to place, to the land	4 (4)
	Challenge seeking, enjoy volatility, always different	1 (1)
	Country lifestyle, farming way of life	6 (10)
	Hands on, tangible work	1 (1)
	'Honourable profession', feeding people	2 (2)
	Investment, profit making	3 (4)
	Passion for farming, pride in products	3 (7)
	Renewed interest in food and farming	5 (8)
	Self-employed, 'own boss'	1 (1)
	Succession, expectation, obligation	6 (9)
	Tradition, family heritage	9 (12)
	Work with technology	2 (2)

	Category	# of sources (times coded)
Reasons farmers protect features or adopt environmental behaviours	Aesthetics	4 (4)
	Care about the environment, environmental values, right thing to do, altruism, proud, passionate	11 (25)
	CSR, Public Relations	2 (2)
	Cultural attachment to countryside, maintain traditional imagery	1 (1)
	Efficiency, farm improvements, business resilience, production benefits	4 (4)
	Financial benefits from schemes, 'playing the system'	3 (4)
	Financial security from schemes, 'nothing to lose'	4 (5)
	Legacy of farm, for next generation	5 (7)
	Marketing opportunities	2 (3)
	Morals	1 (1)
	Peer Pressure, farming community	1 (1)
	Regulation, BPS, cross-compliance	3 (3)
	Retailer expectations, industry standards	1 (1)
	Shooting, hunting, recreation	4 (5)

	Category	# of sources (times coded)
Reasons farmers may not protect features or adopt environmental behaviours	Crop volatility	2 (2)
	Does not fit with modern, intensive agriculture model	1 (1)
	Lack awareness, information	1 (1)
	Market, retailer, consumer pressure for low prices	2 (4)
	Paperwork (agri-environmental schemes)	1 (1)
	Poor weather	1 (1)
	'Waste of time'	1 (1)

Theme	Category	Sub-category	# of sources (times coded)	Example(s) of Quotes
Farmer Motivations and Decision-making - general	Farmer Motivations, attitudes (General)	Farmers are financially motivated, 'trying to make a living'	3 (3)	“But clearly, I mean the whole thing is economically driven, I think this is the fundamental thing … they want to make money don't they on their farm?” ORG-EN-P06 “there are still people that the bottom line is that they need to put bread on their table if you'll pardon the pun and there is that tug of war going on.” ORG-EN-P05b
		Farmers are not good at collaboration, independent businesses, critical of one another	2 (2)	“farmers are not very good at collaborating because they actually like being their own boss, and if you collaborate with another farmer or group of farmers you then have to, you know, working within their constraints and not do exactly what you want when you want.” ORG-EN-P11
		Farmers are not very good with change, risk averse	2 (5)	“the agronomist will come and tell you what chemicals to use, you put them on, you do it, you get the result. They're very risk averse and so they're not going to push out and say 'I don't think that's right, I'm gonna do me own thing' in case it goes wrong.” ORG-EN-P03 “Sometimes it’s difficult to get farmers to address new approaches to things, or even not so new” ORG-EN-P06
		Farmers are optimistic, carry on in tough times	2 (2)	“nobody is really making money in this county at farming at the moment unless you're growing veg or something like that but it doesn't stop farmers sowing next year's crop there's always this optimism in it though, we haven't made any money this year or we've lost money this year but actually next year's crop goes in the ground just the same.” ORG-EN-P06
		Farmers are practical people, want practical solutions to practical problems	1 (2)	“I tend to find that farmers are quite practical people and so they like the practicalities of things, so I always - so when I'm going onto a farm I talk with them about how to do things, what they hope, in a way hope to achieve but not why they want to achieve it.” ORG-EN-P10

		Farmers can be cash poor even with valuable assets	1 (1)	“often the farmers tend to be asset rich and cash poor” ORG-EN-P10
		Farmers need to balance a lot of competing demands	1 (1)	“at the end of the day a farmer has to make sure that they balance all the time capability of optimising greenhouse gas, profit, making a living, animal health and husbandry, water quality, soil quality, biodiversity quality, market, so for us that balance is there but there will always be conflict” ORG-EN-P01
		Farmers will produce what gives them the best returns; short-term thinking	1 (4)	“the system of growing in the UK, as with most countries is private enterprise to a private market, where farmers will grow what gives them the best return on their efforts … I think in the past the motivations of farmers have been - it’s all been about yield and productivity, and not about sustainability, with a small 's', you know how to keep your soil, how to keep your market, how to keep your land in good heart, it’s all been very short term.” ORG-EN-P03
		Farming isn't all about the money, financially irrational decisions	6 (8)	“I mean, and you know, the money side is important, of course it is, but you know, if it was down to money we wouldn't be doing this. There's a lot more to it than that.” ORG-EN-P05b “he loves that meadow but he was, you know, he quite clearly said 'its not economical' and he just kind of made the point of, unless its made economical why would a farmer do it? They're doing it because they love it and they wander around their farm and they want to see nice things as well, so there that was motivation and I think that is the way for a lot of people. I don't think the environmental payments themselves are necessarily enough motivation to do it, particularly with the paperwork so take agri-environment out of the equation and you're left with the fact that people actually want to do that and want to preserve it for their family and they do want to go into a meadow and hear a Skylark singing.” ORG-EN-P10
		Some farmers are production focused, are not concerned about the environment, legislation or regulation in the way of farming	5 (6)	“most commercial farmers will say that the existing legislation that they have to abide by protects the environment sufficiently and that they don't need to do any more than that, I personally would dispute that, but they would say that is adequate for them and in many cases they would say that there's too much legislation actually and all they want to do is carry on producing food, and its quite noticeable that back in 2007 the wheat harvest globally wasn't brilliant and there was - the speculators got on board and started buying wheat and the price doubled over a 6 month period and at this point all the commercial farmers who were focused on high yields started shouting about 'now we can forget the

				environment, this is the signal, this is what we've been waiting for, we told you it was coming, the global population is growing faster than we can feed it so now we need to go up a gear, we need to pull the hedges out again and put the land back into production' and of course many did move in that direction, only of course to find that the price collapsed again and actually they were no better off." ORG-EN-P11
		Production focus among farmers is changing; not just about maximising yields	2 (3)	"So I'm sure, yeah, there's still farmers out there that are very, just driven on sort of profit or you know production, but there's definitely a change, you know the tide is changing in terms of looking at the funding that we get and how its such a big part of it now, but yeah, you know, in any population there's gonna be extremes." ORG-EN-P05b
		Some negativity towards perceived misuse of farmland, not maximising potential, not looking after it	1 (1)	"I think its not necessarily that you're a bad farmer but you're not keeping - if people look across the hedge and they see, if they see it all very weedy or something, not necessarily weeds but its all wildflowers people will think that you're not looking after it for the future, I think that's probably a fair point 'round here and if there's a year where its very profitable then people will look across and think 'why're you doin that' but you know if you take the long term view as well as obviously the environmental view and all the other benefits, but people do get quite focused on thinking 'why're you doing that'?" ORG-EN-P05b
Role of Farmers and Encouraging Environmental Behaviour and Land Management Decisions	Encouraging farmer behaviour and decision-making, change in practices or decisions	Assurance systems, industry standards are more important to some sectors than government schemes	1 (1)	"so in terms of the Red Tractor assurance, 80% of production will be within the scheme, ok, so that's the route to market that I was describing earlier, that's almost a sort of cost of entry to get involved with potatoes, but that said I think we probably have a high proportion over the years who will have been through Entry Level and Higher Level payment schemes" ORG-EN-P09
		Attempting to expand farmer pride to environmental benchmarks, not just agricultural benchmarks	1 (1)	"we want farmers to shout about - as well as shout about how many tonnes per hectare or acre they get, we also want farmers to shout about well, you know, they saw X number of different species of bird on their farm or they saw a particular species of bird on their farm as well so it's to enhance and develop that pride that farmers already feel and trying to encourage farmers to get involved … farmers aren't just there to talk about their production, they're also there and talking about the contribution that they're making to the environment and how they can , perhaps not see six different species one year but they might see seven the next year, so yeah I think in terms of what motivates, as I say I think farmers like to be able to see different types of wildlife on their farms as well." ORG-EN-P04

		Covering capital costs, cost-sharing	1 (3)	“its a 50/50 contribution or a 40/60 depending on if they're going to plant the trees themselves, we don't actually hand the money over, we just buy the trees and pay the contractor.” ORG-EN-P08
		Demonstrate good on-farm decisions by incentivising positive behaviour change	1 (3)	“we've measures under agri-environment schemes that are seeking to effectively incentivise some of those behaviours … But you know when you look at water quality there are strong economic arguments why farmers should do those things for themselves without any support and yet typically they're not, which makes it less obvious but I think often some of things are, dare I say, they're more invisible to farmers in terms of - the loss of nutrients, etc. it can be quite an invisible process” ORG-EN-P02
		Demonstration farms, demonstrating balance between profitability and environmental conservation	5 (9)	“We have a commercial arable farm in Cambridgeshire, which is run to commercially grow food, it’s a very much standard commercial farm growing commercial crops, the idea being to demonstrate wildlife-friendly farming whilst still engaging in profitable farming.” ORG-EN-P03 “Yes its very much a demonstration farm but one thing I would like to emphasise is that whilst it is a research and demonstration farm it is also a commercial farming unit … and that's actually quite important to me because I want farmers to visit here and see it as an ordinary working farm that they can relate to, not as an agricultural research station” ORG-EN-P11
		Diverse motivations for stewardship decisions, altruism and financial gain	3 (3)	“So you'd probably be familiar with the literature, but there's countless literature that demonstrates a massive range of those motivations right the way through from that highly altruistic, right the way through to the just the economic rational farmers.” ORG-EN-P02
		Educating farmers about environmental practices, impacts; educating agricultural advisors	3 (3)	“I think from looking at some of the horticultural courses and the agricultural courses its more an optional extra, it’s an add-on, I think farmers need to be really trained in the environment at the very beginning, they need to be trained about the impacts, they need to be looking both at local impacts and global impacts, supply chains, they need to be taught more about business as well I think” ORG-EN-P07
		Education is not the only answer, may not be right route	1 (1)	“In terms of motivating them to do environmental measures I really think its down to them and that families have very distinct ideas between, you know, father and son or father and daughter, and so it depends on how its passed on. You do find that people change as they grow, so I don't necessarily think its always right to target "well we should be getting into colleges and things like that" I think its a

				whole community thing, if we want to look at environmental measures across the board, but as conservation organisations we also have to realise that this is their business and they do need to make money and - or live off it." ORG-EN-P10
		Farmers want to see local evidence; need UK based evidence	1 (2)	"what we're lacking is a lot of UK based evidence, some of the stats we quote are from Canada, and other temperate climates which as I'm sure you're aware farmers to know what the farmer down the road is doing he's certainly not really going to take much notice of what's happening in another country beyond saying 'well that's interesting, and that probably works for them, but I'm here in England' sort of thing." ORG-EN-P08
		Industry led, voluntary initiatives; pre-empting government intervention	1 (6)	"I think one of the things that we would say is that perhaps government, government agencies should look at voluntary mechanisms or voluntary ways or looking at how farmers can make changes voluntarily, so without the introduction of legislation or a strict stipulation or requirement to make changes." ORG-EN-P04
		Marketing opportunities, labelling, farm assurance	1 (3)	"we have the LEAF marque, which is an environmental farm assurance scheme for farmers to be recognised in the marketplace for their environmental criteria" ORG-EN-P01
		Need farmers to promote changes; need trusted actors for legitimacy	2 (2)	"So its not like a bunch of fluffy tree-huggers coming along, there's a kind of a much more serious farming agenda so that might really help us to approach other farms." ORG-EN-P05a "it's been a small number but growing, who are passionate about engaging and educating the general public and saying that this is how we're producing our food and we're supporting birds and we're you know we're producing … we think they're great role models and they will talk to other farmers who will listen to them, they won't listen to us, as much as they will listen to the farmers saying 'actually you ought to try this its making me money'." ORG-EN-P08
		Need to work directly with farmers to encourage environmental decisions within the farm realities, must also make a profit	4 (6)	"It is that integration that is key, so we're very much focused on trying to get the best out of the farm but always the bottom line, is the farmer's bottom line, you know it's actually got to fit in with what he can do, what workforce he's got to be able to do things, what facilities he's got, you know what he wants out of it, and above all else he has got to stay in business and hopefully make money on his farm, so yeah it's not wishful thinking, it would be nice if you could do, you know, such and such, but it doesn't fit in with the farm business, where I think we're all

				very conscious that the farm business is an important factor in all of this." ORG-EN-P06
		Provide environmental advice to farmers; Help farmers apply to agri-environmental schemes	3 (5)	"sort of common mandate in the sense that we all aim to provide independent, and that's the key word there, independent environment and wildlife conservation advice to farmers and landowners." ORG-EN-P06 [multiple organisations indicated that they worked one-on-one with individual farmers and landowners to provide advice and assistance with environmental decisions / practices]
		Public engagement, consumer awareness	2 (5)	"the idea was to educate young people about the kind of use of land, how to rebalance nature and farming and food production and to create some sort of balance for the future. That was kind of the focus of the project." ORG-EN-P05a
		Regulation, BPS, cross-compliance	3 (3)	"I think a lot of it is currently driven by regulation so even with low prices at the moment, I mean you've now got things like - with the cross compliance and everything and all the rules attached to basic payments" ORG-EN-P06 "But then I think you've got at the bottom end of that you've got your I suppose your Common Agricultural Policy, you've got a variety of commercial incentives there, around land use, and Single Farm payments and I think your route to those payments is around cross compliance from these kinds of issues where I think you have no choice if you want that subsidy." ORG-EN-P09
	Farmer identity, food producer or land steward	Farmers can be both food producers and stewards; fits with farming norm	7 (9)	"I don't think at a, if you like, at a cultural level that there's a widespread problem to the point where it stops other farmers taking land out of production because culturally they don't feel that it's acceptable as a kind of farming norm, I don't think there's that problem … we introduced the entry-level broad and shallow environmental scheme in 2005 and as I say 70% of the land has gone into that scheme and the uptake right from the beginning was pretty high and has risen, so I think culturally there's a widespread acceptance of agri-environment and indeed the kind of principle of environmental management so no I don't think that, that really applies in quite the same way here." ORG-EN-P02 "I think this myth of 'oh well it doesn't matter they're just in it for production' no they walk around their farms and they know their farms and they care about what's there and they do see themselves, certainly the one's I speak to, see

				themselves as custodians of the landscape, its just that their idea of the landscape might differ from other people's idea of the landscape.” ORG-EN-P10
		Food producer and environmental steward identity can come into conflict	2 (3)	“With regards to the food producer and environmental stewardship, yes of course they can come into conflict and I think this is the big challenge” ORG-EN-P01
		Primary job of farmers is to produce food	2 (2)	“Because their primary job, as they see it and probably as society sees it, is to produce food.” ORG-EN-P03
	Farmers Role in Land Stewardship, environmental views	Changing culture among farmers that they need to work with the environment, not against it	1 (2)	“I think that there is quite a big culture shift going on which I suppose in a nutshell I think there is an acknowledgement that over the years we've used diesel to sort of dragged our way out of the problem, is probably a good way of putting it, whereas I think now there's much more recognition that both the economic and the environmental and the production benefits start to stack up.” ORG-EN-P09
		Changing environmental values between generations	1 (2)	“In terms of motivating them to do environmental measures I really think its down to them and that families have very distinct ideas between, you know, father and son or father and daughter, and so it depends on how its passed on … And I've met a farmer who was quite interested in the environment, had a chat with his son, not at all.” ORG-EN-P10
		Differing categories of farmers, some are stewards others are business people; Difficult to Generalise	2 (2)	“I mean if you own a battery chicken farm with 100,000 chickens you're not an environmental steward you are a businessman who's there to make money. You don't care really about the environment, whatever you say about climate for chicken, you're there to make money, you're there to sell meat, produce meat as cheaply as possible for a market that doesn't want to pay a lot for meat, so I think on the other end no, the environment's not key, they'll talk about it but it’s not their motivator.” ORG-EN-P07
		Difficult to reach farmers not already interested in stewardship measures	1 (1)	“I suppose in a way most of the farmers I meet are already swayed towards doing something” ORG-EN-P10

		Ecosystem succession does not always match farmers expectations for set aside land	1 (1)	“I've been to quite a few arable farms that have converted areas of their farms to grassland and after a couple of years, you know, the farmers are expecting this nice flower rich area after a couple of years, its not like that at all” ORG-EN-P10
		Farmers accept small features but not larger areas dedicated to environment on their farm	1 (1)	“most farmers will appreciate hedges and trees as a bit of shelter etc. so at that level its fine it’s when you start trying to, you know, to sort of suggest that they need to take larger areas of land out, even if we're still talking, you know, relatively small areas maybe 5% tree cover over their whole farm, then the issue of basic farm payment etc. starts to come in.” ORG-EN-P08
		Farmers are generally good environmental stewards; best positioned to care for the environment; enhance the countryside	6 (9)	“Yes, that they are good environmental stewards. They are the people that live and breathe nature every single day and no other industry does that they have to have the skill base to respond immediate challenges whether it be emergencies or completely different climate situations where intense rainfall or consistent droughts alongside market drivers and obviously protection and enhancing habitat. I think, personally but I am obviously biased, they are the best environmental stewards because they work with nature, they don't protect it they work with it. And I think that's something that's so inherently important.” ORG-EN-P01 “So, as well as minimising agriculture's impact on the environment, I think farmers do a lot of good work to help enhance our countryside and the environment and farmers are very proud and very passionate about their involvement and contribution to improvements in the environment.” ORG-EN-P04
		Farmers do the best they can for the environment within their knowledge	3 (6)	“I think most farmers feel that trees in a small sense, you know, they are guardians of the land and will be quite knowledgeable on their favourite tree etc. that what they have very limited knowledge on is how to actually manage that woodland and make it more useful to them.” ORG-EN-P08
		Farmers frustrated by environmental regulation, too many barriers, not flexible	1 (2)	“I think that's where farmers perhaps get frustrated, they think that they're being tied up in knots, through environmental regulation, and there's not enough flexibility or leeway or the agencies aren't thinking through the implications for other businesses or activities” ORG-EN-P04

		Farmers look at non-production land as lost	1 (1)	“I think to get that to work we need to look at the narrative again because farmers tend to just look at hectares, per hectare, and so if some of the land is not being used for agriculture they do often talk about that as lost land” ORG-EN-P07
		Farmers need environmental advice, not necessarily experts in conservation, sometimes rely on tradition	5 (5)	“not many farmers will know your average farmland bird I mean they're people of the countryside and they'll know most things, but they won't see it with an ecologist's eye, but they will be proud of their land, but they'll view it with a different eye, and it’s an eye that is prioritising the things that they worry about, is it gonna rain before I get all the wheat in, is my land gonna flood, how much does nitrogen cost, those kinds of things. And so the environment has to come second best.” ORG-EN-P03 “I do think that farmers can't be expected to get it right if they're not told or helped along the way. People will do what they think is the right thing or what suits their farming practice, whether that is actually the right thing in the grand scheme of things” ORG-EN-P05b
		Farmers prefer land sparing, think about different spaces on their farms	1 (1)	“Most of the arable farmers I know will separate out conservation measures, environmental measures, from their arable production. Because that's the way its done on arable land. And so they tend to find space to put margins, corners, that type of stuff, have kind of woodland edges and they think about it here” ORG-EN-P10
		Farmers reluctant to enrol land in agri-environment schemes in case prices go up in future	1 (1)	“when farmers are not making money there are certainly opportunities, depending on farm circumstances, to use, for example, agri-environment schemes to advantage, to in some cases make more money by being in the scheme than continuing to grow crops at a loss, but kind of the silver lining is always just 'round the corner and I suspect there's a certain reluctance amongst most farmers to commit land to doing something for conservation when their hope is that next year the price will be up be up by 30% or something, you know, and then they would have land they could be growing crops on” ORG-EN-P06
		Farmers should be active in conservation; Need	2 (4)	“I don't think it’s necessarily the case that environmental organisations or charities should protect and own or enhance environmental features, lots of farmers do very good work in terms of protecting their hedgerows and other landscape

		to work with farmers to achieve environmental objectives		features, whether its stone walls or manage to protect these areas alongside their farming activities, in fact these features are an inherent part of the landscape" ORG-EN-P04 "our interest in the farm sector is obviously that over 70% of the land area in the UK is managed as farmland. And if we want to meet our objective of creating a more resilient landscape then it's essential that we work with the farming sector." ORG-EN-P08
		Farmers will enrol land in times of high commodity prices (once making enough money)	1 (1)	"I mean often farmers commit more, I think to conservation than they're actually making a lot of money, and when they're making enough to be perfectly satisfied, then they kind of think 'well actually yeah I could afford to lose a bit of land' you know" ORG-EN-P06
		Farming practices, land use decisions leading to soil erosion	1 (1)	"The farming practices do not help us with our soil, we still have farmers for health and safety who go up and down a hill, which means if it rains that soil gets washed straight off. We also have deforested our uplands, which traditionally would have kept soil in place on the top of hills, but instead we've either put sheep on them or we've turned them into fields, so we lose soil from there." ORG-EN-P07
		For most farmers environment comes second to production	1 (2)	"they will be proud of their land, but they'll view it with a different eye, and it's an eye that is prioritising the things that they worry about, is it gonna rain before I get all the wheat in, is my land gonna flood, how much does nitrogen cost, those kinds of things. And so the environment has to come second best … It wasn't they decided 'right bugger the birds let's get on with it' it was 'let's get on with it, produce loads of food, and oh the birds have gone'." ORG-EN-P03
		Historically farming has been all about yield and productivity, not sustainability	1 (2)	"I think in the past the motivations of farmers have been - it's all been about yield and productivity, and not about sustainability, with a small 's', you know how to keep your soil, how to keep your market, how to keep your land in good heart, it's all been very short term…Now society and farmers as a collective - as collective groups over the last 50-60 years, haven't paid much of an eye to the side effects of doing that. And now we know the side effects of doing that." ORG-EN-P03
		Need financial incentive to get farmers to take up stewardship;	2 (3)	"there was a financial incentive that was needed to come in, because I think otherwise, you know, its kind of you gotta see a benefit to it, because your work has to generate income because otherwise you don't survive, so if you are going to be given a cost benefit for putting in some environmental features it makes it

		Farmers return land to production after the end of a scheme		much more palatable and I think that's been key to the motivation. Its a bit like recycling, you know, where people get some kind of kick-back from it, you see much higher levels of it.” ORG-EN-P05a “clearly the impetus is probably going to shift back much more towards production, not least because some of these farmers who have got grassland and, you know, the payment under the new scheme is not going to be anything like as high as it was under the old scheme, you know, they're going to look at that and say 'well hey I can actually make more money by growing any of these crops and so on” ORG-EN-P06
		Need to work within the practical limitations of farming to achieve environmental objectives	1 (1)	“But a hay meadow isn't how farmers farm the land, they use silage because that means they can get the quantity of material, of fodder they need during the winter, or if they just have animals that are kept in sheds the whole time, they can feed them using that stuff throughout the year. They can't do that with hay and our weather is so unpredictable that you know there are years when you just can't make it so there's this kind of mix that we need to have livestock or we need to work with farming and wildlife, somehow this medium line needs to be trodden.” ORG-EN-P10
		Not all farmers are good stewards, can have a large impact; some do minimum required	3 (4)	“do I see the farmers, as represented by the National Farmers Union, or whatever, or as one big whole community as good managers of the environment, I'd say some of them maybe want to but they're starting from a very low level. There are farmers who put a great deal of effort into farming their land as low impact as possible, but I think they're in the minority” ORG-EN-P03 “they're not all, and I know of some awful abusers of the landscape, but I think they're probably a relatively tiny proportion that can be on quite a large scale” ORG-EN-P08 “some of the basic stewardship as well as that I mean its very sort of tick box, but people aren't necessarily doing what is actually the right thing but they've just got to do something, and so they will, for example, in ELS you know, as I say, you can buffer your watercourses and things like that, but you're not told where, you know, its not sort of - you just have to meet a minimum level, you don't actually have to sort of do the right thing, but you're just doing something.” ORG-EN-P05b

		Some farmers are very knowledgeable, concerned about environment	4 (4)	“I think some of them I've met, they're so passionate about it, particularly the ones down towards the more - the LEAF Marque, the organic sector, they're the ones that really they are so passionate about the environmental side, they really care about it, they've gone out of their way, they've learned about it so they've really got the knowledge.” ORG-EN-P07
		Some farmers protect, create features with no regard for financial implications	1 (1)	“I've been on farms where that's it they're so passionate about it, its what they want to do they get no other gain out of it, they want to see as many birds or they want to see, you know, they want to see animals they want to have wildflowers, its what they care about. They think its part of what they do it makes their job exciting” ORG-EN-P07
		Some farmers are profit maximisers, don't care about the environment	1 (1)	“I think on the other end no, the environment's not key, they'll talk about it but it’s not their motivator.” ORG-EN-P07
		Some opposition to on farm features, excuses or assumptions; disinterested in agri-environment schemes	2 (2)	“Obviously we've got a hard core of people that have never entered into agri-environment scheme agreements and lots of people that probably have entered into the broad and shallow agreements but haven't taken land out of production, they've taken up other options, you know I think there is quite a strong sort of feeling there.” ORG-EN-P02 “And you know some farmers are very negative, they'll say 'oh if I've got one tree in the middle of the field the cows will collect under it in the summer and they'll get more flies and mastitis becomes rife' so you are going to get that type of ' they're dropping leaves into my gutters, they're in the way of my combine' so you do get that” ORG-EN-P08
		Trust in British farmers	1 (1)	“you can produce very very cheap food at a very high cost, I mean that's not the approach that UK farmers would do, but that has the potential on the global scale to be a real push back problem.” ORG-EN-P01
	Farming community	Farmers do not operate in isolation, others in the system can undo their good work	1 (1)	“what an individual farmer might do on their own farm can be destroyed potentially by a neighbouring farm or the fact that a bird is a migratory species and somewhere along mainland Europe somebody's taken pot shots at small farmland birds, which are protected in our country.” ORG-EN-P01

		Need groups of farms pursuing environmental objectives to make improvements	2 (3)	“One of the things we have is that we're doing all the right things in terms of stewardship, but that's not to say that all our neighbours are, and we can have an isolated pocket where things are really good, but there isn't that joined up discussion with other people to make sure that all the corridors all actually line up. We can have a little pocket but actually if its all completely barren around us then - you know what I mean? … we looked in the locality and I mean there are farmers who aren't in stewardship, you know you don't have to look that far over the hedge to see that they're farming right to the ditch sort of thing, and I think that will be quite a challenge to get everyone in the sort of catchment if you like, water catchments and things like that, to all work together but I think that's a good way forward. Trying to get that united approach, but its not as easy as we would like it to be.” ORG-EN-P05b

Results of Farmer Interviews

	Environmental Actions or Decisions	# of sources (times coded)
Stewardship practices and decisions adopted by participants	Beetle Banks	1(1)
	Carbon Sequestration	1(3)
	Cover Crops	1(1)
	Created ponds	1(1)
	Cutting hay less frequently	2(2)
	Encouraging pollinator habitat, pollen mixture	4(4)
	Fallow land	4(4)
	Field margins, grass margins, field corners, buffer strips, headlands	7(11)
	Game Strips	1(1)
	Laying hedgerows	10(15)
	Manure spreading plan, do not spread near watercourses	1(1)
	Organic practices, no use of chemicals	3(3)
	Overwinter Stubble	1(1)
	Permanent pasture, meadows	5(6)
	Reduced nitrogen use, precision application	3(4)
	Reducing runoff	1(1)
	Seed harvesting plot	1(1)
	Stone curlew plots	1(1)
	Tree planting	3(3)
	Trimming hedges less frequently	4(5)
	Uses a no-till management system	1(1)
	Uses rotational grazing	1(1)
	Wild bird cover	3(4)
	Wild birdseed plots, wild bird mix	5(5)
	Wind shelterbelts	1(1)

Farmer orientations influencing the adoption of pro-environmental actions

Category	Sub-categories	# of sources (times coded)	Example(s) of Quotes
Business Orientation 10(46)	Adopting stewardship practices, decisions as part of a scheme	9(19)	"No, no, again its part of a scheme. Yeah it was the old Entry Level Stewardship scheme and before that it was another scheme. So yeah we've always been paid to do it, to be fair [laughs]… we've got very little in the way of voluntary environmental measures." (Farmer-EN-P12)
	Chose to produce energy crops due to subsidy	1(1)	"I mean in fact that's when we put the energy crop in too because that was being pushed and subsidised" (Farmer-EN-P09)
	Environmental results not valued by market	1(1)	"Because how do you - there's no financial figure on producing - on the amount of Skylarks that live on the farm. But they're here…but how do you put a price on that?" (Farmer-EN-P02)
	Farmers cannot pursue environmental activities without being profitable	2(2)	"Because its just, yeah the numbers don't add up. … the farms are not hugely profitable at the moment with prices where they are. … And I suspect that the attitude will be … they've either gotta pay us or its gotta be some sort of legislation or that, you know, that type of thing, to make us do it at the moment." (Farmer-EN-P12)
	Features protected by regulation, SSSI on the farm, scheduled monument, Greenbelt	4(4)	n/a
	Features support regulatory compliance, buffers, no-spray zones	3(4)	"The ones around the ditches are quite handy, as I say we haven't got to worry about no spray zones and stuff like that, and also they count towards the greening element of the payment scheme." (Farmer-EN-P03)
	High cost of woodland management	1(1)	"If I could make money, if I could manage them at zero cost I would do it, but whenever anybody talks about doing thinning or this that the other it's going to cost money." (Farmer-EN-P09)
	Leave land out of production for Cross Compliance, Greening	2(2)	"The ones around the ditches are quite handy, as I say we haven't got to worry about no spray zones and stuff like that, and also they count towards the greening element of the payment scheme. So they are useful for that. But obviously there's no payment on them anymore. You just have to have them as part of the greening." (Farmer-EN-P03)
	Low commodity prices have not affected environmental decisions	1(1)	n/a
	Organic for economic reasons, cost-savings from reduced inputs	2(2)	n/a

	Reduced, careful chemical application good for efficiency and environment	4(7)	“As a farmer my objective is not to waste any inputs…if you're pouring chemicals onto ground and half of it is getting off into the environment and killing things that you don't want, that don’t need to be killed, then that is just wasteful” (Farmer-EN-P09)
	Sell firewood off-farm from woodlot	1(1)	n/a
	Stewardship activities required to maintain organic certification	1(1)	n/a
	Woodland used for forestry purposes	1(1)	n/a
Environmental Orientation 12(50)	Awareness of environmental benefits from stewardship practices, decisions	4(5)	“You know, its nice to see different animals, I mean one of those wild areas there was a hare scrape we found, I guess a few years ago now, and I'd never seen it before and I and a friend of mine we were walking around and he said 'oh that's a hare scrape where the hare lives and where a leveret lives' and you know its just a bit of ground that’s sort of basically not worth doing anything with but it was benefiting some animals.” (Farmer-EN-P02)
	Chose organic for personal reasons, feels good	3(6)	“And I just liked that idea, you know, it felt comfortable with me to be organic” (Farmer-EN-P11)
	Decisions, actions for wildlife, habitat - permanent pasture, hedge cutting, low-impact farming	3(8)	“we only cut our hedge one in every two or one in every three so that there's more flowers in the spring for your bees and more berries in the autumn for your birds.” (Farmer-EN-P01)
	Enjoys seeing wildlife on the farm	3(5)	“It was productive land. Its up hedge side and we don't - you know its just a wildlife area really we dug a pond on the farm as a wildlife pond some years ago beside our farm drive and its always like a, you know, a feature, there's always something going on up there some wildlife of some sort on it. We've frogs, toads, fish in it. Frogs and toads obviously come to spawn in it. We have fish in it. There's always some herons there, or ducks there or something. You know. Its a, just a nice wildlife area.” (Farmer-EN-P06)
	Environmental decisions contrary to financial benefits	1(1)	“because we're organic and some of the environmental things we've done was because we were young innocent and didn't think about pensions.” (Farmer-EN-P01)
	Identify as an environmental oriented farmer, generally values the environment	3(3)	“well I've been in most of the schemes that the government have had over the last 25 years but we're into environmental type farming in any case, but I've been in all the schemes and I'm with a scheme now so yes I've been involved in those sort of things.” (Farmer-EN-P08) “I mean we've always farmed sympathetically for the environment.” (Farmer-EN-P09)

	Not just about taking the money, want to see environmental results from actions - conscientious	6(7)	“we get paid because we used to have hares here when we started the scheme and that was one of the things we leave in wild areas you know the hares would get more - then the boys come in and they disappear and you think well bloody hell what a waste of time that was.” (Farmer-EN-P02) “we have got that scheme and that's been an experiment which has been monitored for the past 10 years every other year to see how they establish and how they spread and they did the final report this year whereby we've got 100 different plant species on that one small strip of chalk grassland. So we feel that's been a great success and we will carry that on, you know, simply because we've achieved it” (Farmer-EN-P09)
	Proud of environmental achievements, species numbers	2(4)	“this has just resulted in a huge increase in wildlife on the site. We’ve got Barn Owls nesting, we've had Little Owls. I mean we've got - the local RSPB bird enthusiast lead is a member and he's just said, you know, its completely transformed site, its been a complete turnaround, even on this small site.” (Farmer-EN-P10)
	Pursue stewardship activities in response to 'bigger issues' in agri-environmental sustainability	1(1)	n/a
	Tree planting, hedge laying for personal reasons	3(3)	“Well actually the vast majority of that was not even on schemes…that's just a sort of you know a personal passion if you like. Of establishing new hedgerows.” (Farmer-EN-P05)
	Undertake stewardship activities for personal reasons, values	2(3)	“there's lots of my money gone into it, irrespective of the grant aid. We've spent more than the grant we've spent our money on it” (Farmer-EN-P08)
Farm Health Orientation 10(16)	Concerned about soil health, reducing soil erosion	3(6)	“I mean scientists are saying we've got a hundred harvests left in our soils, you know, I've seen first hand what we've done to our soil, its totally dependent on using the soil like blotting paper for chemicals. We're destroying natural fertility” (Farmer-EN-P10)
	Establish features for appearance, aesthetics	1(2)	“A lot of the stuff that got gapped up was actually main roadside hedgerows and that just, you know, maintains our appearance really…I'm very fond of my hedgerows” (Farmer-EN-P05)
	Farmers have personal interest in maintaining the health, sustainability, productivity of the farm	1(1)	“I'm 37 I've got what another not quite 30 years, 25 years left of productive sort of working left so I can't destroy my farm because it won't be good for that period of time so I need to make sure I look after it” (Farmer-EN-P02)
	Inherited farm, family farm	6(6)	“No no the family's been here since whenever. 1800 and something or other.” (Farmer-EN-P03)

	Notice improvements in soil health from practices	1(1)	“The soils slowly improving through using animals, growing green manures, and just generally trying to look after the soil.” (Farmer-EN-P10)
	Restoring land previously used for arable production, opposed to 'industrial' agriculture	1(3)	“We certainly notice the after effects of industrial agriculture with the soil being in such dreadful condition that's taken a long time to recover from but - and we're still recovering.” (Farmer-EN-P10)
Lifestyle Orientation 11(31)	Natural areas used by public against farmer's wishes, trespassing	2(3)	“The other issue we had mainly around here was sort of, there's a small town nearby, of course a lot of the margins sort of began to be used as dog walking areas and that sort of thing.” (Farmer-EN-P03)
	Non-production spaces, woodland, grassland used for recreation	1(1)	n/a
	Prefer messier, untidy landscape - more natural	1(1)	“It looks messier than it used to but it looks better in my opinion.” (Farmer-EN-P10)
	Shooting	8(25)	“we do little things for our own shoot and that, which is for our benefit, for our pleasure if you like, if I can use that word, because I'd rather eat a pheasant that's lived in a wood than eat the chicken that's lived in a shed all its life and has only been alive for 6 or 8 weeks, you know, that's my personal opinion.” (Farmer-EN-P02)
Production Orientation 7(18)	Associate environmental activities with production increases, benefits of pollinators	3(3)	“certainly our production is increasing, year on year, its just getting easier to produce food year on year.” (Farmer-EN-P10) “well all vegetables need to be pollinated but particularly your beans and your peas and your courgettes, yields were really down so obviously for us having lots of pollinating insects around is important for yields.” (Farmer-EN-P01)
	Collect firewood for personal use	1(1)	n/a
	Did not notice production improvements from features	1(2)	“I don't think there were any particular benefits in terms of production” (Farmer-EN-P03)
	Fallow, crop rotation to control weeds, pests	1(2)	“this year we have actually decided to completely fallow about 75 acres with a green manure on it just to try, you know, because we haven't got - or we're losing the option of oilseed rape we do have grass weed problems such as black grass that we're trying to get on top of so we have picked, you know, decided that we'll have an area of fallow each year, a 12 month fallow where we'll put a green manure crop on it of some sort.” (Farmer-EN-P12)
	Features, field margins produce pests, weeds	2(5)	“certainly getting rid of them [grass margins] is a nightmare because once they've been there for ten years of course the tree roots and the hedge roots have all moved out into the field. You've also got all of the weed problems that have arisen from

			them. And it has sort of taken us probably two cropping years to get them back into the sort of field condition that they were in before." (Farmer-EN-P03)
	Focus on crop diversity, avoid mono-cropping, reduce vulnerability	1(1)	n/a
	Focus on nitrogen fixing crops	1(1)	n/a
	Not worth time, effort to bring marginal land into production	1(1)	"I mean if, yeah, if you wanna maximise your output from every single bit of ground you got I suppose we should've been doing something with it but probably if you add up the time it takes you to do that then its probably not worth it anyway." (Farmer-EN-P02)
	Outer edge of fields are least productive, may not be profitable, hardest to cultivate	2(2)	"the outside of the field is always ripe and unevenly, that we would do our set-aside around the outside of the fields." (Farmer-EN-P09)
	Work with nature to reduce pests, encourage predator-prey dynamics	1(1)	n/a

External factors influencing participants' adoption of pro-environmental actions

Category	Sub-categories	# of sources (times coded)	Example(s) of Quotes
External Factors - Geography, soil quality, climate	Farming very marginal land with support from schemes	1(4)	"when they looked at the soil type map [my son] realised that our farm was virtually unfarmable [laughs]. … it's all coal measures. And it's none too good really … I mean if it weren't for the Single Farm Payment then that would be it, that would be the end of it. Really. Because that's what I live off." (Farmer-EN-P04)
	Leaves marginal land out of production, enrols marginal land in schemes	6(10)	"we are taking a reasonable amount of land out of production to be in this scheme, so probably - yeah we've probably got 5% of our farmed area, or potentially farmed area, is in the scheme. But you know we sort of put the options in place in all the places where the productivity of the land was the lowest if you know what I mean. You know, awkward field corners, so we've sort of tended to site the options to make our life easier and also you know the sort of income we're getting from those poor areas is

			probably as good, if not better than if just carried on cropping them. So we've used it to our advantage, really." (Farmer-EN-P12) "Yeah, its marginal land, but also it works well with the Natural England contract with the stewardship, in that I get paid to - I get compensated to leave it out of production, you know, so then its beneficial so that we have, you know, various areas that are left and our corners of fields, our sides of fields, you know the margins that we leave, the footpaths, and lots of, yeah, areas like that." (Farmer-EN-P11)
	Not worth time, effort to bring marginal land into production	1(1)	"But as far as production losses, negligible I would say. I mean if, yeah, if you wanna maximise your output from every single bit of ground you got I suppose we should've been doing something with it but probably if you add up the time it takes you to do that then its probably not worth it anyway." (Farmer-EN-P02)
External Factors - Markets, prices, economy, social expectations	Expectation of cheap food is a problem for farmers, environment	1(3)	"now that food is so cheap, there's no value it in at all, people don't have any value for food generally speaking … they expect to be able to go and buy whatever they want as cheap as they can so they've got more money to spend on iPhones and iPads and stuff like that it's just, it's how society is these days." (Farmer-EN-P02)
	Public not prepared to pay for environmental benefits through market or taxes	1(1)	"I think there's this conflict all the time, if you see what I mean, between the policy and what people are actually prepared to pay for. Whether it's through taxes or through the market." (Farmer-EN-P02)
	Reference to low commodity prices, low margins	2(3)	"I think with you know commodity prices where they are … you know, they're not gonna pay their way if you try and grow wheat on them at £130 a ton" (Farmer-EN-P12)
	Reliant on BPS for farm revenue	2(2)	"more than half of our income is on the Basic Farm Payment now, about half of our profit rather comes from about that figure, our farm is about very very similar to most, 55% of the profit seems to come from the Basic Farm Payment" (Farmer-EN-P08) "So its a conundrum because I know if I look at the sort of financial results for this farm year, if you take away my Basic Payment, you know the money I get from the EU, then you know that is much, a much bigger figure than the profit so we're immediately into a big loss situation … that would apply to most farmers, I would say" (Farmer-EN-P12)

	Voters, society have forgotten rationing, shortages	1(1)	“it wasn't that long after the war and in the war they were rationed, so the farmers and the people, like housewives and the people that voted and the politicians, they remember rationing, they remember what it was like to be hungry … so the government policy back in those days was set by people who remembered what it was like to be hungry, they grew up in the aftermath of the war and the cold war and all that sort of thing and so policy was set up to produce more food, you know, people were paid to take hedges out, make fields bigger, be more productive, produce food because we don't want to be hungry” (Farmer-EN-P02)
External Factors - Ownership, renting, landlords	Concern over increasing rents	3(4)	“the cost of occupying land if you're not the landowner has rocketed and you know rents have gone up, if you're involved in other contracting arrangements, the sort of first share of money going to the landowner's rocketed up, so in some ways the subsidy payments are sort of bypassing certainly tenant farmers and farm contractors and goin' straight to the landowner.” (Farmer-EN-P12)
	Difficult to pursue AES schemes or environmental decisions on short-term tenancies	1(1)	“nobody's going to invest money in a two year tenancy not knowing whether you're going to still have it at the end of the two years” (Farmer-EN-P03)
	Involvement of, influence from, other organisations and landlords, National Trust tenancy	1(1)	“My landlords on 80 hectares of the farm which is where we live, is the National Trust, and obviously they're very keen on the environment.” (Farmer-EN-P09)
	Rent land from Church of England	1(1)	n/a
	Support from landowner, landlord for AES enrolment	3(4)	“we've got quite a big higher level stewardship scheme which was you know and the estate's got a history of being in various stewardship schemes that have sort of been available at different times, so there's always been a push to join these schemes, from the landowner and the agent, and probably not least because there's a very big sort of game shoot on the estate as well.” (Farmer-EN-P12)
	Tenant farming - issue with landlords asking too much from farmers with low margins	2(2)	“And [the landowners] say 'well we'll have that and you do what you can with the farm' but that doesn't work with prices down, down below £130 a ton for wheat.” (Farmer-EN-P04)
	Unfair distribution of land in England, need to inherit farmland	1(2)	“in the UK, land is very unevenly distributed, so this results in land prices being pumped up, it also happens to do with subsidies, but it makes it incredibly difficult for new entrants into farming to actually get their hands on any farms, it must be one of the only sort of like career paths where you really just have to inherit it” (Farmer-EN-P10)

Ontario

Results of Stakeholder Organisation Interviews

	Category	# of sources (times coded)
Motivations for farming (general)	Culture	1 (1)
	Enjoying Technology	2 (3)
	Good environment for family	1 (1)
	Lifestyle	7 (9)
	New Markets, immigration patterns	1 (1)
	Noble cause of feeding people	2 (2)
	Profitability & Business	10 (13)
	Romantic, idealistic reasons	2 (2)
	Self-employed, own boss	1 (1)
	Tradition	6 (8)
	Values and beliefs	2 (2)

	Category	# of sources (times coded)
Reasons farmers protect features or adopt environmental behaviours	Benefits for production	7 (9)
	Business connected to the wider environment	3 (3)
	Consumer demand	1 (1)
	Culture of land stewardship	3 (5)
	Farmers proud of features and wildlife	1 (1)
	Feeling of appreciation, being a 'good guy'	1 (2)
	Financial incentives & agri-environmental programs	3 (3)
	For next generation	2 (2)
	Hunting	1 (1)
	Influence of family and friends	1 (2)
	Marketability	2 (2)
	Personal beliefs, values	7 (8)
	Personal connection to the land	3 (3)
	Personal interest e.g. breathes the air, drinks the water	3 (3)
	Regional culture and peers	1 (1)
	Regulation	2 (3)
	Right thing to do, altruism	2 (2)

	Category	# of sources (times coded)
Reasons farmers may not protect features or adopt environmental behaviours	Ecosystem already fragmented, changed	1 (1)
	Farmers cannot afford to address environmental concerns	1 (2)
	Farmers unaware of environmental impact	2 (2)
	Fear of regulation (e.g. Species at Risk)	1 (2)
	Financial gain	6 (9)
	Financial necessity	3 (3)
	Losing control of farm through environmental agreements	1 (2)
	Lower priority	1 (1)
	Peer pressure, 'farming culture'	1 (3)
	Removing habitat in anticipation of not being able to later	1 (1)
	Short-term thinking	3 (3)
	Unintentional	1 (1)

Theme	Category	Sub-category	# of sources (times coded)	Example(s) of Quotes
Farmer Motivations and Decision-making - general	Farmer Identity	Farmer as producer not steward	1 (1)	“So that's a straight trade-off between a societal environmental issue and a farmer economic issue, and in that particular case the farmer, the environmental issue is really little to do with the farmer.” ORG-ON-P08
		Farmers tied to the landscape	1 (2)	“They, in some cases, have as much of a tie to the landscape as I might have to landscapes that I enjoy for different reasons… And I think in some ways the farmers are less likely to fall into that kind of modern trap, because they are actually going outside and they will actually step onto the soil and look at the crops and handle biological material. I think that gives me a lot of hope for that sector of society not being as divorced from the natural world as some other sectors are.” ORG-ON-P04

	Motivations behind farmers' land management decisions	Economically irrational decisions, values, beliefs	3 (4)	“It’s not purely about money, clearly, because many farmers are undertaking activities that are possibly detrimental to their business operations. They're not making as much money but they do it anyway for whatever motivation.” ORG-ON-P03 “I think farmers' decision making model is no strictly economic. It depends, and again its hard to make-when you have 50,000 farms, its hard to make generalizations, about the entire group, so there are different people within that and have different motivations so, there's lots of-but I think most people would agree that its just like behaviours of all of us. We're a complicated set of behaviours. We're not strictly, we're not Spock. We're not the rational actor that Adam Smith had in mind. Right? It doesn't exist. We're more of a complicated set of behaviours motivated by a whole bunch of things. So I think farmers are motivated by things, social things, and value based things, so their decision to participate in environmental things is not just-its not an economic motivation, its a value based decision, in part.” ORG-ON-P11
		Profit maximisation	5 (5)	“do farmers always make an economic decision? Yes, within-but economics is complicated. Economics can be just grain in the bin this week, or-farmers know that they have to preserve their soil quality, at some level, and some do a better job than others. So you can mine your soil for maximum productivity this year, but you know you're degrading your soil for next year and ten years out. So, the question of 'do farmers always make an economic decision' I'm going to say yes, but then the question is the timeframe. So I'd like to think that farmers don't make the easy quick buck for this year, that they have a longer time horizon.” ORG-ON-P08
Role of Farmers and Encouraging Environmental Behaviour and Land Management Decisions	Compensation for environmental behaviour, conservation, ecosystem services	Farmers are not adequately compensated, rewarded for ecosystem services	3 (5)	“The role of food production can have negative environmental consequences. Farmers are rewarded for production, sometimes there are extra costs to the best stewardship practices. Or looked at another way they highest levels of stewardship, lowest soil erosion, best manure handling practices are not rewarded in the market place.” ORG-ON-P08 “So not only do they provide food, they're often helping provide clean water and clean air through good land stewardship practices. That’s generally not supported- its supported nominally and in small ways through various policies and incentives, but it in no way often- the farmer, its out of their own pocket very often and that needs to change if we're going to see any real success in moving in that direction.” ORG-ON-P07

		Farmers need compensation for behaviours and decisions with no production benefit	1 (1)	“But when you, you know you say 'we don't want you to harvest your hay'. That's money now and the only benefit is to the bobolink, not to the farmer… If he harvests his hay late it just gets tough, and old and hard. So that's a straight trade-off between a societal environmental issue and a farmer economic issue, and in that particular case the farmer, the environmental issue is really little to do with the farmer.” ORG-ON-P08
		General support for public funding of farmers	1 (2)	“I think Canadian farmers having some of the best land in the world should be completely supported by municipal, provincial and federal governments” ORG-ON-P05
		Poor people will pay the price of high food costs resulting from environmental conservation	1 (2)	“Not to mention who takes the risk and who pays? Who takes the risk if you run short of food or it is to highly priced - the poor.” ORG-ON-P08
		Society should compensate landowners for environmental conservation, incentives	2 (6)	“But the key in that whole picture is that it needs to be-and this is a much bigger issue is that people need to understand that its actually to everyone's benefit to do this, and if it is to everyone's benefit, to society's benefit, to economic benefit, as well then we need to be able to pay for it needs to be done through incentives and even-if its being done on private land, the private land owner, which are often farmers, need to be supported and it needs to be-they can't be paying for the health of everyone's natural environment.” ORG-ON-P07
		Who should pay for increased cost of production	1 (1)	“Who pays farmers (or other rural land owners) to manage their land in an economically “in-efficient” way, to preserve some natural features i.e. who pays for the hedgerows and margins of productive land? ... It is easy for society to want to download these costs onto the farmer, in a scenario where they can get cheap food, and still have natural features everywhere, this is an easy sell to and urban audience” ORG-ON-P08
	Encouraging farmer behaviour and decision-making	Changing decisions and values between generations	1 (1)	“different generations will come forward with different perspectives. That they work into the business, the management decisions. And I'm always surprised. It’s not just the older generation that is now turning attention to the needs of wildlife. It’s not like that at all. I've seen an equal number of new farmers that are, once they find themselves in the decision making process or strongly influencing the decision making process it’s a great opportunity not only for new crops and new practices but to introduce a new way of thinking when it comes to things like biodiversity.” ORG-ON-P06

		Cover crops	2 (2)	“So much attention being paid in our association right now on the topic of cover crops, which is unbelievable people have an insatiable appetite for everything cover crop” ORG-ON-P06
		Education and awareness - for farmers	5 (7)	“through the education and awareness we make-our producers are made aware of the potential or the risk I guess associated with some of their production practices and they're also made aware of best management practices that can address those concerns” ORG-ON-P09
		Empowerment, involvement of farmers	1 (4)	“Our underlying bible is a set of principles. Not a set of rules. But what that effectively does is that it gives power over the environment back to communities and farmers.” ORG-ON-P10 “it’s about engagement, it’s about participating, it’s about being one of the good guys, not one of the bad guys, it’s about being patted on the back.” ORG-ON-P10
		Farmers have diverse motivations	2 (2)	“My understanding is that, again we're often very good at pigeon-holing people or pigeon-holing professions, but we're all very different and different farmers have very different opinions about what was going on there I think.” ORG-ON-P04
		Farmers meaning well but lacking necessary knowledge	3 (4)	“So I would say most set out with the intention of being good stewards but there is sometimes a disconnect or a time lag between understanding the impacts of what you do on a site level, to what impact that has on the wider landscape.” ORG-ON-P03
		Incentives and voluntary programs better than regulation, negative reaction to limiting freedom	11 (27)	“I often feel that maybe the North American culture is more - the spirit of the pioneer. People don't like to be told what to do on their own land and they would be more willing to engage if it wasn't directed but is rather an acknowledgement that yes...here's the just rewards from that rather than putting in place a regulatory system” ORG-ON-P03 “And we've been treating farmers environmentally with a kick in the ass, so they feel a jackbooted regulatory approach affecting them and this is sort of them voting with their feet. Right? … the joke I always make is, you know when your grandmother gave you a Christmas card and if a little bit of money didn't fall out of it she didn't love you all that much anymore right? The money, even though it’s not very much, is love. And that's a really dumb thing to say but it’s the truth. Because the money doesn't move mountains. It doesn't allow you to go buy a new car, right?” ORG-ON-P11

		Industry standards, assurance systems	1 (1)	“And then I think the overall, this whole development of the-from a retail side of wanting some measures of sustainability. That's certainly a factor in how farmers and farm organizations are thinking about ag production. So there's a move to try to create an industry wide standard for sustainability” ORG-ON-P11
		Market, consumers	5 (6)	“The best way of having it is the market pay for it and I think a lot of the things that we say...if society demands that we do such and such and such then we're gonna say 'well thats all fine and dandy but then you've gotta reward us for doing that', it goes hand in hand. If they're not willing to pay it through the product that purchase then society as a whole is going to have to, through various programs, to reward people for doing that kind of work.” ORG-ON-P01
		Need to be profitable before they can be sustainable	1 (1)	“Well I said right off the top if farms aren't profitable they aren't going to be sustainable. There's got to be attention first and foremost made to the profitability of these operations, there's no question in my mind about that at all.” ORG-ON-P06
		Other agreements	1 (1)	“I know elsewhere in Ontario we do have some arrangements with farmers who will cut the hay at the certain point in time after the birds have successfully bred and their offspring have fledged. In those cases we may well keep that kind of arrangement going for longer potentially indefinitely specifically to try and conserve those species of birds.” ORG-ON-P04
		Property rights and land ownership	9 (14)	[general concern by organisations of infringing on people’s property rights and some sensitivity of land ownership, such as the purchase of easements or outright purchase of property]
		Proven alternatives (e.g. BMPs)	1 (1)	“so if you're gonna suggest to a farmer that they modify their practices to better accommodate that species at risk, you've got to have suggestions that are proven, when you speak to that individual, you've gotta be able to offer up some alternative practices that are not going to negatively affect his bottom line, or his productivity, so there's gotta be proven best management practices” ORG-ON-P06
		Regulation	6 (13)	“I think there will always be a role for regulation… But it’s been like having a carrot and stick I think you need both.” ORG-ON-P03 “I think in many cases the behaviour would change if the rule went away. As much as I like farmers, and as much as I support them, and as much as I am driving healthy local food systems, I mean let’s be honest everybody's out to make a living and if we're going to make...until our food system and our consumers are fully supportive of the farmer you have to keep saying 'what's in it for them?'” ORG-ON-P05

				“But there is a role for regulation to play in this, but it can't be driven solely by regulation or its doomed for failure, there's gotta be - you gotta be seen as bringing agriculture into these discussions in a meaningful way and putting all the options on the table and deciding how you're going to move forward.” ORG-ON-P06
	Farmer support mechanisms, payment for ecosystem services	Concern over the monetization of nature	2 (4)	“It’s a huge fad, it’s a huge fad in academia especially. I think it’s more popular in academia than anywhere. It’s unbelievable how people have changed the phraseology to cater to that perspective… we don't monetize our children, we don’t monetize our spouses, so why would on earth would we do that to nature? … rather than trying to spread the ethic you're monetizing it and then devaluing it.” ORG-ON-P11
		Farmers only rewarded for production	1 (2)	“In general they are good stewards. But yes the roll of food production can have negative environmental consequences. Farmers are rewarded for production, sometimes there are extra costs to the best stewardship practices. Or looked at another way they highest levels of stewardship, lowest soil erosion, best manure handling practices are not rewarded in the market place.” ORG-ON-P08
		Payment for ecosystem services	6 (27)	“competition or the demands on those ecosystems and the economics that are tied to all other, individual aspects of it whether its cutting a tree, it immediately has, if it’s a commercial value it has a price tag attached to it, but we don't put a price tag on the value of clean water if a farmer-if a stream's running through their property, we don't put value on the soil that’s being eroded we don't put value on the air that’s being cleaned by the trees we don't put value on the trees that’s actually incorporated into our overall economic system, and I think we, to be fair and to be realistic and to be sort of holistic in a way that’s actually going to benefit everyone, we need to think of things in those terms and then as a society-we have these bumper stickers 'farmers feed cities' well, actually agricultural land owners do more than just provide food. They also provide those other ecological goods and services, and we as a society need to incorporate that into our economic system, because its economics that are driving us in the other direction.” ORG-ON-P07 “I think it doesn't seem to have the traction that it would need to go over the top… kind of revamp the entire system of how you support agriculture, so Ontario did that, went through a process for all the supports and came up with the Risk Management program that was put in place a few years ago, but that would have been the opportunity, if there was interest in the ag community to go to a more European style that would have been the point and there really was no interest in

				going there in the mainstream, so that approach really never had the currency." ORG-ON-P11 [considerable support for the notion of payment for ecosystem services, however conversations often included misunderstandings of what payment for ecosystem services (usually) means and how a model would work. NGO's were also much more supportive than public sector participants]
		Payments may undermine farmers' stewardship ethic	1 (2)	"there's a lot of perverse consequences of payments for ecological services too, right? Because, where is the value based? Where's the stewardship behind that? Are you devaluing the people who just do it because they believe in it? Then they say 'well, you're giving them money and I've already done that, I did that because I think its a good thing, so why are you paying somebody to do it', so you're undermining the stewardship ethic, through payments." ORG-ON-P11
		Used to be that environmentalists wanted to protect ecosystems for their inherent value	1 (1)	"I've been in this business for quite a while and when I started out it was, you conserve things for their own sake, for their intrinsic value, you didn't need to-it seemed almost sacrilegious to need to even want to try to come up with dollar values for things like ecological goods and services, even the term ecological goods, just for the natural environment. To me it was, and to us as conservationists or environmentalists it was there it was kind of a sacred thing, the natural environment that we were part of and we should preserve it." ORG-ON-P07
	Farmers' role in land stewardship	Farmers are good stewards under right economic conditions	3 (3)	"I think there's a desire to be good stewards of the land for most people, but as it becomes harder to make a living for different scales of farmers then obviously it becomes harder to pursue those other kinds of activities. If you can't make a living then you aren't going to do additional activities that are going to cost you money." ORG-ON-P03
		Farmers are good stewards, role of steward is appropriate	10 (14)	"I hope it's abundantly clear that I see all farmers as being environmental stewards and there's examples of extremes in any walk of life, and agriculture's no different, but by all means they're environmental stewards." ORG-ON-P06 "They have to have both roles, they absolutely have to be in the production of food, they need to be stewardly, they need to be conservation minded, with the land and the environment around them. So yes, and I think overall, farmers are seen to be that way and for the vast majority they are. And because they understand that the mistreating of the environment around you is gonna cost you money. That's simply the way it is." ORG-ON-P01

		Getting support from farmers	1 (1)	“So, how do you address that then? Not wanting to be a campaign that simply wags their fingers and says no you can't, no you can't, you're not going to get farmers on board for that.” ORG-ON-P05
		Many farmers have good understanding of environmental practices	1 (1)	“there's many farmers who have a very, very well rounded understanding of good environmental practices and impacts and that sort of thing as to what they're doing and they try to do-try to be as responsible as possible, there's no question about that” ORG-ON-P07
		Practical considerations of env practices for farmers	1 (1)	“I mean they have to be good environmental stewards but then there's particular issues where, you know like spreading manure in the fall. So as we learn more about how phosphorous runs off, spreading manure in the fall, we're starting to learn that that might be landing in the river. But we can't spread manure on 6 foot high corn. So you gotta wait until the corn comes off.” ORG-ON-P08
		Role of farmers (food producer v. environmental steward)	5 (7)	“Can the roles of food producer and environmental steward come into conflict? They come in conflict all the time. They always have, I suspect they always will. No matter how we manage that conflict and that’s one of the many challenges of food production it also applies to fibre production and biomass production.” ORG-ON-P06 “they shouldn't conflict. But they should-I don't think that they should conflict but the reality is that-when I talked about the debt to equity ratio I mean, I think sometimes farmers find themselves in a position where they observe, they observe erosion or run-off or something of that nature and either they don't know just how to address it or they have some ideas of how it might be addressed but they don't have the resources to do that…I don't think they're conflicted in terms of production over environmental stewardship but they might be conflicted in terms of barriers to addressing the environmental concern.” ORG-ON-P09
		Should be left to farmers to decide whether or not to have features	2 (3)	“I think that is the farmer's, the farmer's choices as the, you know, having title to the land.” ORG-ON-P09 “But we, again, it’s about willing participants. And I'm not, I'm not saying everyone should participate, we say if you want to participate here we are.” ORG-ON-P10
		Trusting farmers to do what's right	1 (1)	[more of a sense that we can and should trust farmers to do what is right rather than regulate them]

	Farming Community	Farmers don't criticise each other	1 (1)	“Yeah, and there's certainly a culture about you don't dare speak ill of another farmer and lets all hang together and you know all for one, one for all. Lowest common denominator, we look after each other” ORG-ON-P10
		Farmers critical of each other	1 (2)	I mean if you don't already know you'll find this too, farmers are pretty quick to criticize their neighbours too…they tend to see faults in their neighbours before they see it in themselves. It’s not like they're blind to that. They're not-they may-if they see a neighbour who's applying manure in the middle of a snow storm, they don't like that. It’s not like they're-it’s not like farmers are pro farming or pro agriculture to the extent that they tolerate bad behaviour by other farmers.” ORG-ON-P09

Results of Farmer Interviews

	Environmental Actions or Decisions	# of sources (times coded)
Stewardship practices and decisions adopted by participants	Cover crops	7(11)
	Created pollinator habitat	5(6)
	Creating habitat, nest boxes for species at risk	3(3)
	Crop rotation	6(7)
	Fence livestock out of woodlot, wetland, streams	5(6)
	Field margins, buffers, riparian buffers	5(5)
	Grassland, improved pastures, permanent pasture, fallow fields	6(7)
	Improved water management, ponds	7(9)
	Late hay cutting for ground nesting birds - bobolinks and meadowlarks	5(6)
	Limit livestock numbers to reduce impact on the land	1(2)
	Low-till, no-till management	8(11)
	Maintaining seed genetics, heritage varieties	1(2)
	Organic principles, practices, no use of chemicals	12(16)
	Plant based mulch, use hay for mulch	2(3)
	Planting native plants and trees	2(3)
	Raise grass-fed sheep, grass-fed beef	3(3)
	Reducing fuel use	2(2)
	Renewable energy use	2(2)
	Rotational grazing	5(7)
	Sustainable, efficient buildings, structures	4(6)
	Tractor attachment to warn wildlife during hay cutting	1(2)
	Tree planting	11(18)
	Use livestock to improve soil health	5(11)
	Use of guardian dogs, llama, to deter predators, pests	3(3)
	Wetland out of production	4(5)
	Wind breaks	7(10)
	Wooded areas out of production	7(7)

Farmer orientations influencing the adoption of pro-environmental actions

Category	Sub-categories	# of sources (times coded)	Example(s) of Quotes
Business Orientation 10(24)	Diversification of farm business, farm production - spreads risk	4(8)	"Our model kind of helps to insure. The model of growing lots of different stuff, though this past summer we weren't so sure…We covered our bases and we ended up doing fine in the end but yeah I mean if you're just growing one thing on a huge scale I think those are more the people who are getting crop insurance." (Farmer-ON-P09) "what it actually does is it keeps, no matter wet or drought, its guaranteed something will succeed and something will fail. So it actually ends up financially pretty much even from year to year." (Farmer-ON-P08)
	Equipment, machinery costs lock farmers into certain practices, models, decisions	1(2)	"And like I even look at ourselves at farmers OK? We have our own grain storage facility, we've invested money in that direction, our equipment costs that are associated with harvesting grain are - we're invested in a certain direction right? We've really specified what it is that we do so now I'm going to have to go in a totally different direction so that lends myself to well what to do I do with these already existing assets that I have?" (Farmer-ON-P16)
	Farm business, production decisions for health market - business opportunity	1(1)	"this whole gluten free craze, and this whole lack of communication between the consumer, what was going on as far as sourcing locally sourced grains, everybody's talking local sources meat, local source cheese, local source vegetables, and yet the biggest portion on our consumers plate is the grains." (Farmer-ON-P15)
	Farmers cannot adopt stewardship practices, decisions for profitability reasons, cannot afford to sacrifice revenue	2(2)	"not enough farmers are making enough of a living and its hard enough for them to make a living without giving up, you know, doing the things that I'm doing that might cause them to sacrifice some of their efficiencies in the short term. In the long term not, but in the short term, you know, they're struggling anyway." (Farmer-ON-P01) "If we didn't have good jobs we couldn't proceed down that road very easily." (Farmer-ON-P13)
	Lack of herbicides allows for harvest of wild plants, flowers - new business opportunity	1(3)	"because I'm not spraying I'm discovering that I'm harvesting plants I didn't plant, serendipitous native plants that are showing up in the orchard floor. Edible

			flowers to a high-end local restaurant as well…that's part of my marketing is other people probably don't have it." (Farmer-ON-P08)
	No-till practices is cost-saving, improved efficiency	1(1)	"We have a lot fewer - lower fuel costs, lower capital costs, we don't to have the same equipment, you have less hours spent doing it" (Farmer-ON-P18)
	Taking environmental actions to adhere to Environmental Farm Plan, committed to upholding plan	1(1)	"And also to conform to the terms of the Environmental Farm Plan, I mean one of the things you do when you take the plan is that you agree that you are going to, you know, uphold the objectives of the plan and you'll do whatever is necessary to meet all identified potential problems." (Farmer-ON-P10)
	Too costly to bring marginal land into production, not worth the expense	1(2)	"if I wanted to go in tomorrow and clear cut it and plough it up and plant there'd be absolutely nothing to stop me from doing that. I'm not interested in doing that I don't have the time or the money to invest in doing something like that, it's just not worth it. The sandy soils, the low production capacity, and poorly drained and it's just, you know, it would involve an enormous amount of investment in land levelling and drainage and so on and it's simply not worth doing it. You've never gonna get the money back." (Farmer-ON-P10)
	View that chemicals do not work well, do not improve productivity	1(1)	"Well when we were using the chemicals and things, the chemicals didn't really seem to work very well on stuff, a lot of times I end up cultivating again anyway" (Farmer-ON-P14)
	Woodland, wetland offers tax benefit, managed forest plan	2(3)	"We have considered doing a managed forest plan for tax easements, I don't know if you're familiar with that, but you kind of work with someone who is certified to make a plan for you and then you kind of say that you're not gonna clear cut the forest and what have you so we would do that but we really aren't using the forest much at all besides recreation." (Farmer-ON-P09)
Environmental Orientation 18(93)	Attachment to old growth trees, well-established features	1(1)	"original old growth trees. There's one there that's about 400 years old, I figure." (Farmer-ON-P04)
	Attempting to demonstrate good stewardship to others in farming community, increase awareness	2(3)	"we've planted probably 10,000 trees on our property over that period of time to re-establish wind breaks and try and demonstrate to our neighbours that maybe there are other ways of doing things, so, yeah, so we're going against the grain a little bit." (Farmer-ON-P12)
	Believe in organic, ecological farming - continuing model in spite of profitability	3(3)	"I try not to sound negative but it's been a tough haul for us trying to make any money doing this and I'm committed to what we're doing I think what we're doing is the farm of the future which sounds funny from what is basically a farming model based upon technology of 150 years ago plus" (Farmer-ON-P07)

	Chose livestock breed for environmental reasons, low impact breed	2(4)	“then that became the great big checklist of OK what kind of cow?... OK they gotta be easy calving, they've gotta be able to survive on just grass, no grain, no corn, and these sorts of parameters…and what kept coming up: Devons … they're just a smaller animal. And so yeah they don't plug the pastures the same way” (Farmer-ON-P04)
	Concern about loss of biodiversity in major farming areas	2(4)	“we can all be like horses with the blinders on and think that you know the lack of biodiversity, the loss of our ecosystem, our soil degradation all that kind of stuff that's happening in Africa but it’s not happening here on our own turf. But you know anybody just has to pick up a magazine and see that you know the species at risk within our own community our own farming community is staggering … we're not talking bobolink or any of these more you know rare birds we're talking barn swallows.” (Farmer-ON-P15) “This area is so commercially refined as agriculture that there aren't many wild species left here to start with…the coyotes are gone, the foxes are gone, everything is gone. There's just damn little wildlife left. And then you take the habitat loss too, where the woodlots are all going down.” (Farmer-ON-P04)
	Could expand but intentionally limit farm expansion, livestock numbers for environmental reasons	4(6)	“I think we could easily log it and we could do what we wanted to with a permit. Its significant they call it, but its not protected in that area, but we could expand the entire distance if we wished. Its just we don't. That would be, you know, that would be strip mining from an agricultural sense.” (Farmer-ON-P13)
	Discussion of pride, proud of farm, proud of stewardship activities	2(3)	“In terms of being proud of what we do as a certified organic farm I wouldn't say it’s just keeping chemicals off our farm we're really committed to our soil and to building the healthiest soil that we can build and to nourishing the soil food web and all of that life that is in our soil that is what makes us organic and what makes us proud to be organic and what makes us successful. So I would say that is a whole ecology, a whole environment that is not considered with conventional agro-ecological policy” (Farmer-ON-P09)
	Farm is founded on environmental ethic, prioritises environment over production	4(4)	“When we bought this parcel of land…we set out specifically to set up a model where we felt it didn't have to be an either or, it didn't have to be environmentally and not farm, it didn't have to be only one way or the other, so what we tried to do was integrate land stewardship into our whole farming process” (Farmer-ON-P15)
	Farming decisions influenced by ideology, broader, 'big picture' beliefs	1(1)	“in our county of sand and tobacco, which is heavily pesticide ridden from fumigation of soil to the spraying at the end of the, you know, foliage ripeners, and you can smell it in the area, we just didn't think that it was good stewardship

			of the area…once we had the chance and saw the rain, we decided we wanted to work a little bit further and make it happen, a lot like what perhaps Cuba is doing a little bit more. On our visits there and reading about what they're doing in their environment, with immense productivity, without the measurement from a monetary perspective but a measurement from a natural or production and a human productivity zone." (Farmer-ON-P13)
	Intentionally protecting unique ecosystem on farm, Carolinian Forest	1(1)	"Its Carolinian forest so its kind of unique for southern Ontario so that's what guards it for us in our mind." (Farmer-ON-P13)
	Knowingly sacrificing revenue for environmental actions e.g. late hay harvesting	3(4)	"Nobody has ever come onto my property and said you cannot cut your hay, no. But I am aware and if I see bobolinks I try to avoid cutting that hay until after the young have fledged. But that means I end up with poorer quality hay and I've taken the hit in my pocket." (Farmer-ON-P10) "I'm not pushing the production that way I tend - I'm waiting, I let the birds nest first and then cut my hay later. But that's just my - and I'm not compensated for that it's just what I do." (Farmer-ON-P12)
	Leave productive land out of production, take productive land out of production for stewardship purposes	4(7)	"Actually the windbreaks that we have - it's a four row windbreak on each side of our property is in very high quality land…we've probably got 60 feet on either side of the property that are in trees on very good land." (Farmer-ON-P12) "So we actually have quite a nice pine plantation which my dad planted quite a few of those trees. So its not a windbreak but its - and its by the river and its a nice natural area there but we could have cropped that for sure, but its been left out of production." (Farmer-ON-P18)
	Personal interest in biodiversity, enjoy wildlife, excited about biodiversity	6(13)	"Well the great thing about our farm is that because we don't have a lot of, I guess, tech stuff is we have wonderful Monarchs [butterflies] we have all kinds of Bluebirds coming on we have just a - we've seen more and more birds and insects coming in since we started being totally organic and the colour of birds that come through is incredible. And it seems to be a little place where we have so, so many wonderful species - are staying or whatever so we just make sure we have anything available from milkweed to anything, like we just are excited about what we have and the little paradise that we're sitting on here." (Farmer-ON-P06)

			“Things like the yellow spotted salamander I know lives in the woods right beside the field, you know, I've seen them I've played with them, so that is a species at risk and we're providing a you know a nature sink for them…we're within the range of these little creatures, we're in the - of various, you know, flying squirrels or what have you, so you know, you cut down the trees and they will not have a home. We know that it guides our decision making processes without someone else coming and telling us that, I guess.” (Farmer-ON-P13)
	Personal interest in tree planting, passion for horticulture, personal cause	4(9)	“I know that a lot of farmers around here are interested in ripping out their tree lines to make these massive crop fields, which breaks my heart every time I see it happening” (Farmer-ON-P09) “I just shake my head when I think of the magnificent trees that were just cleared off you know sometimes cut and sawed and sometimes just burned and it kind of breaks my heart sometimes…I guess I've always felt that we need trees, like, we really should have about 15% forest cover, you know, in a minimal sense for a sustainable environment. And [my Township] is sitting at about three and half percent forest cover. So you know, it’s pretty bad, it’s pretty bad.” (Farmer-ON-P04)
	Seeking to create wildlife habitat - primary objective	6(7)	“I've planted out a bunch of wild cherry and you know one thing and another and some cedar and you know Siberian pear for wildlife and you know just trying to keep a little bit more of a woodlot footprint here” (Farmer-ON-P04)
	Stewardship activities benefit wider watershed, source water protection	3(5)	“there's a wetland at the back of my farm … it’s a cold water stream there where there should be trout so the more we can do to protect that is kind of what we're trying to do.” (Farmer-ON-P18)
	Stewardship activities, decisions for personal beliefs, ethic, 'doing what's right'	8(14)	“Well I'm just doing my part because I was brought up that way…to be frank, I'm 58 so [laughs] so I don't know whether I'll live to see - but you know my father planted hundreds of trees for the next generation so, I figure I'm in line to do that myself.” (Farmer-ON-P01)
	Decisions due to anticipated impact of climate change, see impact of climate change	3(4)	“I guess our pond, I mean our dam, is the most recent thing that we've created. And we chose a design that we thought was a sustainable design but the reason for doing it was to survive through you know climate change.” (Farmer-ON-P09)
Farm Health Orientation 16(55)	Challenge with wind erosion	2(2)	“So our major challenge on the farm is wind because of the - even though we do have tons of trees, there's still huge sections that are un-treed, and our neighbours obviously has like no trees. So wind is our biggest real challenge” (Farmer-ON-P03)

	Concern about soil health, soil degradation, actions to improve soil health	11(26)	“I guess our real goal is to obviously improve the soil quality you know definitely improve the soil life that's out there improve the organic matter composition of the soil so yeah you start with keeping it in place for one thing and then you know building it up with microbes, manure all the rest of it and its a grand experiment but seeing in the short few years that we're doing it I think it is, you know, definitely paying dividends.” (Farmer-ON-P04)
	Discussion of farm aesthetics, enjoy aesthetics of woodlot, trees	3(4)	“we have a really nice farm, its all rolling hills and different ecosystems” (Farmer-ON-P03)
	Inherited farm, family farm	5(7)	n/a
	Personal interest in rehabilitating land after resource extraction, after poor farming practices, noble cause of improving soil	4(8)	“I thought 'man there's some absolutely noble about repairing these damaged lands and putting them back into farmland and forest'…we just looked it and said 'OK we have to do something about this land, we have to take this on as a bit of a cause'” (Farmer-ON-P04)
	Specific efforts to reduce water erosion, washes	1(3)	“over the last couple of years we have established more grassed waterways…where the land is sloping downward to the river there was becoming quite a serious wash and it was, it was down to just stone and gravel so we filled that back in with top soil and then we seeded it down and we put some more underground drainage tiles in as well to try to take the water under the ground rather than washing over the top of it and taking the soil with it. So we seeded down about 20 acres there” (Farmer-ON-P18)
	Stewardship activities, tree planting, for farm health - general	1(1)	n/a
	Stewardship activities, decisions for next generation	2(4)	“And as a fifth generation farmer I'm hopin' that there's gonna be a sixth generation farmer one day, we're trying to work hard so that, that opportunity is not eroded by my practices. OK? We want this asset that we hand off to our next generation, and that's our whole focus, our whole farm focus is that we want our farms that we manage here to be in better condition for future generations, regardless if they're our kids or they're somebody else's kids” (Farmer-ON-P16)
Lifestyle Orientation 17(41)	Discussion of identity, attachment to certain practices, certain equipment to form identity	2(3)	“farmers’ identity is as much tied to their work as it is their hobbies, OK? So when you tell a farmer that he can't be out there in the field driving his tractor, that's part of the thing that he loves the most about his job, OK? It’s part of his identity today, just like an old ploughman liked to walk behind his nice team of

			horses that he took great pride in…its no different than today than drivin' a great big shiny piece of kit down the field" (Farmer-ON-P16) "that's exactly what my neighbours are dealing with. They're proud of their equipment, oh they love that big stuff" (Farmer-ON-P17)
	Farm decisions influenced by age, physical ability	4(5)	"there are certain areas where I would ramp up production if I were younger and wanted to spend the money" (Farmer-ON-P08)
	Farm decisions influenced by family, want to spend more time with children, grandchildren	2(2)	"then as we got older and grandkids and stuff came around we sort of want to slow down a little bit" (Farmer-ON-P06)
	Farming for lifestyle, hobby, 'homesteading', career change	4(5)	"I try not to be too negative I mean I do enjoy the lifestyle of farming and I'm here for the long haul so, so be it." (Farmer-ON-P02) "well its kind of homesteading where you're providing a healthy life for your family" (Farmer-ON-P01)
	Features used for hunting, by farmer or by others	2(2)	"Yes people hunt, people fish, people camp, not just us other people too." (Farmer-ON-P18)
	Full-time farmer for family reasons, need to look after children, other family	2(3)	"so I knew I was gonna be raising four kids on my own, and so rather than paying for day-care and having somebody that didn't even know them look after them, I decided I'd get off the road … and raise my kids without day-care so that I could be with them and you know look after them." (Farmer-ON-P04)
	Influence of tradition, carrying on practices from previous generation	2(2)	"It's hard, right, because this business that we're in regardless if you're in England or if you're in Ontario, Canada, it's a learned profession, right? Grandpa did it this way, dad it this way, that's why I do it this way. … it's no different than goin' home for Christmas dinner, and my, you know, you like the way the turkey is presented, you like the way you've got these special favourite dishes that mom makes or grandma's brought to the table for years and years and years, you know, and when those things aren't there on the table everybody sort of says 'oh where's that famous Jello pudding grandma?' … it's the same thing, we're dealing with a big psychological thing" (Farmer-ON-P16)
	Organic production, environmental actions for health reasons, history with pesticide poisoning	3(3)	"my dad got very sick with pesticide poisoning, in the early 60's. A company was in to spray cattle for warble fly, things like lindane and whatever else they were using in those days were very much a nerve poison and he almost - he basically showed symptoms of having a stroke. And so almost lost him, I was only five years old then" (Farmer-ON-P04)

			“Well a lot of people ask 'how did you get into certified organic, how did you become organic' and I always relate this back to before I became organic when I was applying pesticides and I used to get very sick, I'd get terrible headaches and nausea and even though I would wear all the appropriate garb and I would have a mask and everything on and between myself and my wife we just said what the hell are you doing this for? So I just quit and as soon as I was able I became certified organic.” (Farmer-ON-P10) “And I couldn't take the chemicals, I had scar tissue in my lungs and when it - when people spray it I can feel it, it bothers me, so that's, you know, a couple of the reasons anyway.” (Farmer-ON-P14)
	Personal, family attachment to farm, grew up on farm, influence of memories and nostalgia	2(3)	“We had thousands of butterflies which I'd never seen before and its just - as I keep saying this is where I grew up, so seeing the changes for all sorts of reasons … And I think it’s also because growing up here we used to play in the woods.” (Farmer-ON-P08)
	Raise horses as pets, other livestock for personal use	4(4)	n/a
	Raise specialty, heritage, rare breed livestock	5(8)	“So the operation in the past has certainly focused on the sheep and rotational grazing. We're also members of rare breeds Canada so we are certainly concerned with the maintenance of endangered breeds of livestock.” (Farmer-ON-P17)
	Use forest, woodlot for personal recreation	1(1)	n/a
Production Orientation 16(67)	Discussion of co-benefits for environment and production from stewardship practices, decisions	3(6)	“its an unintended consequence of just simply providing a beneficial habitat and so what those birds do, these grassland type birds, is they can really help to keep species of insects in check. Right? So the species of insects that would then - like are flying by nature, moths, that would come in and lay eggs in your cover crop field that might in turn effect your subsequent crop, I like to follow corn after my cover crop, you know we don't have to worry about that when we have these beneficial ecosystem relationships at play.” (Farmer-ON-P16)
	Discussion of predators, coyotes	2(3)	“we started this coyote proof fencing. We did have substantial losses…I haven't seen coyotes in a long time. I hear them at night and so on but I've not heard or seen them close to the house or the flock or anything.” (Farmer-ON-P17)

	Harvest firewood for personal use	5(6)	n/a
	Harvest trees for fence posts	1(1)	n/a
	Intentionally expanding production area, would like to expand farmed area	2(6)	“Its good soil but there's too many roots from the trees and there's too many trees alive right now, I mean in an ideal world I'd like to clear some of it but I don't know if that'll ever happen.” (Farmer-ON-P02)
	Leave marginal land out of production, wet area, slope or hilly area	8(14)	“I have an area that was very poor, wet pasture and I have just abandoned it and allowed the bush to grow back up. Its now carrying quite a good cover of aspen and birch and oh eventually, you know, long after I'm dead and buried one day somebody will go in and harvest the lumber for pulp, for paper, or something like that. But for the moment its just essentially a natural area for birds and wildlife.” (Farmer-ON-P10)
	No major problems with coyotes	1(1)	“I mean we do have a lot of rabbits and you know other wildlife around that I think are easier targets for the coyotes. … I've never seen a coyote den out in our forest … we don't have huge fences so the coyotes can pass through if they want and they still do pass through but they just haven't been hanging around as much, I guess you could say.” (Farmer-ON-P05)
	No problem with pests from features	2(4)	“I mean anything that a bunny or a little creature would do is insignificant to us so I think it would really only be deer that would cause a problem and closest to the forest we have garlic and asparagus and they just haven't - we have not noticed any kind of pest problems, or animal problems.” (Farmer-ON-P09)
	Observed production benefits from efforts to improve soil health, reduce erosion	6(11)	“So basically the biggest benefit that I see on an annual basis now is that…when we have big rain events and our soils are to the point whereby we don't get standing water on our farm. And I can have adjacent farm management with my neighbours right beside me and you'll see that there's all kinds of standing water on their fields after a big rain event and our infiltration rate is going up by leaps and bounds” (Farmer-ON-P16)
	Pear trees grow best next to pine trees - production benefit	1(2)	“I've come to this sort of realisation that the best pear trees I've seen in my life have been next to pine trees.” (Farmer-ON-P08)
	Problems with pests and wildlife	1(1)	“I should shoot more of the deer around here though because they eat a lot of my crops. The Wild Turkeys are the worst.” (Farmer-ON-P02)
	Production benefits from pollinators	2(2)	“we plant a lot for pollinators in our cover crops and then also just around our farm we plant - cause they benefit us right, to have a lot of pollination happening around here.” (Farmer-ON-P09)

	Tap trees for maple syrup	4(6)	“And we also do maple syrup. We do maple syrup every year. It’s not a lot but we tap 180 trees…it’s enough for us to have sugar for ourselves and to sell some as well.” (Farmer-ON-P06)
	Tree planting around perimeter, fence line	1(1)	“Its very very good farmland so what we've done is the perimeter of the 50 acres and its the fence line in between our place and the neighbours” (Farmer-ON-P15)
	Tree planting as shade for livestock	1(1)	“a double row of trees so that ultimately there'll be a shaded lane for the cows.” (Farmer-ON-P04)
	Unintended environmental benefits from on-farm decisions (e.g. cover crops)	1(2)	“It’s unintended because I didn't set out to provide this habitat, OK? My intention was for soil building, I wanna release nutrients into the soil, I want to, you know, make - produce copious amounts of nitrogen fertiliser vis a vis legumes, right? And so by doing this, that was what my goal was, I wanna alleviate compaction if there was compaction layers in the soil, I wanna build soil organic matter with these cover crops, so I didn't set out to, you know, provide habitat for birds. I didn't set out to provide a habitat for pollinators.” (Farmer-ON-P16)

External factors influencing participants’ adoption of pro-environmental actions

Category	Sub-categories	# of sources (times coded)	Example(s) of Quotes
Agri-business, agri-chemical industry, retailers	Agri-business, agricultural industry only interested in pushing practices that make them a profit	1(1)	“its not in a jug if its not in a bag and if its not covered in shiny paint the industry that supports me as a farmer is not interested in it, because they have a hard time profiting from it.” (Farmer-ON-P16)
	Commodity agriculture lacks control over sale of product, prices, limited incentive to improve product quality	1(1)	“we don't control the price of what we receive for our crop either…I don't go out and I don't say to Peter at ADM or Joe at Cargill I want $7 for my corn, because I believe that I'm doing all these beneficial practices and my corn is more nutrient dense and its higher in vitamins and micronutrients and all this other stuff, no, it’s a commodity” (Farmer-ON-P16)
	Farming advice comes from agri-business, vested interests, not best for farmer or environment but best for sales	2(4)	“when I was just a small boy my dad would go and seek the advice of the Minister or the local Ministry of Agriculture, OK, the OMAFRA office. And he would get his information from them … Now the farmer gets his information from the person selling him or her an input. And if that input's fertiliser or if that input's machinery or seed or whatever and collectively all of those individuals are motivated by selling that person something … And that’s part of the problem here in Ontario, is that the

			information exchange between the farmer producer and the advocate, the advocate is sales heavy, and so that's why we've gone to this yield centric focus in Ontario." (Farmer-ON-P16)
	Hard to find some untreated, neonic free, seeds - companies not selling them	2(2)	"we were not allowed, I mean, it's not that we weren't allowed there was just no option, everything was treated with neonics, so you didn't really know" (Farmer-ON-P18)
Discussion of societal, community, peer influences	Difficulty with rural social dynamics, maintaining rural idyll, against change or alternative ideas	1(2)	"if you look around it is very undeveloped and the reason it's been undeveloped is because it's a small community and there's a lot of members in the community that want it to stay looking like farmland…so what they end up doing is, anybody tries to do anything that's sustainable or different they like, make it impossible, from what I've noticed" (Farmer-ON-P03)
	Discussion of individual influential people in agriculture, emulating popular farming figures - Opinion Leaders	5(7)	"Yeah, and there's famous farmers, you know Sepp Holzer, you know him? … I've done courses with him and met him a bunch of years ago" (Farmer-ON-P03) "we're very much following Salatin's model in Virginia, I don't know if you've seen their place or at least their website Polyface farms." (Farmer-ON-P17)
	Farmers championing stewardship, speaking to farm community, need a trusted member of the community	1(4)	"And maybe had they empowered a farmer to say 'OK [name] we want you to do out there, we want you to take this leadership role, you're doing these things and we want you to say OK lets put together a big grant proposal, here's the amount of money that we've got at play, that we can divide across said acres, but all of a sudden the conservation authority, they get the money, they get the budget, and then you gotta start paying staff, and you gotta start paying for advertisement, you gotta put on these meetings, and so then you've got - it gets caught up again in that bureaucratic layer." (Farmer-ON-P16)
	Feeling that gender discrimination exists in agricultural community	1(2)	"I think partly because I'm female [laughs] they just look at you. But that just might be my unconscious bias I dunno." (Farmer-ON-P18)
	Importance of finding groups, other farmers with similar goals - peer support	4(5)	"Well I've met some pretty, I mean I've met some pretty fabulous farmers in some groups I belong to around here and they're very, you know, environmentally aware and you know they need to make a living but they also care about that stuff. I'm lucky that way I just, I find people with similar interests." (Farmer-ON-P01)
	Importance of networks, relationships in agri-food	1(2)	"the start-up of our farm has been super super quick because its based on networks and communities and relationships from the past" (Farmer-ON-P03)
	Influence of peers, judgement from others in farming community, peer-pressure	1(1)	"I've also carried the burden of psychology pressure, psychological pressure, as my peers, when I walk into the coffee shop you know at age 44, I'm still fairly young man in the community and people are lookin' at ya and, you know, you can tell they've been talking about somethin', and when you walk in the door it's like

			deafeningly quiet, right? And people will sort of look at ya and your crop's not lookin' too good out there and so I've weathered the storm, right? I've taken it on the chin. But we're not goin' anywhere." (Farmer-ON-P16)
	Problems with neighbours, complaints	1(1)	n/a
Geography, soil quality, climate	Climate not conducive to outdoor livestock	1(1)	"I got enough ground for pasture but then I wouldn't be able to produce enough feed for'em in the winter and my last frost date's like, this year it was June 22 and then it started again in September 1st so its a fairly cold climate that animals eat a lot in the winter time so if I can't produce enough food to feed'em through the winter that's not going to be profitable for me." (Farmer-ON-P02)
	Crop varieties, machinery not designed for Ontario environment, not always well suited to local conditions	1(1)	"the machines that we're using were not designed to run in this environment nor are the hybrids that we buy" (Farmer-ON-P16)
	Farm is on marginal land, low soil quality, rehabilitated aggregate site	6(8)	"I don't live in farming country by any means, I just have a little tiny pocket of riverbed that's really good and the rest is all rock around me." (Farmer-ON-P02) "We're on pretty heavy clay. So you couldn't plant anything but grass there or trees. But its not, yeah, its not highly fertile land by a long-shot." (Farmer-ON-P05)
	Farm located in area with few woodlots, low tree cover	2(4)	"Because everybody was supposed to specialise and so here today the fencerows have long since gone and cropping is the name of the game." (Farmer-ON-P16) "its getting lower. There's so many high hoes in this area so, you know, farmers are taking out 10 acre woodlots at a time now and its really concerning." (Farmer-ON-P04)
	One of the few livestock farms in the area, high quality land	2(2)	"We own 150 acres of grass. Which in Perth County is unusual. Basically we have good quality land" (Farmer-ON-P12)
Markets, prices, economy, social expectations	Farmers remove features under high land, commodity prices	1(1)	"the land is so valuable that farmers are trying to squeeze out every little nickel they can and yeah sadly, you know, even windbreaks that went in with conservation grants are gettin ripped out." (Farmer-ON-P04)
	Influence of commodity prices on farmer decision-making (general)	1(1)	"So we had a strong commodity price in 2012 was when it all started, big drought in the US, Ontario farmers for the most part had a good crop and right away they had a little bit of extra jingle in their pocket because of the spike in commodity prices, went out, bought a bigger tractor and what do you wanna do behind that bigger tractor? You wanna pull a bigger tillage implement. And you wanna make it snort. And so pretty soon guys started to hear the coffee shop banter 'oh I got a couple

			extra bushels of beans when I did some tillage' not realising that they are just exhausting off that accumulated carbon that they had built-up from a few years of no-till OK? They're not tying one and one together" (Farmer-ON-P16)
Ownership, renting, landlords	Farmers renting land not interested in stewardship, only maximising production	2(3)	"It's rented to farmers who are very much in the mode of maximising yields no matter what the costs you know pesticides GMOs massive amounts of fertiliser no proper crop rotation and so on… know that the people who are renting the land are not gonna be interested in any sort of environmental measures." (Famer-ON-P10)
	Rent farm from landlord	1(1)	n/a
Discussion of farm profitability, difficulties, off-farm employment	Difficult to make farming profitable, especially small or ecologically oriented farms	3 (4)	"Well I would say it's very difficult to make any farming operation profitable I mean it's quite discouraging, you know, I always look back and laugh that farmers complain about not making money and then I became one, I'm like holy f*** you really don't make any money." (Farmer-ON-P02) "I would just generally say that farms of 100 acres or less which is the model, it was the model that was put in 150 years, is very tough to make a living….I try not to sound negative but it's been a tough haul for us trying to make any money doing this" (Farmer-ON-P07)
	Farm from urban centres, difficult to sell produce	2 (2)	"Well that goes back to that puzzle piece thing that we're talkin' where if I've gotta drive to Toronto to sell my vegetables it's a two and a half hour drive there and a two and half hour drive back, I do that enough times I'm gonna fall asleep at the wheel or crash." (Farmer-ON-P02)
	Farmers need to work off-farm to be viable, particularly small farmers or ecologically oriented farmers	4 (5)	"If we didn't have good jobs we couldn't proceed down that road very easily." (Farmer-ON-P13)
	Full-time farmers, do not work off-farm	4 (4)	"Oh no this is full time and we hire a number of people as well. Yeah a full time gig." (Farmer-ON-P09)
	Planning to sell farm, quit farming	1 (1)	"my wife and I are now 60 and we're looking at selling the farm in the next 2 to 3 years." (Farmer-ON-P07)
	Retired from off-farm employment	7 (8)	"Yes I do have off-farm. I was a high school teacher for a number of years and so this last February I retired. So I do have a pension, I'm very fortunate to have a pension to lean on." (Farmer-ON-P17)
	Seeking stable income, 'not looking to get rich'	1 (1)	"I'm not looking to make a million dollars, like I said, just slightly diverse with ten puzzle pieces and I'll make my income." (Farmer-ON-P02)
	Work off-farm to supplement farm income	6 (9)	n/a