

## **Investigating the economic visibility and contribution of UK women in agriculture through a systematic review of international literature.**

### **1. Introduction**

The total contribution of agricultural output from high-income countries represents about one-fifth of the world's total output (World Bank, 2019). In the United Kingdom (UK), agricultural production contributes approximately 0.63 percent to gross domestic product (GDP) (World Bank, 2019). In the year 2018/19, total UK farming income is shown to have increased by £398 million (8.2%) to £5.3 billion in current price terms while gross output increased by £571 million (2.1%) to £27.3 billion (Defra 2019). As with other developed countries, the UK has been experiencing a growth in the percentage of women occupied within this industry (Brandth et al., 2011; Hoppe and Korb, 2013; Ball, 2020).

The Farm Structure Survey (Defra, 2016) shows that women represent 52% of UK family farm workers, 19% of non-family workers and 15% of both farm holders and managers. Women farm holders and managers are also most highly classified within mixed livestock (23% and 24%, respectively) and non-classified (24% and 20%) farm types. Using Standard Output (SO) as a measure of the economic size and value of the holding (see Appendix A), the Farm Structure Survey shows women represent 23% of smallest SO band holdings and just 4% and 5% of largest SO band holdings (Defra, 2016). In terms of family workers, different trends are observed where women are most highly represented in non-classified (65%) and horticulture (59%) farm types. Within these farm types, women retain highest representation within the smallest SO band (54%) and lowest percentage representation within the largest SO band (35%). As non-family farm workers, women are most highly represented in horticulture (38%) and mixed livestock (31%) production, representing 26% of workers within the smallest SO holdings and 18% in the largest SO holdings.

Within the European Union (EU), the Common Agricultural Policy (CAP) policy provides financial support to farmers in its 27 member states. It is one of the founding policies of the original Common Market and brings national intervention programmes together into one scheme to allow farmers to compete on a level playing field while protecting against volatility in agricultural prices (and hence incomes) and to provide food security (European Commission, 2019).

The UK voted to leave the EU in 2016 and officially left the trading bloc - its nearest and biggest trading partner - on 31 January 2020, following 27 years of membership. From a UK perspective, CAP has provided income support and rural development funds to farmers and has shaped how agriculture has developed across the UK, at both individual farm and industry levels. In 2014, the Department for Environment, Food and Rural Affairs estimated that payments represented 55% of farm incomes (House of Commons, 2020). In 2019 over one-fifth of UK farms failed to generate a positive return while 28% of UK farms earned a Farm Business Income (FBI) of over £50,000 (Defra, 2019). The same year, UK farmers gained £3.5bn in support, 80% of which was through direct payments (House of Commons, 2020). As a mainstream project, CAP's commitment to gender mainstreaming is significant. In European legislation, gender mainstreaming has been enshrined in Articles 2 and 3 of the Amsterdam Treaty and 'places an obligation on the Community to eliminate inequalities and promote equality between men and women in all its activities' (European Commission, 2000). However, studies exploring the extent to which gender mainstreaming has been successful at both an EU-level (Bock 2015; Shortall, 2015), and within specific EU countries (Prugl, 2009; Oedl-Wieser, 2015; Istenic, 2015), agree that gender mainstreaming has not been sufficiently implemented in EU agricultural policy to promote the transformation of gender relations. The UK exited the EU on 31 January 2020 marking a seven-year agricultural transition period (2021-2027 inclusive) away from CAP-like support towards the development of new domestic Agriculture Acts for England and each of the devolved nations. The redirection of direct support towards payment for public goods through environmental land management initiatives heralds a step-change in traditional agricultural policy and signals uncertainty for the future of agricultural and rural development policy.

According to Ball (2020), academic interest in the role and contribution of women in agriculture from social science disciplines such as gender studies, rural studies and sociology has increased, yet academic attention from the field of economics still lags. As argued by Ball (2020), despite a shortfall in economic studies, insights into the economic contribution of women can be found in other disciplines' literature. Hence, following Ball's

(2020) footsteps, we set out to investigate the economic contribution of women working in the UK agricultural sector through the exploration and systematic review of other disciplines' outputs.

The difference between the present study and Ball (2020) is twofold; firstly, we use the definition of farm women as opposed to Ball's (2020) women farmers; and secondly, we have different research objectives. Within Ball (2020), the definition of women farmers was taken from Gasson (1980), where the categories suggested by Pearson (1979) of independent producers and agricultural partners were combined. According to Pearson (1979), the definition of farm women includes the following categories: Independent producers, where women hold both decision making and primary labour positions; agricultural partners, where women are partners in both the decision making and labour positions; agricultural helpers, where women hold labour positions only; and finally, farm homemakers, where women rarely if ever hold labour positions on the farm and have no decision making power but may support the farm through off-farm employment or other activities. In the present study, we have broadened Gasson's (1980) definition and have included all categories suggested by Pearson (1979) alongside additional literature such as Haugen and Blekesaune (1996), Bryant (2002) and Contzen and Forney (2017).

Ball's (2020) research objective was to assess whether women farmers have become more economically equal to men farmers than they were in 1995. Ball (2020) concluded that the evidence of progress towards women farmers' equality with men farmers is mixed, highlighting the need for further research. The research objectives of the present study are threefold: firstly, we aim to identify women's economic contribution and visibility; secondly, we aim to document the key differences suggested in the literature between women and men's farming practices and outcomes; finally, we aim to explore the barriers to women's participation and visibility. As such, the outcomes of the present systematic review build upon Ball (2020) and allow the creation of an initial 'bigger picture' of women's contribution and provide an additional resource that can underpin further economic studies. It is our aim that addressing a lack of economic research in this area will contribute towards the multi-dimensional consideration of all aspects of the farm business, including existing cultural, social, political and environmental research.

This systematic review is organised as follows: Section 2 details the methodology used; Section 3 provides the systematic review results; Section 4 discusses the results concerning the UK policy context and provides recommendations for further economic research. The paper concludes with Section 5.

## **2. Methodology**

The methodology employed for this study is a systematic review of international peer-reviewed, English-language literature between January 1970 and January 2020, using the PRISMA statement as guidance (Moher et al., 2009). The British Medical Journal (BMJ, 2009) suggests systematic reviews provide a useful way to summarise evidence accurately and reliably. As such, a systematic review attempts to collate all evidence that fits pre-specified eligibility criteria to answer a specific research question. It uses explicit, systematic methods that are selected to minimise bias, thus providing reliable findings from which conclusions can be drawn and decisions made (BMJ, 2009). Key limitations of this methodology are discussed in more detail in section 4.3 'Study Limitations'.

First, to capture the multidisciplinary evidence, we used the University of Nottingham online library 'NU-search' which uses 27 databases for agriculture, 34 for economics and 45 for sociology (see Appendix B for database list). Second, we searched citations within the first round of records to identify additional relevant literature. From a total of 14,470 search results, 1340 records were identified for abstract screening, 480 full-texts were assessed for eligibility, and 184 peer-review papers were selected which focus on the role of women in agriculture within developed countries.

## 2.1. Search strategy

### 2.1.1. Identification and search terms

Searches were performed in 'NU-search' for literature published since 1970 on women farmers in Organization for Economic Cooperation and Development (OECD) high-income countries using the terms "women or gender" and "agriculture or agricultural or farm or farmer" in addition to the name of each of the OECD high-income countries. This initial search strategy yielded 14,470 records.

### 2.1.2. Initial screening

A complication of using the 'NU-search' database was that despite the specific search terms employed, results generated from 105 databases still included vast quantities of research which was not relevant to this study, the majority of which documented women's roles in agriculture in developing countries. Preserving the richness of relevant research was not found to be possible in combination with narrower search terms. As a result, an immediate screening was employed by reviewing the titles of only the first several hundred records for each search (ranked in order of relevance to search terms) to efficiently collect only the relevant titles for this study. For example, where the title of literature clearly did not indicate links to our search terms, e.g. named a developing country, it was excluded from further screening. Only titles that were clearly irrelevant to the search terms were excluded. Where this was unclear, the literature was retained for further screening. This generated 1040 records for further review.

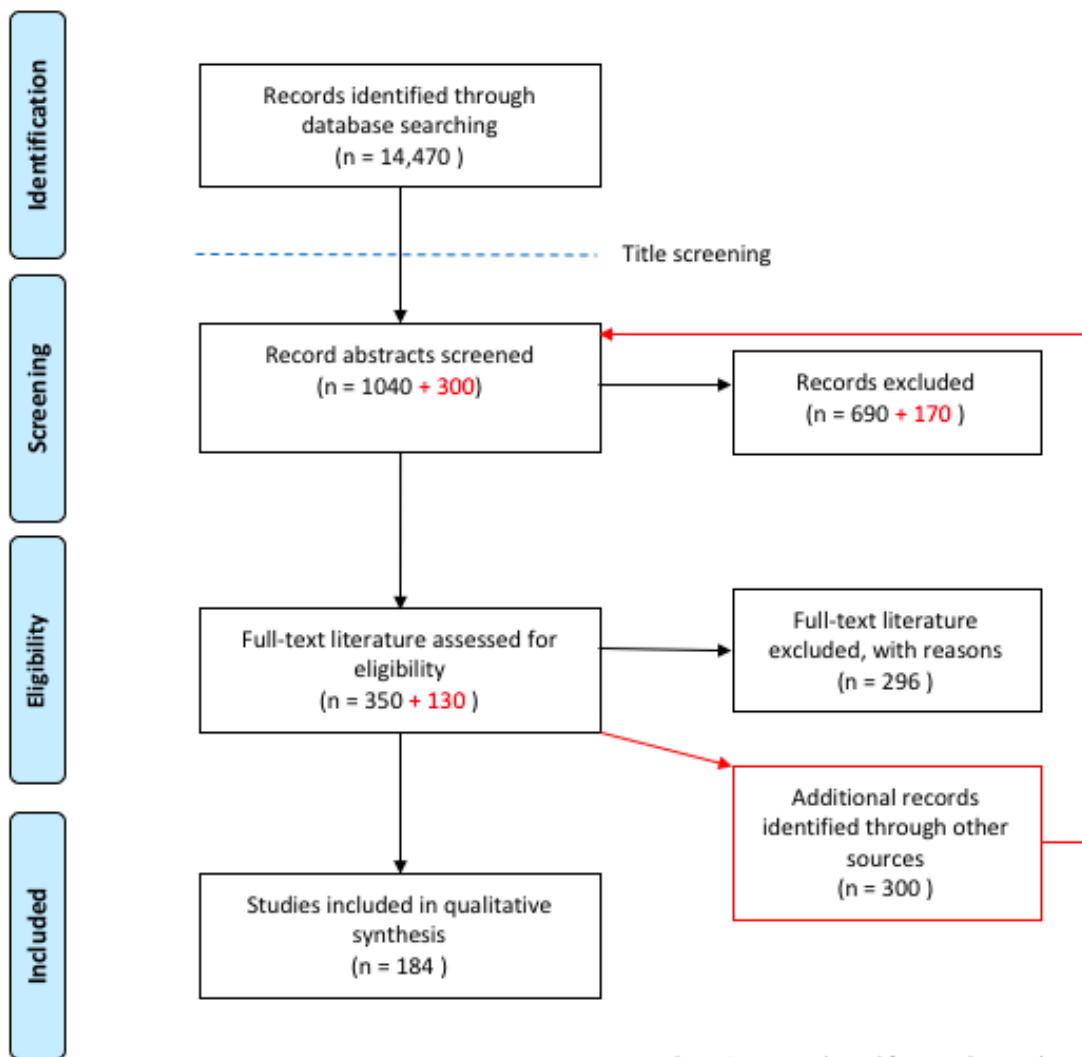
### 2.1.3. Abstract screening

A second screening was employed to afford a greater focus on the research terms within a more manageable record set. In this stage, the abstracts of 1040 records were assessed for relevance to search terms and applicability to study criteria. This included records that specifically focused on the role of gender in agriculture within developed countries. Duplications across multiple searches were also removed. In this stage, the abstracts of 350 pieces of literature were identified as relevant.

### 2.1.4. Full text assessment and citation identification

We then conducted an in-depth review of the 350 full-text records. This included the assessment of original content and identification of relevance to our three research objectives. Records without available full-text were excluded. Throughout the review of the full text records selected for assessment, 300 relevant citations from the literature reference lists were also identified. Once screened, this generated an additional 130 records for full-text assessment. Following this, the final collection for synthesis in this review comprised of 184 records. PRISMA search strategy and outcomes are presented in Figure 1.

Figure 1. PRISMA Flow Diagram.



PRISMA Flow Diagram. Adapted from Moher et al, 2009.

### 3. Systematic Review Results

The findings of the systematic review allow firstly to identify the economic contribution and classification of farm women. Differences within farm women as a group are explored and used to develop a conceptual framework characterising the different economic identity types of farm women across a spectrum of economic contribution and visibility. Secondly, these findings allow a comparison of the economic contribution of farm men and women, revealing key differences between farming practices and outcomes. Thirdly, this paper reveals that key barriers and potential incentives to women's participation and visibility in agriculture are associated with access to land, education and organisations.

#### 3.1 Economic contribution and classification

Informed by the work of Pearson (1979) and extended by the work of Gasson (1981, 1992); Haugen (1990); O'Hara (1994); Haugen and Brandth (1994); Bryant (2002) and Contzen and Forney (2017) we draw together interdisciplinary research to create three on-farm economic identity classifications: traditional farm housewife; working farm family member; and women farmer. The creation of two additional off-farm economic identity classifications, namely 'dual occupation' (pluriactive) and 'off-farm occupation', allows us to distinguish those who combine farming with another economic identity which may be located in waged work or a second

enterprise. Building upon these categories, we expand upon the organisation of labour, economic visibility and decision making power associated with each economic farm identity classification. In the formulation of these roles, it is accepted that individuals may exhibit fluidity between classifications. All criterion may not explicitly nor indefinitely apply, and individuals may fulfil different roles, or aspects of different roles, at different times (Riley, 2009).

### **3.1.1 On-farm economic identity classifications**

#### **A. Traditional Farm Housewife**

Traditional farm housewives encounter clear gender division of labour. They may be primarily responsible for domestic tasks but help around the farm during busy periods or emergencies (Whatmore; 1991; Gasson 1981; O'Hara 1994; Byrant, 2002; Silvasti, 2003; Seuneke and Bock, 2015; Contzen and Forney, 2017). They may have entered farming through marriage rather than occupational choice (Haugen and Brandth, 1994) and their domestic work often gains limited economic visibility despite making a valuable contribution to the farm (O'Hara, 1994; Haugen and Brandth, 1994; Riley, 2009). Traditional farm housewives may work off-farm to support income, but personal income is commonly undifferentiated and contributes towards 'farming income' (Gasson 1981; Bryant, 2002; Shortall, 2002; Contzen and Forney, 2017). They contribute little to daily farm decisions but may be consulted over strategic farm decisions (Contzen and Forney, 2017).

#### **B. Working Farm Member**

Within this economic identity, the literature suggests women are assistants to men farmers. They are either classified as farm assistants or subordinate managers, indicating that autonomy varies with economic power relations.

##### **B.1. Farm Assistant**

Farm assistants encounter clear gender division of labour and are primarily responsible for domestic tasks in addition to suitable farm tasks e.g. labour for youngstock/livestock and farm administration (Whatmore; 1991; Gasson 1981; O'Hara 1994; Byrant, 2002; Silvasti, 2003; Contzen and Forney, 2017). Farm assistants provide limited input into daily farm decisions but may be consulted over strategic farm decisions (Contzen and Forney, 2017). In addition, they may receive limited acknowledgement of their economic contribution (Bryant, 2002; Shortall, 2002; Contzen and Forney, 2017). Farm assistants may work off-farm to support income, but personal income is commonly undifferentiated and contributes towards 'farming income' (Gasson 1981; Bryant, 2002; Shortall, 2002; Contzen and Forney, 2017).

##### **B.2. Subordinate Manager**

Subordinate farm managers are associated with the increasingly flexible division of labour and may be responsible for minor farm enterprise or diversification (Whatmore; 1991; Gasson 1981; O'Hara 1994; Byrant, 2002; Silvasti, 2003; Contzen and Forney, 2017). They may also be responsible for farm administration duties. Their work receives increased acknowledgement of their economic contribution (Bryant, 2002; Shortall, 2002; Contzen and Forney, 2017) while they provide valued input into daily farm decisions and strategic farm decisions (Contzen and Forney, 2017). Subordinate farm managers may work off-farm to support income, with limited but increasing differentiation of personal income and 'farming income' (Gasson 1981; Bryant, 2002; Shortall, 2002; Contzen and Forney, 2017).

#### **C. Women Farmer**

Within this economic identity, women hold clearly defined responsibility and autonomy for farm or major enterprises. They may farm independently or in partnership with family, spouse or an employer. Within this category, women can be further grouped into traditional women farmers or professional women farmers.

##### **C.1. Traditional women farmer**

Traditional women farmers may be older and farm independently (Haugen, 1990; Byrant, 2002; Contzen and Forney, 2017). Division of labour is not gendered, but they may maintain traditional views and workstyles, for example avoiding heavy machinery (Haugen, 1990; Byrant, 2002; Contzen and Forney, 2017). Traditional women farmers may be widowed and previously fulfilled a 'working farm family member' role (Haugen, 1990;

Haugen and Brandth, 1994; Bryant, 2002; Contzen and Forney, 2017). There is a clear acknowledgement of their economic contribution and autonomy over daily farm decisions, where they have the authority within strategic farm decisions (Contzen and Forney, 2017). They may also work off-farm to support income and maintain limited but increasing differentiation of personal income and 'farming income' (Gasson 1981; Bryant, 2002; Shortall, 2002; Contzen and Forney, 2017).

### C.2. Professional women farmer

Professional women farmers may be younger and entered farming through occupational choice, holding managerial positions or being entrepreneurs (Haugen, 1990; Bryant, 2002; Haugen and Brandth, 1994; Contzen and Forney, 2017). Within this category, the division of labour is not gendered, and it appears that progressive views and work styles are more prominent (Bryant, 2002; Contzen and Forney, 2017). Professional women farmers receive clear acknowledgement of their economic contribution, possess autonomy over daily farm decisions and have authority within strategic farm decisions (Contzen and Forney, 2017). They may work off the farm to support income, and there is greater differentiation of personal income and 'farming income' (Gasson 1981; Bryant, 2002; Shortall, 2002; Contzen and Forney, 2017).

### 3.1.2 Off-farm economic identity classifications

#### **A. Dual Occupation**

Dual occupation can be associated with any economic identity classification and used to describe pluriactive women who engage and identify with economic endeavours both on- and off-farm. For example, a 'working farm family member' may identify both as a farm worker, and as an off-farm professional e.g. marketeer (Bryant, 2002). The organisation of labour, economic visibility and decision making power associated with dual occupation identities is associated with each economic identity classification, as described above (Bryant, 2002; Contzen and Forney, 2017).

#### **B. Off-Farm Occupation**

An off-farm economic identity classification can be associated with a limited on-farm presence and disengagement with farming activities (Bryant, 2002). They may include those without an autonomous association to farming e.g. entry through marriage rather than occupational choice (Haugen and Brandth, 1994). As farm work is not undertaken, division of labour does not occur and the economic contribution of off-farm income is clearly acknowledged (Bryant, 2002; Contzen and Forney, 2017). No input into daily farm decisions is sought or received, although off-farm economic identities may be consulted over strategic farm decisions which affect the household (Contzen and Forney, 2017).

### 3.1.3 Economic contribution and economic visibility conceptual framework

Figure 2 builds upon these economic identity classifications and to map a conceptual framework. This follows the findings of Byrant (2002), who used a similar model to demonstrate categories of farm occupational identity and the relationships between them. Figure 2 uses this structure to visually represent the economic identity classifications presented within this paper alongside additional economic indicators, including the economic contribution and visibility of farm women.

Figure 2. Farm women identity conceptual framework

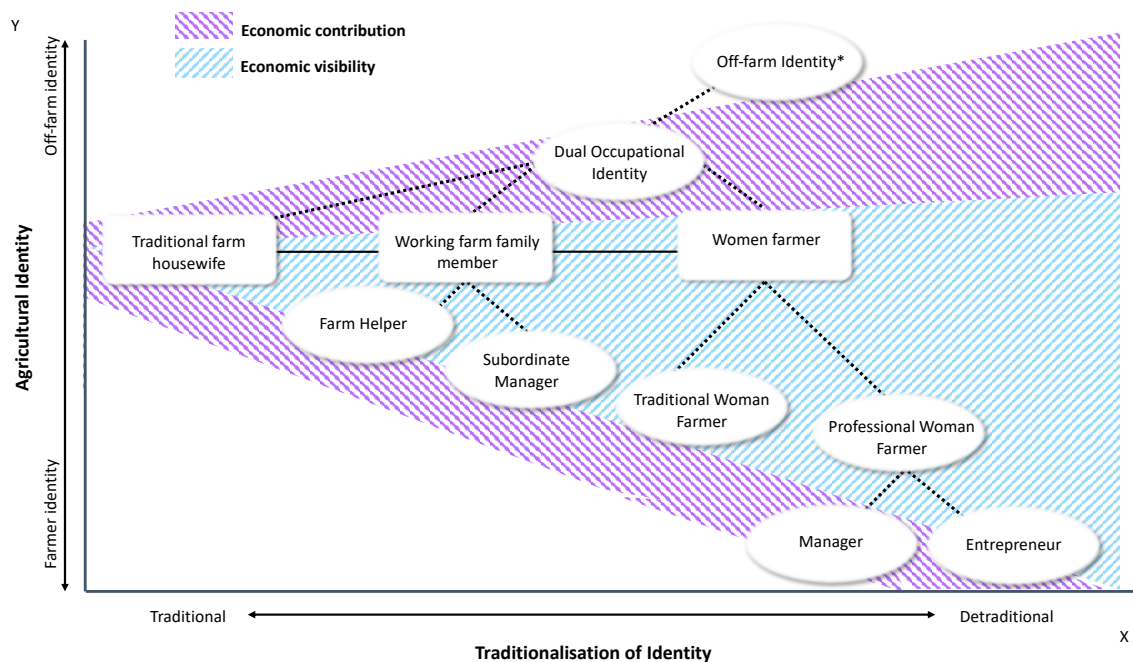


Figure 2 illustrates the three on-farm economic identity classifications: traditional farm housewife; working farm family member; and women farmer, which sit across a central trajectory. Differences of agency within 'working farm family member' and 'women farmer' groups are represented via the creation of additional categories which sit within these broader economic identity classifications. Dual occupation and off-farm economic identity classifications are also accounted for.

The relationship between 'on-farm' and 'off-farm' identity is mapped via the y-axis to reflect agricultural identity and participation in farm activities. As in Byrant (2002), the x-axis of this graph represents a continuum from 'traditional' to 'detraditional' whereby each economic identity is plotted. The term detraditional is used, rather than non-traditional, to indicate the active process whereby self-reflexive individuals must choose between diverging options to construct their own economic identities amidst increasingly open global influences (Beck 1992a, Giddens 1991; Beck, Giddens and Lash 1994). Giddens (1991) described detraditionalisation as the 'evacuation' or emptying out of traditional local contexts of action which are in some sense rooted in origin or place.

The economic contribution is represented within the dotted coded intersect. The symmetrical widening of the intersect along the x-axis demonstrates increasing economic contributions associated with higher input and autonomy over farm tasks in association with detraditionalised economic classifications. Its symmetrical representation accounts for the economic contribution of women spanning across both farm and off-farm identity classifications, and the contribution this makes to both farm and household income.

Economic visibility is represented within the dashed coded intersect. The widening of the intersect along the x-axis demonstrates the increasing recognition of economic contributions associated with both greater on-farm economic contributions and detraditionalised economic identity classifications. Its asymmetrical representation accounts for a lack of differentiation between income streams and the widely documented failure for many 'farm incomes' to recognise the contribution of off-farm or non-farming incomes e.g. diversification (Gasson 1992; Shortall, 2002; Bryant, 2002). An exception to this is the 'off-farm identity' classification, where no overlap between farm and waged work occurs. This income stream is clearly differentiated and high economic visibility is received. Its classification positioning relative to the y-axis prevents inclusion within the dotted intersect and is noted (\*) in Figure 2.

The relative positioning of both the dashed and dotted coded intersects illustrates that the economic contribution of most farm women far exceeds the recognition they gain. Findings throughout the literature reviewed suggest that despite providing vital support to the farm and household, the value of women's contribution to the farm is often not fully recognised. This may occur through a combination of off-farm employment; unpaid farm or household work; undifferentiated income streams; gendered division of labour; and subordination (O'Hara, 1994; Gasson, 1992; Bryant, 2002; Riley, 2009).

In terms of women's economic visibility, this is associated with clear decision making power and autonomy over enterprise decisions (Gasson, 1992; Bryant, 2002). This work gains visibility and acceptance both within the household and the wider farming community. When women hold detraditionalised economic identities, a more economical liberal discourse is identified (Ní Laoire, 2002; Coldwell, 2007), whereby traditional social structures are replaced by market forces which in turn influence the construction of work identities (Bryant, 2002; Lankester, 2012).

### **3.2 Comparison of the economic contribution of farm men and women**

The literature also documented differences in economic contributions between farming men and women. In this section, we draw together interdisciplinary research to compare the economic contribution of both farming men and women across a variety of categories. A total of 56 studies were identified to document economic differences across 10 distinct categories including: farm size; type of production; farm income; off-farm work; age; education; land; labour; machinery and technology. Corresponding sub-categories were also formed. The categories/sub-categories comprising the largest number of supporting studies include 'diversification' (16), 'agricultural education and training' (13) and 'farm size' (11). The category including the smallest number of supporting studies is labour (1). These findings revealed key differences between farming practices and outcomes of farming men and women. An overview of the scope of this research is provided in Figure 3.



Figure 3. Overview of literature for the economic comparison of farm men and women

Category	Subcategory	Number of studies	Timeframe of literature	What the literature suggests
<b>Farm size</b>		11	1985 - 2014	Women are associated with smaller farm size
<b>Type of production</b>	Farm type	10	1985 - 2016	Women are associated with livestock and speciality production as well as organic production.
	Diversification	16	1992 - 2014	Women are positively associated with farm diversification
	Sustainable and environmental objectives	6	1999 - 2016	Women are associated with sustainable and environmental objectives
<b>Farm income</b>	Farm income and profitability	8	1985 – 2016	Women are associated with lower farm income, profit, return on equity and sales value
	Business goals	3	2010 - 2014	Women are associated with goals other than profit maximisation
<b>Off-farm work</b>	Frequency	3	1985 - 2013	Women associated with higher engagement in part-time work than male farmers.
	Income	5	1985 - 1998	Women are associated with lower off-farm income
<b>Age</b>		5	1985 - 2013	Mixed evidence with three studies supporting that women are associated with a higher age; one study supporting that women are associated with a lower age, and one study supporting that there is no significant difference.
<b>Education</b>	Agricultural training and education	13	1996 - 2019	Women are associated with lower access and participation in agricultural training and education
	General education	3	1998 - 2013	Women are associated with higher levels of general education
	Age	3	1990 - 2011	Younger women are associated with higher educational qualifications
<b>Land</b>	Succession	5	1994 - 2017	The majority of literature suggests that women are associated with a lower likelihood to inherit farmland. However, one study did suggest that younger women are more likely to inherit than older women.
	Tenure	3	1985 - 2013	Women are associated with a lower likelihood to rent farmland
<b>Labour</b>		1	2016	Women are associated with a higher labour input and higher reliance on family help
<b>Machinery</b>		4	1990 - 2014	Two papers suggest that women are associated with a lower attraction to farm machinery and an additional two papers suggest that the difference between men and women machinery use is lower in younger women than older women.
<b>Technology</b>		7	1997 - 2014	The majority of the literature suggests that women are drivers and users of technology, with only one study documenting no difference or less use.

Eleven studies conducted throughout the US and Europe between 1985 and 2014 found significant differences in farm size between men and women farmers. The majority of these studies found that women were associated with a smaller farm size compared to men farmers (Kalbacher, 1985; Haugen, 1990; Leckie, 1993; Haugen and Brandth, 1994; Perry et al., 1995; Rosenfeld and Tigges, 1998; Gidarakou, 1999; Shortall, 2010; Hoppe and Korbe, 2013; Ball, 2014). Only one US paper, Zeuli and King (1998), found women farmers to be associated with larger farm sizes, in contrast to the results of previous and subsequent studies. The findings of Zeuli and King (1998) infer that although their results may buck the trend of existing research, these differences may well be less substantial than other contributory factors. They suggest that where farm size is held constant, there do not appear to be substantial differences in farm income or profitability that can be attributed to gender.

Farm type is another area Zeuli and King (1998) offer to explain differences between male- and female-operated farms that have traditionally been attributed to gender. The findings of their 1998 study concur with prior research in the area to suggest that women are more highly represented in livestock and speciality production farm types (Kalbacher, 1985; Leckie, 1993; Perry et al., 1995; Rosenfeld and Tigges, 1998; Zeuli and King, 1998; Trauger, 2004; Elias and Lundqvist, 2016). An additional two studies from Canada (Sumner and Llewelyn, 2011), and Ireland (Läpple, 2012), suggest that women are more highly represented in organic production. Furthermore, sixteen studies conducted across the UK and Europe between 1992 – 2014 suggest that women are positively associated with farm diversification (Gasson and Winter, 1992; Evans and Ilbery, 1993, 1996; Benjamin 1994; Cawley, 1995; Ilbery et al., 1998; Caballe, 1999; Carter, 1999; Gorman, 2004; Bock 2004; Trauger, 2004; Iakovidou et al, 2009; Haugen and Brandth 2010, 2011; Ball, 2014; Heggem, 2014; Wright and Annes, 2014), and six studies between 1999 and 2016 indicate that women are associated with sustainable and environmental objectives (Trauger, 2004; Gidarakou, 1999; Zelezny et al., 2000; Goldsmith et al., 2013; Xiao and McCright, 2015; Sachs et al., 2016).

In terms of business goals, recent US studies including Trauger (2010), Hoppe and Korb (2013) and Ball (2014) suggest that women are associated with business goals other than profit maximisation. Examples include an emphasis on work/life balance and the requirement to work businesses around other commitments such as family and childcare. This, combined with factors such as farm size and type, may offer insight into the findings of eight studies included in this review which associate women with lower farm income, including profit, return on equity and sales value (Kalbacher, 1985; Haugen and Brandth, 1994; Perry, 1995; Rosenfeld and Tigges, 1998; Zeuli and King, 1998; Hoppe and Korb, 2013; Zeuli and King, 1998; Elias and Lundqvist, 2016).

Another area linked to this is participation in off-farm work. Kalbacher (1985) and Haugen et al. (1993) found women in the US and Norway engaged more highly in part-time off-farm work. Furthermore, five additional studies indicate that where women do engage in off-farm work their work is found to yield a lower income than men (Kalbacher, 1985; Leckie, 1993; Perry et al., 1995; Rosenfeld and Tigges, 1998; Zeuli and King, 1998). On the contrary, Hoppe and Korb (2013), a US study, suggest that women are less likely to engage in part-time work than men.

A component indicated to be linked to many of the aforementioned factors is education. Thirteen studies from across Europe, Australia and the US, conducted between 1996 and 2019 suggest that women are associated with lower access to, and participation within, agricultural training and education (Haugen and Brandth, 1994; Shortall, 1996; Alston, 1998; Liepins and Schick, 1998; Pini, 2002; Brandth, 2002; Safilios-Rothschild, 2006; Trauger et al., 2008, 2010; Brasier et al., 2009; Istenic, 2015; Shortall 2017, 2019). Yet, three further studies suggest that women are associated with higher levels of general education (Rosenfeld and Tigges, 1998; Zeuli and King, 1998; Hoppe and Korbe, 2013).

In terms of access to resources, the existing literature suggests that this is intrinsically linked to land succession and resource ownership. This systematic review found five studies conducted throughout Europe between 1994 – 2017 which indicated that women are associated with a lower likelihood to inherit farmland (Haugen and Brandth, 1994; Leckie, 1994; Mann, 2007; Cavicchioli et al., 2015; Shortall, 2017). A further three studies from the US found that women farmers are associated with a lower likelihood to rent farmland (Kalbacher, 1985; Zeuli and King, 1998; Hoppe and Korbe, 2013), and a study by Elias and Lundqvist (2016) suggests that Norwegian women are associated with a higher labour input and higher reliance on family help.

Regarding the use of machinery and technology, two US studies, Trauger (2004) and Ball (2014), found that women are associated with a lower attraction to farm machinery. Yet the same two studies, in addition to four more from across Europe, Australia and the US (Zepeda and Castillo, 1997; Burton et al., 2003; Trauger et al., 2010; Hay and Pearce, 2014), suggest women are the drivers and users of technology. Indeed, a more overt example of women's crucial role within the mechanisation process was observed on 40 UK farms where women were central to, and commonly took control of, farm finances steering the adoption of farm technology and mechanisation (Riley, 2009). Haugen (1990) suggests that the difference between men and women machinery use is lower in younger women than older women. Despite this, a US study by Zeuli and King (1998) suggests no difference in computer use between genders but found men to be higher users of information services.

An important aspect highlighted within this systematic review is age and the result of generational differences across farmer populations. Existing research documenting the age structure of women farmers is unclear. North American studies by Kalbacher (1985), Leckie (1993), and Hoppe and Korb (2013), suggest that women are generally older than their male counterparts, however, Gidakou (1999) found that in Greece, women were generally younger, while Zeuli and King (1998) found no significant difference between the age structure of men and women farmers in the US.

Furthermore, a small number of studies have identified differences between farm women, based solely on their age. Three studies suggest that younger women are associated with higher educational qualifications than older women and compared to their male counterparts (Haugen, 1990; Bock and Shortall, 2006; Hovecar and Cernic Istenic, 2011). Furthermore, Haugen and Brandth (1994) found that younger Norwegian women were more likely to inherit land than older women and, as mentioned previously, Haugen (1990) suggests that the difference between men and women machinery use is lower in younger women than older women.

### **3.3 Identified barriers and potential incentives**

The understanding of key challenges and opportunities is essential in any attempt to bridge the gap between men and women. The literature identifies three prominent themes affecting farm women across a spectrum of economic contribution and visibility. These are access to land, education and training, and organisations.

#### **3.3.1 Access to land**

Shortall et al. (2019) suggests that access to land represents the single largest barrier to women's entry and participation within agriculture. Across most of the developed world, it is the norm for men to own land and for men to pass land from father to son (Gasson, 1980; Sachs, 1983; Whatmore, 1991; Alston, 1995; Shortall 1999, 2010, 2016; Bock and Shortall, 2006; Brandth and Haugen, 2011). Studies including Alston (1998); Mann (2007); Voyce (2007); Rossier and Wyss (2008); Cavicchioli et al. (2015, 2018) and Shortall et al. (2017) illustrate that men and first-born potential successors are more likely to succeed the family farm. This knowledge is well established within the international literature reviewed, which suggest that patrilineal succession presents a major barrier to women's participation within agriculture (Gidakou et al., 2000; Rossier and Wyss, 2008; Cassidy and McGrath, 2014, 2015; Shortall et al., 2017).

Rather than being of legal origins - for example, during and after the Spanish Civil War under General Francisco Franco (1939-1975) where Spanish women were prohibited from almost all economic activities including employment and ownership of property without a husband's approval - women's access to land throughout developed countries is suggested to be largely governed by cultural practices. Knowledge established within the literature reviewed reflects the persistence of traditional normative beliefs (Silvasti, 2003; Price and Evans, 2006; Rossier and Wyss, 2008; Shortall et al., 2017). This correlates with studies by Mann (2007), Cassidy and McGrath (2014, 2015) and Luhrs (2016) who suggest that gendered socialisation and education of male and female offspring can often be linked to the inheritance patterns of land, and is shown to reduce agricultural socialisation of females from an early age. Furthermore, an industry survey by Farmers Weekly (2014) reveals that 61% of female respondents considered themselves "rarely" or "never" treated equally when it comes to succession. This is a factor that may also be further exasperated by a lack of future business planning practices. Succession planning is identified as a key issue through the agricultural sector, where it is estimated that less than 50% farms have a succession plan in place (Cassidy and McGrath, 2014; Farmers Weekly, 2015).

Furthermore, access and ownership of land correlates with considerable economic resources and facilitates access to other resources including capital, infrastructure, training and networks (Rico and Fuller, 2016; Williams, 2006; Ingram and Kirwan, 2011; Miler and Butler, 2014; Ilbery et al., 2010). Pertinently, recent studies have revealed that land ownership, and its associated economic benefits, are associated with the recognition of women's economic position within farming both internally and externally to the farm (Brandth, 2002; Safilios-Rothschild, 2003; Cush et al., 2018). The findings of such studies support the notion that patrilineal succession, therefore, aids to mask the economic participation and visibility of women in the sector through restricted access to land and other resources. Furthermore, a Farmers Weekly industry survey (2014) revealed that the route of entry to farming for both men and women differs significantly as a result of successional practices. While only 2% of male respondents married into farming, the survey revealed that marriage remains the main route into farming for 25% of women respondents. As marriage is the most common route of entry into farming for women, their marrying into the sector is said to present challenges from both cultural norms and restricted ownership and access to economic resources, as patrilineal succession remains dominant (Shortall, 2002; Shortall et al., 2017).

Two studies by Brandth and Overrein (2013) and Wheeler et al. (2012) suggest that traditional patterns of succession may be weakening, and with this, greater economic opportunities for women within agriculture are presented. Such opportunities may be found in a range of economic arrangements including joint farming ventures, share farming and land matching schemes which have been demonstrated to increase women's access to land and resources (Williams, 2006; Almas, 2010; Ingram and Kirwan, 2011; Macken-Walsh and Roche, 2012; Shortall et al., 2017; Rico and Fuller, 2016; Cush et al., 2018). Furthermore, Safilios-Rothschild (2003), Gidarakou et al. (2008) and Cush et al. (2018) also suggest that where women achieve land ownership status this appears to encourage participation in economic activities such as farm decision making, production and investments.

### **3.3.2 Education**

Education is another key theme identified throughout this systematic review. Access to education facilitates the sharing of knowledge and networks and is a key component which affects women's economic contribution, performance and visibility within agriculture (Slagsvold and Sørensen, 2008). The provision of training and education is also often supported by policy, therefore, it is an important area for economic understanding.

Studies have demonstrated that there are key differences in education between farm men and women, notably that women are associated with lower access and participation in agricultural training and education (Haugen and Brandth, 1994; Shortall, 1996; Alston, 1998; Liepins and Schick, 1998; Pini, 2002; Brandth, 2002; Safilios-Rothschild, 2006; Trauger et al., 2008, 2010; Brasier et al., 2009; Istenic, 2015; Shortall 2017, 2019). Yet, women farmers are also associated with higher levels of general education (Rosenfeld and Tigges, 1998; Zeuli and King, 1998; Hoppe and Korbe, 2013). Women's access and participation in educational activities are shown to be primarily attained through traditional education and off-farm work, rather than specific agricultural education and training (Brandth et al., 2011). Shortall et al. (2017) observe that women rarely attend continuing education provisions for people on farms.

Sociological studies suggest these findings may be embedded in cultural norms, whereby, despite growing up on a farm, women may not experience the same exposure to on-the-job training as men (Shortall, 1996; Cassidy and McGrath, 2015; Shortall et al., 2017). This can be linked to successional practices and offer an insight into the gendered division of labour to explain differences in educational requirements (Shortall, 1996; Cassidy and McGrath, 2015; Shortall et al., 2017) and economic contribution and visibility.

Shortall (2010, 2015) and Istenič (2015) suggest that women do not benefit, and are not targeted, for agricultural training as much as men because they are not the landowner. Particularly, women who enter the sector through marriage also have less access to training and networks (Shortall, 2002; Williams, 2006; Shortall et al., 2017). Furthermore, research argues that agricultural education services continue to offer only specific programmes which are not consistent with women's demands or requirements (Shortall, 1996; Liepins and Schick, 1998; Albright, 2006; Trauger et al., 2008; Brasier et al., 2009; Trauger, 2010; Charatsari et al., 2013), and content adheres to the traditional division of labour which may no longer represent women's evolving economic roles within modern farming systems (Shortall, 1996; Schmitt, 1998; Charatsari et al., 2013; Trauger

2010). In addition to this, other barriers may include that women hold competing commitments, such as family and work responsibilities in which training would interfere (Shortall, 2002; Little and Panelli, 2003; Brasier et al., 2009; Charatsari et al., 2013; Shortall et al., 2017).

A key component of discussion within the literature reviewed is whether women may feel uncomfortable at current training events because the events are primarily attended by men (Shortall, 1996; Trauger 2010; Charatsari et al., 2013; Shortall et al., 2017). Several studies also reveal that women feel they are not 'taken as seriously' as men at training events (Shortall, 1996; Trauger, 2008; Brasier et al., 2009; Trauger, 2010). Economic obstacles to the provision of women-only events are suggested to include that providers are not aware of the demand, or differences in educational preferences, and are therefore reluctant to run courses focusing upon the specific educational requirements of women (Trauger, 2010; Shortall et al., 2017).

Economic incentives for the integration of women within agricultural education are clearly represented throughout the literature reviewed. Bower (2010) and Charatsari et al. (2013) suggest that women have a positive perception of education and training that exclusively addresses women and can encourage their economic participation on-farm (Sachs, 1983; Shortall, 1996; Albright 2006; Safilios-Rothschild, 2006; Shortall, 2010; Schultz et al., 2017). The literature suggests that women recognise the areas they require training in (Trauger et al., 2008; Barbercheck et al., 2009; Bock and Shortall et al., 2017; Shortall et al., 2017), and what kind of educational styles they prefer. Trauger (2008) and Shortall et al. (2017) suggest that women prefer personable experiences, and prefer workshops, demonstrations and discussions as methods of information transfer. Furthermore, studies show that successful women's groups are said to be based upon education and networking to increase knowledge and social capital (Bell & Kilpatrick, 2000; Heins et al., 2010; Kiernan et al., 2012; Schultz et al. 2017). Studies by Trauger et al. (2008); Barbercheck et al. (2009); Brasier et al. (2009) and Shortall et al. (2017) suggest there is a demand for more women-only courses in the agricultural industry. Shortall et al. (2017) also suggest that short courses for women who are new to farming, particularly those who have married into farming, should be developed.

### **3.3.3. Organisations**

The final key theme associated with barriers to economic contribution and visibility is agricultural organisations. Here, the economic visibility and contribution of females within agricultural organisations is taken as a measure of female participation. Indeed, it is suggested that the participation of both men and women contributes different skills and attributes to rural leadership and that gender-integrated workforces utilise complementary skill sets to improve overall performance (Gillard et al, 1990; Grace, 1994; Roberts, 1994; Claridge and Chamala, 1995; Buchy, 2001; Pini, 2003; Sheriden and Mckenzie, 2011). Despite this, Shortall (2001) states that there is no country where women are well represented in farming organisations. Indeed, according to existing research, women are under-represented in farming organisations throughout the developed world (Shortall, 2001; Pini, 2002; Alston, 2003; Shortall et al., 2017) and represent both a higher proportion of lower economic status workers and hold minimal representation at the highest economic managerial and executive positions (Liepins, 1998; Alston, 1998).

Grace (1997), Alston (1998) and Pini (2002) suggest women's willingness and ability to participate in agricultural activities may be impacted by a lack of confidence and experience associated with gendered experiences including poorer access to social networks. However, studies also suggest that specific organisational factors may affect women's participation in farming groups (Grace, 1997; Pini, 2002). Alston (2000) and Brandth (2002) suggest that the traditional limiting of votes to one per farm may impact female representation due to household power relations (Alston, 2000; Brandth, 2002). Furthermore, a body of research suggests that masculinist cultures, for example, language used, gender segregation and 'the pervasive operation of old boys' network' is off-putting to women (Grace, 1997; Alston, 1998; Elix and Lambert, 1998; Alston, 2000; Pini, 2002; Shortall, 2020). Additionally, the time and location of meetings (for example, evening time at public houses) is cited as a common barrier preventing women from attending local groups who may often have to balance childcare and household commitments (Grace, 1997; Elix and Lambert, 1998; Shortall, 2002; Pini, 2002; Little and Panelli, 2003).

Other research suggests that women are deterred by hierarchical structures and prefer more open and collaborative organisational structures (Gillard et al., 1990; Grace, 1997; Elix and Lambert, 1998; Pini, 2002). The informal practices governing the nomination and election of representatives in hierarchical farmers'

organisations may also disadvantage women as 'unarticulated merit' around personal characteristics leading to progression tend to privilege 'masculine identities' over softer, more 'feminine' approaches (Grace, 1997; Alston, 1998, 2000; Alston and Wilkinson, 1998; Pini, 2002).

Further interdisciplinary research focuses upon the experience of women as individuals within organisations and shares useful insights into the broader experience of women to provide learnings for future economic applications. Alston (1998), and Brandth and Bjørkhaug (2015) suggest that as a minority within organisations, women can struggle to have their views perceived as by their own merit and not as 'women's views', and further studies suggest that even 'confident women' may feel 'uncomfortable, intimidated and not taken seriously' when attending meetings primarily attended by men. This is also suggested to be an issue for young people (Alston, 1998; Pini, 2002; Shortall et al., 2017). Examples of this are illustrated by Morris and Evans (2001) regarding how reports in the farming press may serve to reinforce prejudices in the farming community. Morris and Evans (2001) suggest 'appropriate' female gender roles within groups and organisations are assumed according to traditional females' roles of nurturer and carer and contrast markedly with the typical representation and activities of men.

Some studies suggest a lack of female participation is commonly perceived by organisations to be an individual rather than organisational constraint (Still, 1993; Sinclair, 1994; Gherardi, 1995; Elix and Lambert, 1998; Alston and Wilkinson, 1998; Shortall, 2002; Shortall, 2020). It is suggested that in some cases, agricultural power holders may deny there are any constraints for women in achieving positions of leadership and 'women's silence is taken to justify their exclusion and lack of interest' (Shortall, 1992; Alston and Wilkinson, 1998; Shortall, 2002; Pini, 2002). In such cases, barriers to women's participation have been described as implicit rather than explicitly defined, and the term 'gender blind' was coined to describe where such incidences may occur (Sinclair, 1994; Gherardi, 1995; Alston and Wilkinson, 1998). In the first study of its kind, Shortall (2020) suggests that implicit social barriers can endure through a culture of informal processes of social interaction which are not only difficult to prove and challenge but result in normative claims which are, in turn, accepted by both men and women. It is suggested that the implicit nature of such challenges may contribute to a slow rate of change and stubbornness of gendered cultural norms.

To overcome some of these barriers, women-only organisations have been suggested to encourage women's participation and address issues pertinent to them (Alston, 1998; Shortall et al., 2017). Women's groups across developed countries report varying levels of interaction and influence, however, a particularly recent and successful example is that of the Scottish Government who have employed a combination of research and policy measures to establish and promote the position of women in Scottish farming through the formation of the Women In Agriculture Taskforce (Shortall et al., 2019).

#### **4. Developing a new research agenda**

##### **4.1 Farm women in UK agriculture**

The UK's exit of the EU creates great uncertainty regarding the future of agricultural and rural development policy. As the transition away from CAP support begins, the development of new domestic Agriculture Acts for England and each of the devolved nations presents an opportunity to transform gender relations and promote equality between men and women.

The literature reviewed reveals that gendered challenges still exist within the agricultural sector of developed countries. Further economic research is required to address this. Pairing the Farm Structure Survey (Defra, 2016) statistics and the economic identity classification framework proposed within this review, an initial classification of UK farm women's economic contribution and visibility can be achieved. The 52% of UK family farm workers which are women could be included within the economic identities of 'traditional farm housewives' and 'working farm members'. Research on the respective proportions would allow a better understanding of the extent of women's contribution and visibility. The 19% of non-family workers which are women could be included within the economic identity of 'working farm members'. Research on the respective proportion of 'farm assistants' and 'subordinate managers' would allow a better understanding of their decision making involvement and economic visibility. Finally, the 15% of farm holders and managers which are women could be included within the 'women farmer' economic identity classification. Further research on dual occupation statistics would allow a clearer understanding of farm women in UK agriculture.

## 4.2 Research and policy recommendations

As the sector continues to face challenges, policy represents a central enabler between research and society. The way women interact with government support and benefits appears to impact both their economic identities and participation within agriculture (Safilios-Rothschild, 2003; Gidarakou et al., 2008; Cush et al., 2018). Therefore, as the UK develops its own Agriculture Acts, it is imperative that policy is engaged to transform the economic, social and political position of women in agriculture.

As such, further research is required to address a range of economic factors identified throughout this review. In the first instance, further research is required to investigate differences, and the causality of differences, between men's and women's farm performance. As this paper highlights, women are associated with smaller farm sizes and different farm types than men. Women are also illustrated to participate more highly in diversification activities, hold different business interests, and be more likely to engage in lower-paid off-farm work. As such, robust economic insights are sought in the UK setting to investigate whether differences exist when key economic indicators, e.g. farm size, are held constant and to investigate the relationship between these findings and other economic factors including access to land, education and organisations.

Furthermore, studies identify women farmers to be associated with a lower attraction to farm machinery despite research also suggesting that women are the drivers and users of technology. As the use and capabilities of technology within modern agriculture continues to grow, further research is required to assess where attitudes and usage of machinery and technology segment across farmer populations and position these findings in the context of wider influences to inform industry and policy.

As such, age and the result of generational differences across farmer populations is a key determinant for further research to consider. This review highlights international literature illustrating differences between farm women as a group - identified by age - which includes machinery use, educational qualifications and land inheritance patterns. The findings of each study may be influenced by both the time and geographical location under which the research was conducted, and as no conclusive or recent UK results are presented, there is a clear need for this research to be conducted to inform UK research and policy.

Education is also presented as a key component which affects women's economic contribution, performance and visibility within agriculture, and its links with policy make it an important area for economic understanding. To encourage the provision and economic viability of suitable educational provision for women, it is suggested that courses should be accompanied with data analysis around course demand and future learning requirements to address the needs of women and support their economic participation (Kiernan et al., 2012; Shortall et al., 2017). Furthermore, a flexible approach to rural childcare and employment is essential. Further economic research is required to focus on how policy can enable the educational needs of women to be met to support women's economic participation and unlock the full potential of the rural economy.

The broader policy context is critical to the advancement of gender equality, and differences in how women engage and perform within agriculture must be supported by policy to enhance its economic sustainability. Examined studies cite that women's contribution to the domestic aspect, rather than the productive aspect, of farm activities make vital economic contributions (Alston, 1998). Yet, many fail to gain recognition within both policy and society, and such contributions are commonly under-valued by men and women alike. Therefore, there is a clear need for policy to increase the visibility of a diverse range of farm actors to ensure that women do not become 'trapped by the twin burdens of patriarchy and commoditisation' (O'Hara, 1994, p54).

The mobilisation of women to create and take advantage of economic and policy opportunities is also essential (Pini and Shortall, 2006). As discussed, agricultural organisations are a key factor facilitating the economic progression and prosperity of the farming sector, yet, key gender-specific challenges are illustrated throughout a wealth of interdisciplinary research. As a result, this paper identifies a clear need for more women to be represented within farming organisations to garner and reap the support of policy. As such, women-only organisations have been suggested to encourage female participation and address issues pertinent to women (Alston, 1998; Shortall et al., 2017). Women's groups across developed countries report varying levels of interaction and influence, however, a particularly recent and successful example is that of the Scottish

Government who have employed a combination of research and policy measures to establish and promote the position of women in Scottish farming through the formation of the Women in Agriculture Taskforce (Shortall et al., 2019).

In 2016 the Scottish Government's Rural and Environment Science and Analytical Services Division (RESAS) commissioned research on 'Women in Farming and the Agriculture Sector'. An introduction to the report states: 'farming, and the agricultural sector as a whole, is an area in which women's contributions are often not recognised and at a leadership level women are significantly under-represented' and refers to a 'leaky pipeline' between training and labour market participation (Goulden et al., 2011). Shortall's (2010) report for the European Parliament is also cited which details a lack of data and visibility of farm women to be major challenges for the sector.

The overall purpose of the Scottish initiative was to establish a baseline position on women in farming and the agriculture sector. 'The Women in Agriculture Taskforce' was subsequently established to act upon recommendations from research to inform future policies to enhance the role of women in agriculture. The Scottish study is a pertinent example of a timely endeavour combining interdisciplinary research and industry engagement to deliver actionable policy recommendations. Similar research is required throughout the rest of the UK to address the factors identified throughout this review.

### **4.3. Study limitations**

Along with recommendations, this study may be characterised by four main limitations, including: publication bias; selective reporting; fluidity of economic identify classifications; and geographical specificity.

Firstly, publication bias. The decision to use literature between January 1970 and January 2020 was taken to preserve research richness and include the foundation of work produced throughout 1970-80s. Despite the authors' acknowledgement that significant changes within gender relations and women's position in the labour market over that time have been shown to occur (UK Parliament, 2020), and that matters of significant importance will have occurred beyond the limits of timeframe, it is beyond the scope of this paper to offer a commentary on this matter. Instead, this paper aims to use existing literature to highlight the need for economic research and offer recommendations on the direction of this research.

We also acknowledge that the full scope of research which relates to themes identified throughout this systematic review may not have been fully recognised by our methodology and may again be associated publication bias. Systematic reviews provide a useful way to summarise evidence accurately and reliably, unfortunately, there is also evidence that key information may be poorly reported in systematic reviews, thus diminishing their potential usefulness (BMJ, 2009). As is true for all research, systematic review methodology should be reported fully and transparently to allow readers to assess the strengths and weaknesses of the investigation (see section 2 for full details). The primary aim of this review is to provide a broad assessment of women's position in agriculture and identify areas for further economic research via a replicable methodology. This search methodology focused upon studies published since 1970 on women farmers in OECD high-income countries using the terms "women or gender" and "agriculture or agricultural or farm or farmer". Therefore, studies without explicit reference to these search terms may not have been included within our search results or the first round of citation screening despite providing potentially useful insights into additional themes identified throughout this review. An example of this is an extensive catalogue of literature focusing on farm succession which is dominated by discussions on male succession.

Secondly, we acknowledge that the generalisation of insights presented within this review may not be feasible and may be attributed to selective reporting. As a result, these findings may not be applied to all woman within farming. Indeed, suggestions that organisational structures can present barriers to women in agriculture could be deemed at odds with the fact that two high profile agricultural leaders currently exist as the first female heads of National Farmers Union and Linking Environment and Farming (LEAF), two leading agricultural organisations in the UK. However, this economic review is concerned with reviewing literature to identify the prominent trends at an industry level and make recommendations for further economic research rather than assessing individual cases.



Thirdly, it is noted that the economic identity classifications presented in section 3.1 may not explicitly nor indefinitely apply to all individuals, nor remain fixed across time and space. This paper acknowledges that individuals may exhibit fluidity between classifications as a result of spatial and temporal dynamicity (Riley, 2009). A further limitation relating to this classification system is that women themselves may underestimate their contribution and the value this generates within the farm and the farming family (Whatmore, 1991; O'Hara, 1994; Riley, 2009). This is indeed represented in Figure 2, yet, it is beyond the scope of this review to address further quantification. Discussion is also held in Section 4.2 which stresses the need for future policy to recognise the true economic contribution of a diverse range of farm actors.

Fourth, a further limitation of this study is the review of international, rather than UK-specific material. The decision to review data from throughout developed countries was taken to address the paucity of research in the UK. The UK agriculture sector has been assessed to show similar trends to that of other developed countries, however, it cannot be concluded that the generalisation of international findings is wholly representative of UK agriculture. Furthermore, as England and each of the devolved nations refine their own Agriculture Acts, this paper must not overlook the difficulty of a UK analysis given the different structure of agriculture in each of the four UK regions. Again, this highlights the need for specific economic research to be undertaken to enable actionable UK and regional specific recommendations to be delivered during a crucial and unprecedented political period.

## **5. Conclusion**

The research objectives of this paper were to identify women's economic contribution and visibility; to document the key differences between women and men's farming practices; and, to explore the barriers to women's participation and visibility. As such, this paper discusses a range of factors impacting the roles and participation of women in UK agriculture, by the use of literature from throughout both UK and developed countries, to highlight the important roles policy and further research can play in addressing prominent gendered challenges.

Key economic differences between men and women farmers are found to occur, however, further economic research is required to establish the causality of these differences and isolate any gender-specific inferences from the influence of prevalent gender inequalities. To date, there is relatively little research focused specifically upon farm women and there continue to be concerns about data quality, accuracy and access (Rosenberg, 2017). Furthermore, disparities remain across the globe as to where this research is undertaken, and much agricultural research continues to ignore gender considerations even when they might be informative (Ball, 2020). The incorporation of gender considerations into agricultural research practices would facilitate richer data insights into both comparisons between farm men and women, as well as between farm women as a group, and will have important policy implications.

Key differences between women's economic contribution and visibility are illustrated between economic identity classifications of farm women. Combining this with findings that suggest women maintain high representation across fast-growing 'environmentally conscious' agricultural markets - such as organic, local, direct-to-market and farm tourism - suggests that researching and supporting the role of women in UK agriculture has important economic implications. The need for economic research becomes even more prominent as the UK looks to refine its own Agriculture Acts. Political mantras such as 'public money for public goods' highlight the need to focus upon environmental and rural development as a vital component of developing agricultural policy.

As such, policy plays a critical role in the advancement of gender equality. The success of initiatives such as the Scottish Government's Women in Agriculture Taskforce (Shortall et al., 2019) demonstrates the need and ability for research and policy to work together to identify, support and deliver on the specific needs of women.

## **Acknowledgements**

*Funding: This work was supported with thanks to generous research support from NFU Mutual Charitable Trust, The Perry Foundation, The Douglas Bomford Trust, The Clan Trust, and The Worshipful Company of Farmers Charitable Trust.*

*The authors would also like to thank The Journal of Rural Studies editor and anonymous reviewers for their constructive and valuable feedback.*

## Reference list

- Adams, R., Ferreira, D. 2009. Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*. 94(2), 291–309.
- Adinolfi, F., Capitanio, F. 2009. Innovation vs opposition: The role of women in the family farms regeneration process. An Italian experience. *New Medit: Mediterranean Journal of Economics, Agriculture and Environment*. 8(2), 23–30.
- Albright, C. 2006. Who's Running the Farm?: Changes and characteristics of Arkansas women in agriculture. *Journal of Agriculture Economics*. 5, 1315-1322. From: <https://academic-oup-com.ezproxy.nottingham.ac.uk/ajae/article/88/5/1315/49622>
- Almas, R. 2010. I have seen the future and it works! How Joint Farming may solve contradictions between technological level and farm structure in Norwegian dairy production Bonanno, A., Bakker, H., Jussaume, R., Kawamura, Y., Shucksmith, M. (Eds.), *From Community to Consumption: New and Classical Themes in Rural Sociological Research, Research in Rural Sociology and Development*. 16, 3-16. From: [https://doi.org/10.1108/S1057-1922\(2010\)0000016004](https://doi.org/10.1108/S1057-1922(2010)0000016004)
- Alston, M. 1995. *Women on the land: the hidden heart of Australia*. New South Wales: University of New South Wales.
- Alston, M. 1998. There are just no women out there: how the industry justifies the exclusion of women from agricultural leadership, *Rural Society*. 8 (3), 197-209.
- Alston, M. 2000. *Breaking through the Grass Ceiling: Women, Power and Leadership in Agricultural Organisations*, Harwood, Amsterdam.
- Alston, M. 2003. Women's representation in an Australian rural context. *Sociologia Ruralis*. 43(4), 474-487. From: <https://doi.org/10.1046/j.1467-9523.2003.00256.x>
- Alston, M., Wilkinson, J. 1998. Australian farm women – shut out or fenced in? The lack of women in agricultural leadership, *Sociologia Ruralis*. 38 (3), 391-408. From: <https://doi.org/10.1111/1467-9523.00085>
- Andersson, E., Lundqvist, P. 2016. Gendered time in Swedish family farming. *Journal of Family Business Management*. 6(3), 310-329. From: <http://dx.doi.org.ezproxy.nottingham.ac.uk/10.1108/JFBM-07-2015-0023>
- Ball, J. 2020. Women farmers in developed countries: a literature review. *Agriculture and Human Values*. 1-14. From: <https://doi-org.ezproxy.nottingham.ac.uk/10.1007/s10460-019-09978-3>
- Ball, J. 2014. She works hard for the money: women in Kansas agriculture. *Agriculture and Human Values*. 31(4), 593-60. From: <https://link-springer-com.ezproxy.nottingham.ac.uk/article/10.1007/s10460-014-9504-8>
- Barbercheck, M. 2009. Meeting the Extension Needs of Women Farmers: A Perspective from Pennsylvania. *Journal of Extension*. 47(3). From: [https://www.researchgate.net/publication/228659264\\_Meeting\\_the\\_Extension\\_Needs\\_of\\_Women\\_Farmers\\_A\\_Perspective\\_from\\_Pennsylvania](https://www.researchgate.net/publication/228659264_Meeting_the_Extension_Needs_of_Women_Farmers_A_Perspective_from_Pennsylvania)
- Beck, U., Giddens, A., Lash, S. 1994. *Reflexive Modernization: Politics, Tradition and Aesthetics in the Modern Social Order*. Stanford University Press.
- Bell, R., Kilpatrick, S. 2000. Sharing the Driving Seat: Involving everyone in a family business, *Rural Society*. 10(1), 5-13. From: [10.5172/rsj.10.1.5](https://doi.org/10.5172/rsj.10.1.5)
- Benjamin, C. 1994. The growing importance of diversification activities for French farm households. *Journal of Rural Studies*. 10(4), 331-342. From: [https://doi.org/10.1016/0743-0167\(94\)90043-4](https://doi.org/10.1016/0743-0167(94)90043-4)

- Bernard de Raymond, A. 2013. Detaching from agriculture? Field-crop specialization as a challenge to family farming in northern Côte d'Or, France. *Journal of Rural Studies*. 32, 283-294. From: 10.1016/j.jrurstud.2013.07.007
- Blekesaune, A., Haney, W., Haugen, M. 2010. On the Question of the Feminization of Production on Part-time Farms: Evidence from Norway. *Rural Sociology*. 58(1), 111-129. From: 10.1111/j.1549-0831.1993.tb00485.x
- BMJ. 2009. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *British Medical Journal*; 339 :b2700 doi:10.1136/bmj.b2700
- Bock, B. 2010. Personal and Social Development of Women in Rural Areas of Europe. IP/B/ AGRI/IC/2010\_089, European Parliament, Brussels.
- Bock, B. 2015. Gender mainstreaming and rural development policy; the trivialization of rural gender issues. *Gender, Place, and Culture*. 22(5), 731–745.
- Bock, B., Shortall, S. 2017. *Gender and Rural Globalization: International Perspectives on Gender and Rural Development*. Oxford, UK: CAB International
- Bock, B., Shortall, S. eds (2006) *Rural gender relations: issues and case studies*. London: CAB International.
- Bock, B. 2004. Fitting in and Multi-tasking: Dutch Farm Women's Strategies in Rural Entrepreneurship, *Sociologia Ruralis*. 44(3), 245-260. From: <https://doi.org/10.1111/j.1467-9523.2004.00274.x>
- Bower, Q. 2010. Understanding the strategic decisions women make in farming families. *Journal of Rural Studies*. 26, 141-151.
- Bowler, I., Ilbery, B. 1987. Redefining Agricultural Geography, *Area*. 19(4), 327-332. From: [www.jstor.org/stable/20002508](http://www.jstor.org/stable/20002508)
- Brandth, B. 2002. Gender identity in European family farming: a literature review. *Sociologia Ruralis*. 42(2), 181– 201. *Sociologia Ruralis*. 42(3), 181-200. From: <https://doi.org/10.1111/1467-9523.00210>
- Brandth, B., Haugen, M. 2011. Farm diversification into tourism – implications for social identity? *Journal of Rural Studies*. 27(1), 35–44.
- Brandth, B., Haugen, M., Kroken, A. 2011. Farm Tourism: A question of gender and competence. *Journal of Agricultural Science and Technology*. 1(6), 896-905. From: <http://hdl.handle.net/11250/2377361>
- Brandth, B., Overrein, G. 2013. Resourcing Children in a Changing Rural Context: Fathering and Farm Succession in Two Generations of Farmers. 53(1), 95-111. From: <https://doi.org/10.1111/soru.12003>
- Brandth, B., Bjørkhaug, H. 2015. Gender Quotas for Agricultural Boards: Changing Constructions of Gender?, *Gender, Work & Organization*. 22(6), 614-628. From: <https://doi.org/10.1111/gwao.12112>
- Brasier, K., Barbercheck, M., Keirnan, N., Sachs, C., Schwartzberg, A., Trauger, A. 2009. Extension Educators' Perceptions of the Educational Needs of Women Farmers in Pennsylvania. *Journal of Extension*. 47(3). From: [https://www.joe.org/joe/2009june/pdf/JOE\\_v47\\_3a9.pdf](https://www.joe.org/joe/2009june/pdf/JOE_v47_3a9.pdf)
- Bryant, L. 2002. The Detraditionalization of Occupational Identities in Farming in South Australia. *Sociologia Ruralis*. 39(2), 236-261. From: <https://doi.org/10.1111/1467-9523.00104>
- Buchy, M. 2001. Listening to women's voices in the Australian forestry workforce: You learn to cope and get on with things, ANU Forestry Occasional Paper, ANU Forestry, Canberra.

- Burton, M., D. Rigby, and T. Young. 2003. Modelling the adoption of organic horticultural technology in the UK using duration analysis. *The Australian Journal of Agricultural and Resource Economics*. 47 (1), 29–54.
- Byrne, A. 2003. Developing a sociological model for researching women's self and social identities. *European Journal of Women's Studies*. 10, 443-464.
- Callinicos. 1989. Marxist theory / edited by Alex Callinicos. Oxford : Oxford University Press.
- Carter, S. Multiple business ownership in the farm sector: Assessing the enterprise and employment contributions of farmers in Cambridgeshire. *Journal of Rural Studies*. 15(4), 417-429.
- Cassidy, A., and McGrath, B. 2014. The Relationship between 'Non-successor' Farm Offspring and the Continuity of the Irish Family Farm. *Sociologia Ruralis*. 54(4), 399-416. From: <https://doi.org/10.1111/soru.12054>
- Cassidy, A., and McGrath, B. 2015. Farm, place and identity construction among Irish farm youth who migrate. *Journal of Rural Studies*. 37, 20-28. From: <https://doi.org/10.1016/j.jrurstud.2014.11.006>
- Cavicchioli, D., Bertoni, D., Pretolani, R. 2018. Farm succession at a crossroads: The interaction among farm characteristics, labour market conditions, and gender and birth order effects. *Journal of Rural Studies*. 61, 73-83. From: <https://doi.org/10.1016/j.jrurstud.2018.06.002>
- Cavicchioli, D., Bertoni, F. Tesser, and D.G. Frisio. 2015. What factors encourage intrafamily farm succession in mountain areas? *Mountain Research and Development*. 35 (2) 152–161.
- Cawley, M, DA Gilmore, A. Leave and P.McDonagh. 1995. *Farm Diversification: Studies relating to the West of Ireland*. Teagsac, Sandymount, Dublin.
- Charatsari, C., Istenič, M., Lioutas, E. 2013. "I'd like to participate, but . . .": women farmers' scepticism towards agricultural extension/education programmes. *Development in Practice*. 23(4), 511-525. From: [10.1080/09614524.2013.790345](https://doi.org/10.1080/09614524.2013.790345)
- Charatsari, C., Papadaki-Klavdianou, A., Michailidis, A., Partalidou, M. 2013b. Great Expectations? Antecedents of Women Farmers' Willingness to Participate in Agricultural Education Programmes. *Outlook on Agriculture*. 42(3), 193-199. From: [https://www.researchgate.net/publication/239938671\\_I%27d\\_like\\_to\\_participate\\_but\\_Women\\_farmers%27\\_scepticism\\_towards\\_agricultural\\_extensioneducation\\_programmes](https://www.researchgate.net/publication/239938671_I%27d_like_to_participate_but_Women_farmers%27_scepticism_towards_agricultural_extensioneducation_programmes)
- Chiappini, S., De Rosa, M. 2011. Consuming rural development policies: Are there gender differences in Italian agriculture? *Agricultural Economics Review*. 12(1), 56–68.
- Claridge, C., Chamala, S. 1995. Role of women in Australian agriculture and natural resource management: Issues of empowerment and leadership, in: *Women in agriculture: Emerging issues, problems and prospects*, RK Samantra (ed.), MD Publications, New Delhi.
- Coldwell, I. 2007. New farming masculinities: “more than just shit-kickers”, we're “switched-on” farmers wanting to “balance lifestyle, sustainability and coin”. *Journal of Sociology*, 43(1), 87–103.
- Contzen, S., and Forney, J. 2017. Family farming and gendered division of labour on the move: a typology of farming-family configurations. *Agriculture and Human Values*. 34(1), 27-40. From: <http://dx.doi.org.ezproxy.nottingham.ac.uk/10.1007/s10460-016-9687-2>
- Croppenstedt, A., Goldstein, M., Rosas, N. 2013. Gender and Agriculture: Inefficiencies, Segregation, and Low Productivity Traps. *The World Bank Research Observer*. 28(1), 79-109.
- Cush, P., Macken-Walsh, A., Byrne, A. 2018. Joint Farming Ventures in Ireland: Gender identities of the self and the social. *Journal of Rural Studies*. 57, 55-64. From: <https://doi.org/10.1016/j.jrurstud.2017.09.017>

Defra. 2011. Agricultural labour in England and the UK. Farm Structure Survey 2013. National Statistics. From: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/82818/defra-stats-foodfarm-crosscutting-auk-auk2011-120709.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/82818/defra-stats-foodfarm-crosscutting-auk-auk2011-120709.pdf)

Defra. 2013. Agricultural labour in England and the UK. Farm Structure Survey 2013. National Statistics. From: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/725180/FSS2013-labour-statsnotice-12jul18.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/725180/FSS2013-labour-statsnotice-12jul18.pdf)

Defra. 2015. Agricultural labour in England and the UK. Farm Structure Survey 2013. National Statistics. From: <https://www.gov.uk/government/statistics/agriculture-in-the-united-kingdom-2015>

Defra. 2016. Agricultural labour in England and the UK. Farm Structure Survey 2016. National Statistics. From: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/771494/FSS2013-labour-statsnotice-17jan19.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/771494/FSS2013-labour-statsnotice-17jan19.pdf)

Defra. 2019. Agricultural labour in England and the UK. Farm Structure Survey 2019. National Statistics. From: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/904024/AUK\\_2019\\_27July2020.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904024/AUK_2019_27July2020.pdf)

Elix and Lambert. 1998. Missed Opportunities. Harnessing the Potential of Women in Australian Agriculture, Volume 1, Social Survey and Analysis, Rural Industries Research and Development Corporation and Department of Primary Industries and Energy, Canberra.

Escalante, C., Epperson, J., Raghunathan, U. 2009. Gender bias claims in Farm Service Agency's lending decisions. *Journal of Agricultural and Resource Economics*. 34(2), 332–349.

European Commission. 2000. Equal Opportunities for Women and Men in the European Union Annual Report 1999. Luxembourg: Office for Official Publications of the European Communities.

European Commission. 2019. Common Agricultural Policy: Key graphs and figures. European Commission. From: [cap-expenditure-graph1\\_en.pdf](#)

European Parliament. 2008. Report on the Situation of Women in Rural Areas of the EU (2007/2117 (INI)), Committee on Women's Rights and Gender Equality, rapporteur: Christa Klambauer.

European Union. 2019. Agriculture Statistical Factsheet. European Commission. From: [https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agri-statistical-factsheet-eu\\_en.pdf](https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/agri-statistical-factsheet-eu_en.pdf)

EUROSTAT, 2019. Data From Statistical Databases. Available from: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home> [Accessed: June 2020]

Evans, N. and B. Ilbery. 1996. Exploring the influence of farm-based pluriactivity on gender Relations in capitalist agriculture. *Sociologia Ruralis*. 36(1),74– 92. From: <https://doi.org/10.1111/j.1467-9523.1996.tb00005.x>

Evans, N., and Ilbery, B. 1993. The Pluriactivity, Part-Time Farming, and Farm Diversification Debate. *Environment and Planning*. 25(7), 945-959. From: <https://journals-sagepub-com.ezproxy.nottingham.ac.uk/doi/abs/10.1068/a250945>

Farmers Weekly. 2014. New survey shows changing role of women on farms. From: <https://www.fwi.co.uk/farm-life/new-survey-shows-changing-role-of-women-on-farms>  
FWi. 2015. 8 steps for farm succession planning. Olivia Cooper. *Farmers Weekly* (08/12/15), Reed Business Information.

- Gasson, R. .1980. Roles of farm women in England. *Sociologia Ruralis*. 20, 165–180
- Gasson, R. 1981. ROLES OF WOMEN ON FARMS: A PILOT STUDY. *Journal of Agricultural Economics*. 32(1), 11-20. From: <https://doi.org/10.1111/j.1477-9552.1981.tb01537.x>
- Gasson, R., Winter, M. 1992. Gender relations and farm household pluriactivity. *Journal of Rural Studies*. 8(4), 387-397. From: [https://doi.org/10.1016/0743-0167\(92\)90052-8](https://doi.org/10.1016/0743-0167(92)90052-8)
- Gasson, R. 1993. The Family Farm Business. CAB International. Wallingford, Oxon.
- Gherardi, S. 1995. *Gender, symbolism and organizational cultures*. London: Sage.
- Gidarakou, I. 1999. Young women's attitudes towards agriculture and women's new roles in the greek countryside: A first approach. *Journal of Rural Studies*. From: 10.1016/s0743-0167(98)00054-0
- Gidarakou, I., Dimopoulou, E., Lagogianni, R., Sotiorpoulou, S. 2008. Young women and agriculture: The case of active young women farmers in west Macedonia, Greece. In *Regional analysis and policy*, (eds). Coccossis, H., Psycharis, Y. Physica-Verlag HD. 355–374.
- Gidarakou, I., Kazakopoulos, L., Arachoviti, E., Papa- dopoulos, D. 2000. Family farm succession and gender relations: rethinking gender discrimination. *Agr. Med.* 2000(130), 113-28.
- Giddens, A. 1991. *Modernity and Self-identity: Self and Society in the Late Modern Age*. Stanford University Press.
- Gillard, E., Brough, E., Duffield, B. 1990. *Extension strategies involving rural women*, Queensland Department of Primary Industries, Brisbane.
- Goldsmith, R., Feygina, I. and Jost, J. 2013. The gender gap in environmental attitudes: a system justification perspective. In: Alston, M. and Whittenbury, K. (eds) *Research Policy: Addressing the Gendered Impacts of Climate Change*. Springer, Dordrecht, The Netherlands. 159–171.
- Gorman, M. 2004. *Socio-economic impact of rural development: livelihood realities and prospects for Irish farm families*. University College, Dublin.
- Grace, M. 1994. *Women in Rural Queensland: An Exploration of Cultural Contexts, Educational Needs and Leadership Potential*, Queensland University of Technology, Brisbane.
- Grace, M. 1997. *Networking Systems for Rural Women*, Rural Industries Research and Development Corporation, Canberra.
- Grubbström, A., Stenbacka, S., Joosse, S. Balancing family traditions and business: Gendered strategies for achieving future resilience among agricultural students. *Journal of Rural Studies*. 35, 152-161. From: <https://doi.org/10.1016/j.jrurstud.2014.05.003>
- Haugen, M. 1990. FEMALE FARMERS IN NORWEGIAN AGRICULTURE From traditional farm women to professional farmers. *Sociologia Ruralis*. 30 (2). 197-209. From: <https://doi.org/10.1111/j.1467-9523.1990.tb00409.x>
- Haugen, M., Blekesaune, A. 1996. *Family Farming in Norway* Dr.polit thesis. Report 6/96. Trondheim: Centre for Rural Research.
- Haugen, M., Brandth, B. 1994. Gender Differences in Modern Agriculture: The Case of Female Farmers in Norway. *Gender and Society*. 8(2), 206-229. From: <https://www.jstor.org/stable/190010>

Haugen, M., Brandth, B. 2010. Doing Farm Tourism: The Intertwining Practices of Gender and Work. *Journal of Women in Culture and Society*. 35(2), 425-446. From: <https://www.journals.uchicago.edu/action/showCitFormats?doi=10.1086/605480>

Haugen, M., Brandth, B. 2011. Farm diversification into tourism – Implications for social identity? *Journal of Rural Studies*. 27(1), 35-44. From: <https://doi.org/10.1016/j.jrurstud.2010.09.002>

Hay, R., Pearce, P. 2014. Technology adoption by rural women in Queensland, Australia: Women driving technology from the homestead for the paddock. *Journal Of Rural Studies*. 36, 318-327.

Heggem, R. 2014. Exclusion and inclusion of women in Norwegian agriculture: Exploring different outcomes of the ‘tractor gene’. *Journal of Rural Studies*. 34, 263-271. From: <https://doi.org/10.1016/j.jrurstud.2014.03.002>

Heins, L., Beaulieu, J., Altman, I. 2010. The effectiveness of women’s agricultural education programs: A survey from Annie’s Project. *Journal of Agricultural Education* 51(4), 1–9. From: <http://www.jae-online.org/attachments/article/1521/Vol%2051%20No%204%20-%20combined.pdf>

Hoppe, R., Korb, P. 2013. Characteristics of women farm operators and their farms. USDA-ERS Economic Information Bulletin (111). From: [https://www.ers.usda.gov/webdocs/publications/43749/37012\\_eib111.pdf?v=0](https://www.ers.usda.gov/webdocs/publications/43749/37012_eib111.pdf?v=0)

House of Commons. 2020. Agriculture Bill 2019-20 Briefing. Commons Research Briefing CBP-8702. From: <https://commonslibrary.parliament.uk/research-briefings/cbp-8702/>

Iakovidou, Koutsou, & Partalidou. 2009. Women entrepreneurs in the Greek countryside: A typology according to motives and business characteristics. *Journal of Developmental Entrepreneurship*. 14(02), 165-179. From: [https://www.researchgate.net/publication/46510764\\_Women\\_entrepreneurs\\_in\\_the\\_greek\\_countryside\\_A\\_typology\\_according\\_to\\_motives\\_and\\_business\\_characteristics](https://www.researchgate.net/publication/46510764_Women_entrepreneurs_in_the_greek_countryside_A_typology_according_to_motives_and_business_characteristics)

Ilbery, B., Bowler, I., Clark, G., Crockett, A., Shaw, A. 1998. Farm-based tourism as an alternative farm enterprise: A case study from the Northern Pennines, England, ***Regional Studies; Cambridge***. 32(4), 355-364. From: <https://search.proquest.com/openview/34fddc6482deff8b978b8abbcb7b8a40/1?pq-origsite=gscholar&cbl=49042>

Ilbery, B., Maye, D., Watts, D., Holloway, L. 2010. Property matters: Agricultural restructuring and changing landlord–tenant relationships in England, *Geoforum*. 41(3), 423-434. From: <https://doi.org/10.1016/j.geoforum.2009.11.009>

Ingram, J., Kirwan, J. 2011. Matching new entrants and retiring farmers through farm joint ventures: Insights from the Fresh Start Initiative in Cornwall, UK. *Land Use Policy*, 28(4), 917-927. From: <https://doi.org/10.1016/j.landusepol.2011.04.001>

Isidro, H., Sobral, M. 2015. The Effects of Women on Corporate Boards on Firm Value, Financial Performance, and Ethical and Social Compliance. *J Bus Ethics*. 132, 1–19. From: <https://doi-org.ezproxy.nottingham.ac.uk/10.1007/s10551-014-2302-9>

Istemic, M. 2011. Poticaji i prepreke za cjelovivotno ucenje seoskih wena u Sloveniji (Incentives and barriers for lifelong learning among rural women in Slovenia). In: -Dugum, J., Sinković, K. and Secić, B. (eds) *Uloga cjelovivotnog obrazovanja u zaposljavanju seoskih wena u prehrambenom sektoru (The Role of Lifelong Learning in the Employment of Rural Women in Food Sector)*. Mini- starstvo poljoprivrede, ribarstva i ruralnog razvoja, Zagreb. 18–29.

Istemic, M. 2015. Do rural development programmes promote gender equality on farms? The case of Slovenia. *Gender, Place & Culture*. 22(5), 670-684. From: <https://doi.org/10.1080/0966369X.2013.879102>

Istemic, M. 2015. Do rural development programmes promote gender equality on farms? The case of Slovenia. *Gender, Place, and Culture*. 22(5), 670–684.



Jack, C., Moss, J., Wallace, J. 2009. Waiting for Godot – Restructuring on Small Family Farms. Paper presented at the 111 EAAE-IAAE Seminar ‘Small Farms: Decline or Persistence’, University of Kent, Canterbury, June 26–27.

Kalbacher, J. 1985. A profile of female farmers in America. Rural Development Research Report no. 45. Washington DC: Economic Research Service, USDA. From: <https://naldc.nal.usda.gov/download/CAT86865634/PDF>

Kiernan, N., Barbercheck, M., Brasier, K., Sachs, C., Terman, A. 2012. Women farmers: Pulling up their own educational boot straps with extension. *Journal of Extension*. 50(5), 5. From: <https://joe.org/joe/2012october/rb5.php> GREAT STUDY ON PRACTICAL TRAINING

Lankester, A. 2012. Self-perceived Roles in Life and Achieving Sustainability on Family Farms in North-eastern Australia. *Australian Geographer*. 43(3), 233-251.

Lapple, D. 2012. Comparing attitudes and characteristics of organic, former organic and conventional farmers: Evidence from Ireland. *Renewable Agriculture And Food Systems*. 28(4), 329-337. From: [https://www-cambridge-org.ezproxy.nottingham.ac.uk/core/services/aop-cambridge-core/content/view/9920EB355A71381283A9C7AC7B3789F3/S1742170512000294a.pdf/comparing\\_attitudes\\_and\\_characteristics\\_of\\_organic\\_former\\_organic\\_and\\_conventional\\_farmers\\_evidence\\_from\\_ireland.pdf](https://www-cambridge-org.ezproxy.nottingham.ac.uk/core/services/aop-cambridge-core/content/view/9920EB355A71381283A9C7AC7B3789F3/S1742170512000294a.pdf/comparing_attitudes_and_characteristics_of_organic_former_organic_and_conventional_farmers_evidence_from_ireland.pdf)

Leckie, J. 1993. Female Farmers in Canada, 1971–1986. *The Professional Geographer*, 45(2), 180-193. From: [10.1111/j.0033-0124.1993.00180.x](https://doi.org/10.1111/j.0033-0124.1993.00180.x)

Liepins, R. 1998. The gendering of farming and agricultural politics: A matter of discourse and power, *Australian Geographer*. 29(3), 371-388. From: <https://doi.org/10.1080/00049189808703230>

Liepins, R. and Schick, R. 1998. Gender and education: towards a framework for a critical analysis of agricultural training. *Sociologia Ruralis*. 38(3), 286–302. From: <https://doi.org/10.1111/1467-9523.00079>

Little, J. Panel, R. 2003. Gender research in rural geography, *Gender, Place and Culture: A Journal of Feminist Geography*. 10:3, 281-289, From: [10.1080/0966369032000114046](https://doi.org/10.1080/0966369032000114046)

Little, J., Austin, P. 1996. Women and the rural idyll, *Journal of Rural Studies*. 12(2), 101-111. From: [https://doi.org/10.1016/0743-0167\(96\)00004-6](https://doi.org/10.1016/0743-0167(96)00004-6)

Little, J., Jones, O. 2000. Masculinity, Gender, and Rural Policy. 65(4), 621-639. From: <https://doi.org/10.1111/j.1549-0831.2000.tb00047.x>

Luhrs, D. 2016. Consider the daughters, they are important to family farms and rural communities too: family-farm succession. *Gender, Place & Culture*, 23(8), 1078-1092. From: <https://doi.org/10.1080/0966369X.2015.1090405>

Macken-Walsh, A. Roche, B. 2012. Facilitating Farmers' Establishment of Farm Partnerships: a Participatory Template, Teagasc, Carlow.

Mann, S. 2007. Tracing the process of becoming a farm successor on Swiss family farms. *Agriculture and Human Values*. 24 (4), 435–443. From: <https://link-springer-com.ezproxy.nottingham.ac.uk/content/pdf/10.1007/s10460-007-9087-8.pdf>

Mazey, S. 2000. Introduction: Integrating gender-intellectual and ‘real’ world mainstreaming, *Journal of European Public Policy*. 7(3), 333–345.

McBride-Stetson, D., Mazur, A. (eds). 1995. *Comparative State Feminism*, London: Sage.

- McGowan, C. 2011. Women in agriculture. In *Changing land management: Adoption of new practices by rural landholders*, ed. D. Pannell and F. Vanclay, Collingswood, Australia: Commonwealth Scientific and Industrial Research Organization. 141–152.
- McMichael, P. 2009. A food regime analysis of the 'world food crisis'. *Agriculture and Human Values*. 26, 281-295. From: [10.1007/s10460-009-9218-5](https://doi.org/10.1007/s10460-009-9218-5)
- McMahon, M. 2011. Standard fare or fairer standards: Feminist reflections on agri-food governance. *Agriculture and Human Values*. 28(3), 401–412.
- Meredith, D. 2010. Recent Trends in Employment and Unemployment: Assessing the Impact of the Economic Downturn on Part-Time Farmers. Rural Economy Research Centre Paper, Teagasc, Athenry, Galway, Ireland.
- Midgley, J. 2006. Gendered economies: Transferring private gender roles into the public realm through rural community development, *Journal of Rural Studies*. 22(2), 217-231. From: <https://doi.org/10.1016/j.jrurstud.2005.08.014>
- Miller, C. and Razavi, S. (eds). 1998. *Missionaries and Mandarins: Feminist Engagement with Development Institutions*, London: Intermediate Technology Publications.
- Milne, C., Butler, A. 2014. Young Entrants to Farming: Explaining the Issues. Policy Briefing. Rural Policy Center.
- Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med*. 6(7), e1000097. From: [10.1371/journal.pmed1000097](https://doi.org/10.1371/journal.pmed1000097)
- Morris, C., Evans, N. 1999. Research on the geography of agricultural change: redundant or revitalized? *Royal Geographical Society with IBG*. 31(4), 349-358. From: <https://doi.org/10.1111/j.1475-4762.1999.tb00101.x>
- Morris, C., Evans, N. 2001. 'Cheese Makers Are Always Women': Gendered representations of farm life in the agricultural press, *Gender, Place and Culture: A Journal of Feminist Geography*. 8(4), 375-390. From: [10.1080/09663690120111618](https://doi.org/10.1080/09663690120111618)
- Ní Laoire, C. 2002. Young farmers, masculinities and change in rural Ireland. *Irish Geography*. 35(1), 16–27.
- O'Hara, P. 1994. Constructing the future: co-operation and resistance among farm women in Ireland. In S. Whatmore et al. eds, *Gender and rurality*. London: David Fulton Publishers Ltd.) 50–69.
- ONS. 2018. Dataset. EMP04: Employment by occupation. From: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/employmentbyoccupationemp04>
- Oedl-Wieser, T. 2015. Gender equality: A core dimension in rural development programmes in Austria? *Gender, Place, and Culture*. 22(5):685–699.
- OECD. 2020. Agricultural land (indicator). doi: [10.1787/9d1ffd68-en](https://doi.org/10.1787/9d1ffd68-en) (Accessed on 26 July 2020)
- Perry, J., Keating, N., Effland, A., Shaver, F. 1995. Gender and Generation on Family Farms. *Canadian Journal of Agricultural Economics*. 115-30.
- Pini, B. 2002. Constraints to women's involvement in agricultural leadership. *Women in Management Review*. 17(6), 276-284. From: <https://doi-org.ezproxy.nottingham.ac.uk/10.1108/09649420210441923>
- Pini, B. 2003. Sheep, Shadows and Silly Saints: Constructing Women in Agricultural Leadership, *Rural Society*. 13(2), 193-207. From: <https://doi.org/10.5172/rsj.351.13.2.193>

- Pini, B., Shortall, S. 2006. Gender Equality in Agriculture: Examining State Intervention in Australia and Northern Ireland, *Social Policy and Society*. 5(2), 199-206. From: <https://doi-org.ezproxy.nottingham.ac.uk/10.1017/S1474746405002885>
- Pint, B. 1998. The Emerging Economic Rationalist Discourse on Women and Leadership in Australian Agriculture, *Rural Society*. 8(3), 223-233. From: <https://doi.org/10.5172/rsj.8.3.223>
- Price, P., Evans, L. (2006) From 'As Good as Gold' to 'Gold Diggers': Farming Women and the Survival of British Family Farming. *Sociologia Ruralis*. 46 (4), 280-298. From: <https://doi.org/10.1111/j.1467-9523.2006.00418.x>
- Price, L. 2012. The Emergence of Rural Support Organisations in the UK and Canada: Providing Support for Patrilineal Family Farming. *Sociologia Ruralis*. 52(3), 353-376. From: <https://doi.org/10.1111/j.1467-9523.2012.00568.x>
- Prügl, E. 2009. Does gender mainstreaming work? Feminist engagements with the German agricultural state. *International Feminist Journal of Politics*. 11(2), 174–195.
- Quisumbing, A., Pandolfelli, L. 2010. Promising Approaches to Address the Needs of Poor Female Farmers: Resources, Constraints, and Interventions. *World Development*. 38(4), 581-592.
- Rico, M., Fuller, A. 2016. Newcomers to farming: towards a new rurality in Europe. *Documents d'anàlisi geogràfica*. 62(3), 531-551. From: <https://dag.revista.uab.es/article/view/v62-n3-monllor-fuller/376-pdf-en>
- Riley, M. 2009. Bringing the 'invisible farmer' into sharper focus: gender relations and agricultural practices in the Peak District (UK), *Gender, Place & Culture*. 16(6), 665-682. From: 10.1080/09663690903279138
- Roberts, B. 1994. Women in rural conservation and Landcare, in: *Country women at the crossroads*, Teather, E., Franklin, M. (eds.), University of New England Press, Armidale, NSW.
- Rosenberg, N. 2017. Farmers who don't farm: The curious rise of the zero-sales farmer. *Journal of Agriculture, Food Systems, and Community Development*. 7(4), 149–157.
- Rosenfeld, Tigges. 1988. Marital status and independent farming: The importance of family labour flexibility to farm outcomes. *Women in Farming: Changing Roles, Changing Structures*. W. Haney and J. Knowles eds Boulder: Westview Press
- Rossi, J., Garner, S. 2014. Industrial farm animal production: a comprehensive moral critique. *Journal of Agriculture and Environment Ethics*. 27, 479-522,. From: 10.1007/s10806-014-9497-8
- Rossier, R. and B. Wyss. 2008. Gendered interest and motivation of the younger generation in agriculture and farm succession. In Asztalos Morell I. and B.B. Bock (eds), *Gender regimes, citizen participation and rural restructuring*, Elsevier, Amsterdam. 193-216. From: [https://www.researchgate.net/publication/235298305\\_Gendered\\_interest\\_and\\_motivation\\_of\\_the\\_younger\\_generation\\_in\\_agriculture\\_and\\_farm\\_succession](https://www.researchgate.net/publication/235298305_Gendered_interest_and_motivation_of_the_younger_generation_in_agriculture_and_farm_succession)
- Sachs, C. 1983. *The invisible farmers: women in agricultural production*. Totowa, NJ: Rowman and Allanheld.
- Sachs, C.E., M. Barbercheck, K. Brasier, N.E. Kiernan, and A.R. Terman. 2016. *The rise of women farmers and sustainable agriculture*. Iowa City: University of Iowa Press.
- Safilios-Rothschild, C. 2003. Gender role flexibility and smallholder survival. *International Journal of Agricultural Resources, Governance, and Ecology*. 2(2), 187–200.
- Safilios-Rothschild, C. 2006. CAP regulations and farm household relations. In: Bock, B.B. and Shortall, S. (eds) *Rural Gender Relations: Issues and Case Studies*. CAB International, Wallingford, UK. 260–278.

- Schmitt, M. 1998. Gender Segregation at Vocational Schools – Women Farm Apprentices’ Dilemma, *Sociologia Ruralis*. 38(3), 303-317. From: <https://doi.org/10.1111/1467-9523.00080>
- Schultz, M., Hyde, C., Mora, A., Eggers, T., Lei-bold, K. 2017. Annie’s Project farm and ranch business management course for women created positive impacts in 14 states. *Journal of the National Association of County Agricultural Agents*. 10(2). From: <https://www.nacaa.com/journal/index.php?jid=784>
- Scottish Government, 2017. Women in Farming and the Agriculture Sector: Research Report. Agricultural and Rural Delivery Directorate. By: Shortall S, Sutherland LA, McKee A, Hopkins J. 2017. Women in farming and the agriculture sector. Edinburgh, UK: Scottish Government. From: <https://www.gov.scot/publications/women-farming-agriculture-sector/>
- Scottish Government. 2019. Final Report of the Women in Agriculture Taskforce. Agricultural and Rural Delivery Directorate. From: <https://www.gov.scot/publications/final-report-women-agriculture-taskforce/>
- Seuneke, P., Bock, B. 2015. Exploring the roles of women in the development of multifunctional entrepreneurship on family farms: an entrepreneurial learning approach. *NJAS - Wageningen Journal of Life Sciences*. 74(75), 41-50. From: <https://www.tandfonline.com.ezproxy.nottingham.ac.uk/doi/full/10.1080/09589236.2015.1095080>
- Sheriden, A., Mckenzie, F., Still, L. 2011. Making visible the ‘space of betweenness’: understanding women’s limited access to leadership in regional Australia, *Gender, Place & Culture*. 18(6), 732-748. From: [10.1080/0966369X.2011.617909](https://doi.org/10.1080/0966369X.2011.617909)
- Shortall, S. 1992. Power Analysis and Farm Wives - An Empirical Study of the Power Relationships Affecting Women on Irish Farms. *Sociologia Ruralis*. 32(4), 431-452.
- Shortall, S. 1996. Training to be Farmers or Wives? Agricultural Training for Women in Northern Ireland. *Sociologia Ruralis*. 36(3), 269, 285. From: <https://doi.org/10.1111/j.1467-9523.1996.tb00022.x>
- Shortall, S. 1999. *Gender and power – women and farming*. London: Macmillan Press.
- Shortall, S. 2001. Women in the field: women, farming and organisations, *Gender, Work and Organization*. 8(2), 164-81.
- Shortall, S. 2002. Gendered agricultural and rural restructuring: a case study of Northern Ireland. *Sociologia Ruralis*. 42(2), 160–175. From: <https://doi.org/10.1111/1467-9523.00208>
- Shortall, S. 2006. Gender and Farming: An Overview. In: *Rural Gender Relations: Issues and Case-Studies*, edited by B. B. Bock and S. Shortall. Oxfordshire: CABI. 19–26.
- Shortall, S. 2008. Are rural development programmes socially inclusive? Social inclusion, civic engagement, participation, and social capital: Exploring the differences. *Journal of Rural Studies*. 87(2), 450-457.
- Shortall, S. 2010. Women Working on the Farm: How to Promote their Contribution to the Development of Agriculture and Rural Areas in Europe. IP/B/AGRI/IC/2010\_046. European Parliament, Brussels. From: [https://eige.europa.eu/docs/2026\\_IPOL-AGRI\\_NT\(2010\)438609\\_EN.pdf](https://eige.europa.eu/docs/2026_IPOL-AGRI_NT(2010)438609_EN.pdf)
- Shortall, S. 2015. Gender mainstreaming and the Common Agricultural Policy. *Gender, Place & Culture*. 22(5), 717-730. From: [10.1080/0966369X.2014.939147](https://doi.org/10.1080/0966369X.2014.939147)
- Shortall, S. 2016. Gender and identity formation. In D. Brown, M. Shucksmith eds, *The Routledge International Handbook of Rural Studies*. London and New York: Routledge/Falmer.
- Shortall, S. 2017a. Gender and Agriculture. In: Shortall, S. and Bock, B, (eds). *Gender and Rural Globalisation: International Perspectives on Gender and Rural Development*. Oxford, UK: CAB International.

Shortall, S. 2017b. Rural and gender identity. In: Shortall, S. and Bock, B, (eds). *Gender and Rural Globalization: International Perspectives on Gender and Rural Development*. Oxford: CAB International.

Shortall, S., Mckee, A., Sutherland, L. 2020. The Performance of Occupational Closure: The Case of Agriculture and Gender. *Sociologia Ruralis*. 60(1), 40-57.

Silvasti, T. 2003. Bending borders of gendered labour division on farms: the case of Finland. *Sociologia Ruralis*. 43(2), 154–167. From: <https://doi.org/10.1111/1467-9523.00236>

Silvasti, T. 2003. Bending borders of gendered labour division on farms: the case of Finland. *Sociologia Ruralis*. 43(2), 154– 167. From: <https://doi.org/10.1111/1467-9523.00236>

Sinclair, A. 1994. *Trials at the top*. Melbourne: The Australian Centre, University of Melbourne.

Slagsvold, B., A. Sørensen. 2008. Age, education, and the gender gap in the sense of control. *International Journal of Aging and Human Development*. 67(1), 25–42.

Staeheli, L. 2004. Mobilizing women, mobilizing gender: is it mobilizing difference?, *Gender, Place and Culture*. 11(3), 347–372.

Statista. 2018. From: <https://www.statista.com/statistics/270372/distribution-of-gdp-across-economic-sectors-in-the-united-kingdom/>

Sumner, J. & Llewelyn, S. 2011. Organic Solutions? Gender and Organic Farming in the Age of Industrial Agriculture. *Capitalism Nature Socialism*, 22(1), 100-118. From: 10.1080/10455752.2010.546659

Trauger, A. 2004. Because they can do the work: Women farmers in sustainable agriculture in Pennsylvania, USA. *Gender, Place and Culture*. 11 (2), 289–307.

Trauger, A., C. Sachs, M. Barbercheck, K. Brasier and N.E. Kiernan. 2009. Our market is our community: women farmers and civic agriculture in Pennsylvania. USA. *Agriculture and Human Values*. 26(3). From: 10.1007/s10460-008-9190-5

Trauger, A., C. Sachs, M. Barbercheck, N.E. Kiernan, and A. Schwartzberg. 2010. The object of extension: Agricultural education and authentic farmers in Pennsylvania. *Sociologia Ruralis*. 50(2), 85–102.

Trauger, A., Sachs, C., Barbercheck, M., Brasier, K. and Kiernan, N., Schwartzberg, A. 2010b. The object of extension: Agricultural education and authentic farmers in Pennsylvania. *Sociologia Ruralis* 50(2), 85–102. From: <https://doi.org/10.1111/j.1467-9523.2010.00507.x>

Trauger, A., Sachs, C., Barbercheck, M., Kiernan, N., Brasier, K., Findeis, J. 2008. Agricultural education: Gender identity and knowledge exchange. *Journal of Rural Studies*. 24, 432–439. From: <https://pennstate.pure.elsevier.com/en/publications/agricultural-education-gender-identity-and-knowledge-exchange>

UK Parliament. 2020. *Women and the Economy: Briefing Paper [PDF]*. Brigid Francis Devine Niamh Foley. Available from: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKewiYyeXosPfqAhWLiVwKHbnUDX4QFjADegQIARAB&url=http%3A%2F%2Fwww.parliament.uk%2Fbriefing-papers%2Fsn06838.pdf&usq=AOvVaw1a1PMC4AyIRXvj9yu4j3iS>

Van Vliet, JA., Schut, AGT., Reidsma, P., Descheemaeker, K., Slingerland, M., Van de Ven, GWJ, Giller, KE. *Demystifying family farming: Features, diversity and trends across the globe*. *Global Food Security*. 5, 11-18. From: <https://doi.org/10.1016/j.gfs.2015.03.001>

Voyce, M. 2007. Geographical Indications, the EU and Australia: A Case Study on Government at a Distance through Intellectual Property Rights. *Macquarie Law Journal*, 7. From: <https://heinonline.org/HOL/LandingPage?handle=hein.journals/macq7&div=10&id=&page=>

Whatmore, S. 1991. *Farming Women: Gender, Work and Family Enterprise*. Macmillan, London.

Wheeler, S., Bjornlund, H., Zuo, A., Edwards, J. 2012. Handing down the farm? The increasing uncertainty of irrigated farm succession in Australia, *Journal of Rural Studies*. 28(3), 266-275. From: <https://doi.org/10.1016/j.jrurstud.2012.04.001>

Williams, F. 2006. Barriers Facing New Entrants to Farming - an Emphasis on Policy. IDEAS Working Paper Series from RePEc, Land Economy Research Group, SAC.

Williams, F., Farrington, J. 2006. Succession and the future of farming: problem or perception?. *The Rural citizen: governance, culture and wellbeing in the 21st century*. Plymouth.

Wiskerke, J., Bock, B., Stuiver, M., Renting, H. 2003. Environmental co-operatives as a new mode of rural governance. *NJAS - Wageningen Journal of Life Sciences*. 51(1-2), 9-25.

Woodhouse, P. 2010. Beyond industrial agriculture? Some questions about farm size, productivity and sustainability. *Journal of Agrarian Change Agrar*. 10, 437-453. From: 10.1111/j.1471-0366.2010.00278.x

World Bank. 2019. Databank world development indicators. From: <http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators>.

World Bank. 2019. *Doing business 2019: Training for reform (Regional profile: OECD high income)*. World Bank group flagship report, Washington, D.C.: World Bank Group. From: [http://www.doingbusiness.org/content/dam/doingBusiness/media/Profiles/Regional/DB2019/OECD-High income.pdf](http://www.doingbusiness.org/content/dam/doingBusiness/media/Profiles/Regional/DB2019/OECD-High%20income.pdf).

Xiao, C. and McCright, A.M. 2015. Gender differences in environmental concern: revisiting the institutional trust hypothesis in the USA. *Environment and Behavior*. 47(1), 17–37. From: <https://doi.org/10.1177/0013916513491571>

Zelezny, L.C., Chua, P.P. and Aldrich, C. 2000. New ways of thinking about environmentalism: elaborating on gender differences in environmentalism. *Journal of Social Issues*. 56(3), 443–457. From: <http://dx.doi.org/10.1111/0022-4537.00177>

Zepeda, L., and M. Castillo. 1997. The role of husbands and wives in farm technology choices. *American Journal of Agricultural Economics*. 79 (2), 583–588.

Zeuli, K.A., and R.P. King. 1998. Gender differences in farm management. *Review of Agricultural Economics*. 20 (2), 513–529. From: [www.jstor.org/stable/1350005](http://www.jstor.org/stable/1350005).

## Appendix A: Standard Output Definition

According to the Farm Structure Survey 2016, the economic size of the holding is measured using Standard Output (SO):

“For each activity on a farm (e.g. wheat, dairy cows), a standard output is estimated. The standard output is the average monetary value of the agricultural output at farm-gate price in euro per hectare or per head of livestock and by region and represents the level of output that could be expected on the average farm under “normal” conditions.

“The sum of all the outputs, for all activities of a given farm, is referred to as the economic size of that farm. The smallest farms were those with standard output of less than 25,000 euros and the largest farms were those with a standard output of 500,000 euros or more.”

## Appendix B: NuSearch Databases

### Agriculture: 37

1. ProQuest , publisher, 2002. Agricultural & environmental science collection, ProQuest.
2. ProQuest publisher, 2007. Biological science collection, Ann Arbor, Mich.: ProQuest Information and Learning.
3. Learning on Screen & British Universities Film & Video Council, 2013. BoB : the on demand TV and radio service for education., London: Learning on Screen : the British Universities and Colleges Film and Video Council.
4. Wolters Kluwer, Books@Ovid, Wolters Kluwer.
5. C.A.B. International, 1990. CAB abstracts, New York, N.Y.: Ovid Technologies.
6. Thomson Reuters, issuing body, 2002. Current contents connect., Thomson Reuters.
7. Networked Digital Library of Theses Dissertations & Ligue des bibliothèques européennes de recherche, 1999. DART-Europe e-theses portal, London: University College London.
8. Thomson Reuters, issuing body, 2012. Data citation index., Thomson Reuters.
9. Encyclopaedia Britannica, inc, 2001. Britannica academic Academic., Chicago]: Encyclopædia Britannica.
10. European Patent Office, issuing body, 2000. Espacenet., European Patent Office.
11. British Library & Joint Information Systems Committee, 2009. ETHOS e-theses online service., Boston Spa, Yorkshire]: British Library.
12. Virginia Polytechnic Institute State University & Networked Digital Library of Theses Dissertations, 1990. Global ETD Search, Blacksburg, Virginia]: Networked Digital Library of Theses and Dissertations : Virginia Polytechnic Institute and State University.
13. EBSCOhost, GreenFILE-EBSCOhost 節能環保類文獻資料庫, EBSCOhost Publishing.
14. Thomson Reuters & Institute for Scientific Information, 1997. InCites journal citation reports, Philadelphia, Pa.]: Institute for Scientific Information.
15. JSTOR, 1995. JSTOR, New York]: JSTOR.
16. Kanopy, 2008. Kanopy., Kanopy.
17. ProQuest, 2000. Natural science collection, Ann Arbor, MI]: ProQuest.
18. Organisation for Economic Co-operation Development, 2000. OECD iLibrary, Paris]: OECD.
19. Lunds universitetsbibliotek, University of Nottingham & SHERPA, 2005. OpenDOAR directory of open access repositories., Nottingham: University of Nottingham.
20. ProQuest Information Learning Company, 2004. ProQuest dissertations & theses A&I, Ann Arbor, MI: ProQuest Information and Learning Company.

21. Sage Publications, 2011. SAGE research methods, Thousand Oaks, CA: SAGE Publications.
22. ProQuest , publisher, 1995. Science Database., Proquest Information and Learning.
23. Elsevier Science, 1999. ScienceDirect, S.I.]: ScienceDirect, Elsevier Science.
24. Anon, 2005. Scopus, Amsterdam: Elsevier B. V.
25. Institute for Scientific Information & Thomson Reuters, issuing body, 1998. Web of science., Institute for Scientific Information.
26. Oxford University Press, 2008. Who's who ... & Who was who, Oxford: Oxford University Press.
27. British Library, Joint Information Systems Committee & University of Manchester. Manchester Computing, 2000. Zetoc the monitoring and search service for global research publications., Manchester: MIMAS.

#### **Economic: 34**

1. Bell & Howell Information Learning & ProQuest, 1970. ABI/INFORM global, Ann Arbor, Mich.]: ProQuest LLC.
2. Learning on Screen & British Universities Film & Video Council, 2013. BoB : the on demand TV and radio service for education., London: Learning on Screen : the British Universities and Colleges Film and Video Council.
3. EBSCO Publishing, 1990. Business source premier, Ipswich, Mass.: EBSCO Industries.
4. Thomson Reuters, issuing body, 2002. Current contents connect., Thomson Reuters.
5. Networked Digital Library of Theses Dissertations & Ligue des bibliothèques européennes de recherche, 1999. DART-Europe e-theses portal, London: University College London.
6. Thomson Reuters, issuing body, 2012. Data citation index., Thomson Reuters.
7. American Economic Association & ProQuest, 1992. EconLit, CSA.
8. Gale Group, 2008. The economist historical archive 1843-2014, S.I.]: Gale Group.
9. Anon, 1994. Emerald insight, Bingley: Emerald.
10. Encyclopaedia Britannica, inc, 2001. Britannica academic Academic., Chicago]: Encyclopædia Britannica.
11. British Library & Joint Information Systems Committee, 2009. EThOS e-theses online service., Boston Spa, Yorkshire]: British Library.
12. Bureau van Dijk Electronic Publishing, 2000. FAME : UK and Irish company information in an instant., Amsterdam: Bureau van Dijk Electronic Publishing.
13. Virginia Polytechnic Institute State University & Networked Digital Library of Theses Dissertations, 1990. Global ETD Search, Blacksburg, Virginia]: Networked Digital Library of Theses and Dissertations : Virginia Polytechnic Institute and State University.
14. Thomson Reuters & Institute for Scientific Information, 1997. InCites journal citation reports, Philadelphia, Pa.]: Institute for Scientific Information.
15. British Library of Political Economic Science, Cambridge Scientific Abstracts, Inc & ProQuest CSA, 2000. International bibliography of the social sciences IBSS., Bethesda, Md.]: ProQuest CSA.
16. JSTOR, 1995. JSTOR, New York]: JSTOR.
17. Kanopy, 2008. Kanopy., Kanopy.
18. Anon, 2000. Nexis, London]: LexisNexis Group.
19. Organisation for Economic Co-operation Development, 2000. OECD iLibrary, Paris]: OECD.
20. Lunds universitetsbibliotek, University of Nottingham & SHERPA, 2005. OpenDOAR directory of open access repositories., Nottingham: University of Nottingham.
21. Bureau van Dijk Electronic Publishing, 1990. Orbis bank focus world banking information source., Brussels]: Bureau van Dijk Electronic Pub.
22. Public Affairs Information Service & ProQuest, 2000. PAIS index, Bethesda, MD: ProQuest LLC.
23. Euromonitor International, 2000. Passport GMID, London: Euromonitor.
24. ProQuest Information Learning Company, 2004. ProQuest dissertations & theses A&I, Ann Arbor, MI: ProQuest Information and Learning Company.
25. Sage Publications, 2011. SAGE research methods, Thousand Oaks, CA: SAGE Publications.
26. Elsevier Science, 1999. ScienceDirect, S.I.]: ScienceDirect, Elsevier Science.
27. Anon, 2005. Scopus, Amsterdam: Elsevier B. V.
28. ProQuest Information Learning Company, publisher, 1990. Social science database., Bell & Howell.
29. ProQuest, 2010. Social science premium collection., Ann Arbor, MI: ProQuest LLC.
30. UK Data Archive et al., 1990. UK Data Archive., Colchester, U.K.: University of Essex.



31. University of Essex & Economic Social Research Council, 2012. UK data service., Colchester, Essex: UK Data Service, University of Essex.
32. Institute for Scientific Information & Thomson Reuters, issuing body, 1998. Web of science., Institute for Scientific Information.
33. Oxford University Press, 2008. Who's who ... & Who was who, Oxford: Oxford University Press.
34. British Library, Joint Information Systems Committee & University of Manchester. Manchester Computing, 2000. Zetoc the monitoring and search service for global research publications., Manchester: MIMAS.

### **Sociology: 45**

1. Burney, C., British Library & Gale, 2007. 17th-18th century Burney Collection newspapers, S.I.]: Gale Cengage Learning.
2. Joint Information Systems Committee & Research Libraries UK, 2009. 19th century British pamphlets, Ann Arbor, Mich.: JSTOR.
3. Gale Group, 2007. 19th century UK periodicals, S.I.]: Gale Group.
4. Cambridge Scientific Abstracts, Inc & ProQuest, 2000. Applied social sciences index and abstracts ASSIA., Bethesda, Md. ; East Grinstead]: CSA.
5. Gale, 2016. Archives of sexuality & gender. LGBTQ history and culture since 1940., Farmington Hills, Michigan: Gale CENGAGE Learning.
6. Learning on Screen & British Universities Film & Video Council, 2013. BoB : the on demand TV and radio service for education., London: Learning on Screen : the British Universities and Colleges Film and Video Council.
7. British Library & Gale, 2007. British Library newspapers, S.I.]: Gale, Cengage Learning.
8. Thomson Reuters, issuing body, 2002. Current contents connect., Thomson Reuters.
9. Networked Digital Library of Theses Dissertations & Ligue des bibliothèques européennes de recherche, 1999. DART-Europe e-theses portal, London: University College London.
10. Thomson Reuters, issuing body, 2012. Data citation index., Thomson Reuters.
11. Edina, 2000. *Digimap maps & geospatial data for UK academia.*, Edinburgh: EDINA.
12. Anon, Eighteenth Century Journals, Adam Mathew Digital.
13. Encyclopaedia Britannica, inc, 2001. Britannica academic Academic., Chicago]: Encyclopædia Britannica.
14. British Library & Joint Information Systems Committee, 2009. EThOS e-theses online service., Boston Spa, Yorkshire]: British Library.
15. Jacobs, A.H. et al., 2000. The Gerritsen collection of Aletta H. Jacobs., Ann Arbor, Mich.: ProQuest.
16. Virginia Polytechnic Institute State University & Networked Digital Library of Theses Dissertations, 1990. Global ETD Search, Blacksburg, Virginia]: Networked Digital Library of Theses and Dissertations : Virginia Polytechnic Institute and State University.
17. ABC-Clio Information Services & EBSCO Publishing, 1990. Historical abstracts, Ipswich, MA: EBSCO Pub.
18. Thomson Reuters & Institute for Scientific Information, 1997. InCites journal citation reports, Philadelphia, Pa.]: Institute for Scientific Information.
19. British Library of Political Economic Science, Cambridge Scientific Abstracts, Inc & ProQuest CSA, 2000. International bibliography of the social sciences IBSS., Bethesda, Md.]: ProQuest CSA.
20. John Johnson Collection et al., 2003. The John Johnson Collection an archive of printed ephemera., Ann Arbor, Mich.?): Proquest.
21. JSTOR, 1995. JSTOR, New York]: JSTOR.
22. Kanopy, 2008. Kanopy., Kanopy.
23. Mass-Observation, Adam Matthew Digital & University of Sussex, 2000. Mass observation online, Marlborough, Wiltshire : [Brighton]: Adam Matthew Digital ; University of Sussex.
24. Great Britain. Colonial Office, 2015. Migration to new worlds., Adam Matthew Digital.
25. Organisation for Economic Co-operation Development, 2000. OECD iLibrary, Paris]: OECD.
26. Lunds universitetsbibliotek, University of Nottingham & SHERPA, 2005. OpenDOAR directory of open access repositories., Nottingham: University of Nottingham.
27. Public Affairs Information Service & ProQuest, 2000. PAIS index, Bethesda, MD: ProQuest LLC.
28. Gale, 2010. Picture post historical archive, Farmington Hills, MI]: Cengage Learning.
29. Gale, OAD. Primary sources, Gale.

30. ProQuest Information Learning Company, 2004. ProQuest dissertations & theses A&I, Ann Arbor, MI: ProQuest Information and Learning Company.
31. ProQuest, 1791. Proquest historical newspapers. The Guardian and the Observer, Ann Arbor, Mich.?): ProQuest.
32. Sage Publications, 2011. SAGE research methods, Thousand Oaks, CA: SAGE Publications.
33. Elsevier Science, 1999. ScienceDirect, S.I.]: ScienceDirect, Elsevier Science.
34. Anon, 2005. Scopus, Amsterdam: Elsevier B. V.
35. Social Care Institute for Excellence, 2005. Social care online, London]: Social Care Institute for Excellence.
36. ProQuest Information Learning Company, publisher, 1990. Social science database., Bell & Howell.
37. ProQuest, 2010. Social science premium collection., Ann Arbor, MI: ProQuest LLC.
38. Cambridge Scientific Abstracts, Inc. Internet Database Service, ProQuest CSA & ProQuest, 1990. Sociological abstracts., ProQuest.
39. ProQuest , issuing body, 2010. Sociology collection., ProQuest LLC.
40. ProQuest , publisher, 2000. Sociology database., ProQuest LLC.
41. UK Data Archive et al., 1990. UK Data Archive., Colchester, U.K.: University of Essex.
42. University of Essex & Economic Social Research Council, 2012. UK data service., Colchester, Essex: UK Data Service, University of Essex.
43. Institute for Scientific Information & Thomson Reuters, issuing body, 1998. Web of science., Institute for Scientific Information.
44. Oxford University Press, 2008. Who's who ... & Who was who, Oxford: Oxford University Press.
45. British Library, Joint Information Systems Committee & University of Manchester. Manchester Computing, 2000. Zetoc the monitoring and search service for global research publications., Manchester: MIMAS.