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Identifying the role of women in UK farming through a systematic review of international literature.

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Abstract

Women play an imperative role in the economic strengthening and sustainability of the agricultural sector, yet very little economic research documents the role and contribution of farming women in developed countries. Through an interdisciplinary systematic literature review of 184 international peer-reviewed, English-language studies between 1970 and 2020 we identify the effect gendered discourses have elicited within developed countries and present how this has shaped women's economic contribution and visibility within UK agriculture. The study reveals key economic differences both between men and women, and within women as a group, with factors such as access to land, education, organisation and policy driving these differences. Strategies impacting women's economic agency are also evaluated in the context of wider policy. The outcomes of this study increase understanding of factors shaping women's economic contribution and visibility in UK agriculture and will inform further research investigating female participation in agricultural business management and decision making.

Keywords women, agriculture, gender equality, farming

JEL code Q12, Q15, J7, J43

1. Introduction

Women play an imperative role in the economic strengthening and sustainability of the agricultural sector. Despite women's increasing participation in the agricultural labour market, contribution to agricultural productivity and sustainability, and important role in the survival of traditional family farms, rural gender studies identify a dominant traditional discourse shaping women's participation, contribution and visibility within modern farming systems in developed countries (Whatmore, 1991; Shortall, 1992; Alston, 1995; Little and Austin, 1996; Liepins, 1998; Lankester, 2012). This discourse is based upon the conceptualisation of agrarian ideology which prioritises the continuation of the family farm and is reinforced by social and cultural practices such as gender division of labour, patrilineal succession and unpaid family labour.

Despite marked changes within and around agriculture as the result of global agricultural restructuring including the falling economic centrality of farm production to household income, industry consolidation and global commoditisation, agrarian ideology demonstrates an ability to pervade the culture across and within generations (Price, 2012). Policy incentives and organisational structures have been shown to both support and encourage this traditional discourse (Price, 2012), and as such it is largely accepted within the literature to be woven throughout the fabric of postmodern rurality.

In spite of a recognised stubbornness for such ideologies to persist, research also documents individual agency and the emergence of diverse identities and economic performance enabled and accelerated by rural restructuring. One aspect of this is the economic visibility and contribution of women. Whilst a wealth of economic research documents the role and contribution of farming women in developing countries (Quisumbing and Pandolfelli, 2010; Croppenstedt et al., 2013) very little research has been produced within developed countries where women are accounted as principal farm actors rather than a consumer or spouse. Furthermore, traditional accounting methods and masculine definitions of productive work have been criticised for failing to account the true extent of women's labour input (Whatmore, 1990; Brandth, 2002; Little and Panelli, 2003).

Critics may attribute a lack of research in this area to agriculture's low percentage contribution to GDP within developed countries (DEFRA, 2019; EU, 2019) with women only representing a minority within this. Yet, despite this backdrop, the total contribution of agricultural output from high-income countries represents about one-fifth of the world's total output (World Bank, 2019) and the percentage of women in agriculture within developed countries continues to grow (Brandth et al., 2011; Hoppe and Korb, 2013; Ball, 2019). According to Defra (2016) women represent 55% of family farm workers, however only represent 16% of farm holders and 17% of farm managers.

Furthermore, as increasing pressure is placed upon farm income, women have proved to play a vital role in farm survival strategies including unpaid farm labour, off-farm work and diversification (Blekesaune, 1996; Brandth, 2002; Grubbström, Stenbacka and Joosse, 2014; DEFRA, 2016). Women are highly represented in fast-growing agricultural markets such as organic, local, direct-to-market, and farm tourism (Trauger, 2004; Brandth and Haugen, 2011; Sumner and Llewelyn, 2011). They also represent a highly educated workforce, bringing new ideas and energy to the sector (Zeuli and King, 1998; Hoppe and Korbe, 2013).

Research beyond the sector also indicates the benefits of gender integrated workforces which include improved financial performance, social and ethical compliance, and elicit an indirect positive effect upon firm value (Adams and Ferreira, 2009; Isidro and Sobral, 2014). Yet, significant barriers to women's participation and visibility in agriculture are illustrated to be specific to the industry and are not reported by women in other rural/family businesses (Scot Gov, 2017). As such, the roles and

participation of women in farming garners increasing attention from industry, although this interest currently fails to be matched by economic research.

Despite a lack of economic research in this area, much literature from other disciplines including sociology, gender studies, and rural studies presents economic implications and contributes greatly to knowledge in this area. This systematic review of international literature combines interdisciplinary work to investigate factors affecting the contribution and visibility of women in agriculture in developed countries to help formulate recommendations for further research and policy.

The paper is organised as follows: section 2 details the methodology used; section 3 provides results and discussion of the comparisons of economic contributions of male and female farmers, the differences within farm women, the barriers and incentives relating to women's participation and visibility in agriculture by exploring access to land, education and organisations, and concludes with an assessment of current policy landscapes. The article ends with conclusions in section 4 and highlights areas for further economic research.

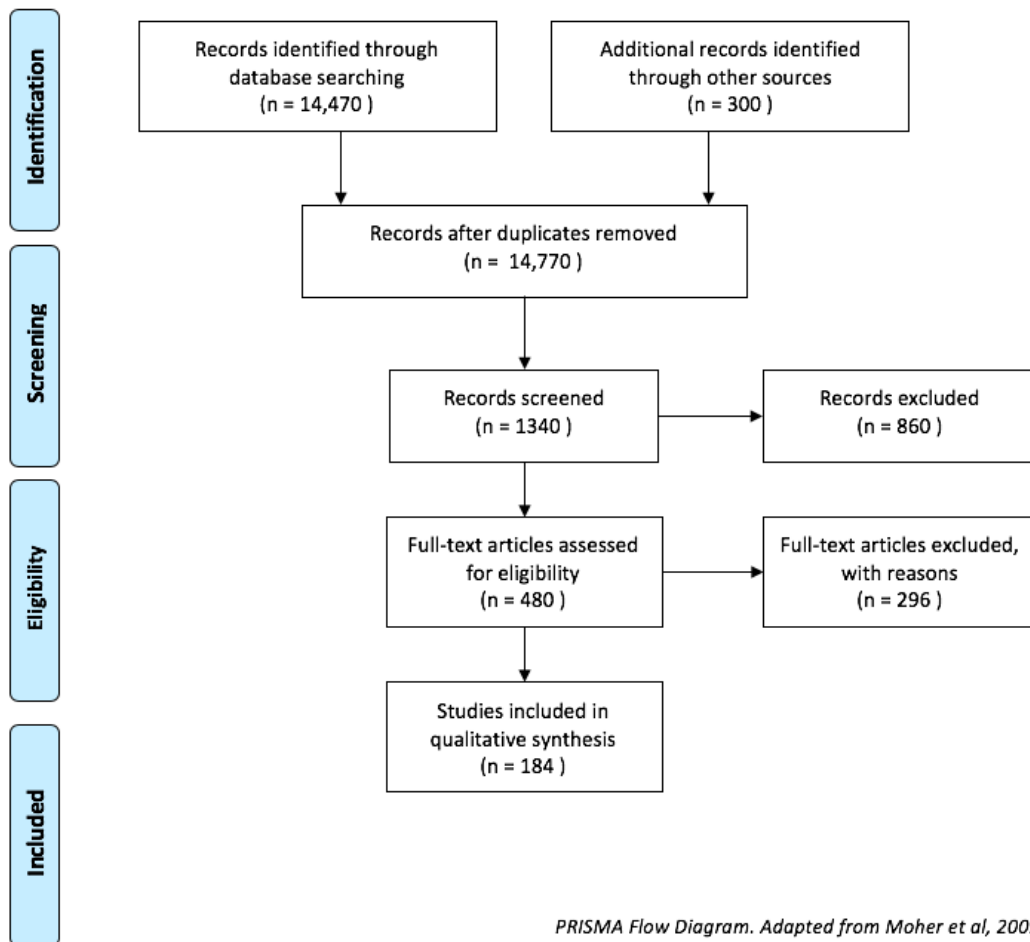
2. Methodology

This research paper characterises the contribution of women to the UK farm economy through a systematic review, conducted in accordance to the PRISMA guidance, of international peer-reviewed, English-language literature between January 1970 and January 2020. From a total of 14,470 search results, 184 peer-review papers were selected which focus upon the role of women in agriculture within developed countries.

To determine what research should be included in this review, searches were conducted in University of Nottingham online library 'NU-search' which uses 27 databases for agriculture, 33 for economics, and 45 for sociology. Searches were performed for studies published since 1970 on women farmers in Organization for Economic Cooperation and Development (OECD) high-income countries (World Bank, 2019) using the terms "women or gender" and "agriculture or agricultural or farm or farmer" plus the name of each of the OECD high-income countries.

These searches resulted in several thousand articles and books on farm women. A complication 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, review of only the first several hundred studies for each search (ranked in order of relevance to search terms) was employed to efficiently garner only the relevant research for this study and duplications across multiple searches were removed. The bibliographies of relevant studies were also searched for additional relevant research. Search strategy and outcomes are presented in Figure 1.

Figure 1. PRISMA Flow Diagram



3. Results and Discussion

In this section, a number of findings are discussed; firstly, a comparison of the economic contributions of male and female farmers which reveals key differences between the farming practices and outcomes of male and female farmers. Secondly, key differences within farm women as a group are also explored and used to develop a framework characterising the different identity types of farm women across a spectrum of economic contributions and visibility. Thirdly, access to land, education and organisations are subsequently revealed to represent key barriers to women’s participation and visibility in agriculture, and finally, an evaluation of EU policy, allows the identification of recommendations for further economic research.

3.1 Key economic comparisons of men and women

The systematic review revealed that interdisciplinary studies documented differences in economic contributions between females and males. Collation of these characteristics along with a list of references is provided in Figure 2.

Figure 2. Economic comparisons of male and female farms

Characteristics of female (vs male) farm		References
Farm Size	Smaller farms	Kalbacher, 1985 [US]; Leckie, 1993 [CAN]; Haugen and Brandth, 1994 [NOR]; Perry et al., 1995 [CAN]; Rosenfeld and Tigges, 1998 [US]; Gidakou, 1999 [GRE]; Shortall, 2010 [EU]; Hoppe and Korb, 2013 [US]; Ball, 2014 [US]
	Younger women have larger farms than older women	Haugen, 1990 [NOR]
	Larger farms	Zeuli and King, 1998 [US]
	Higher for unmarried women	
Types of production	Livestock and speciality horticulture	Kalbacher, 1985 [US]; Leckie, 1993 [CAN]; Zeuli and King, 1998 [US]; Trauger, 2004 [US]
	Dairy and livestock, less likely to choose arable	Elias and Lundqvist, 2016 [SWE]
	Speciality farms	Leckie, 1993 [CAN]; Perry et al., 1995 [CAN]; Rosenfeld and Tigges, 1998 [US]
	Tourism diversification: administration rather than activities	Heggem, 2014 [NOR]; Haug and Brandth 2010, 2011 [NOR]
	Organic farming	Sumner and Llewelyn, 2011 [CAN]; Läpple, 2012 [IRE]
	Higher diversification	Gasson and Winter 1992 [UK]; Evans and Libery, 1993, 1996 [UK]; Benjamin 1994 [FRA]; Cawley, 1995 [IRE]; Carter, 1999 [UK]; Gorman, 2004 [IRE]; Bock 2004 [NET]; Iakovidou, Koutsou, & Partalidou, 2009 [GRE]; Ball, 2014 [US]
	More likely to be in sustainable production models	Trauger, 2004 [US]
	Cite greater concern and participation in environmental activities	Gidakou, 1999 [GRE]; Zelezny et al., 2000 [US, GLOBAL]; Goldsmith et al., 2013 [NET]; Xiao and McCright, 2015 [US]; Sachs et al., 2016 [US]
Farm Income	Lower farm income	Kalbacher, 1985 [US]; Haugen and Brandth, 1994 [NOR]; Perry, 1995 [CAN]; Rosenfeld and Tigges, 1998 [US]; Zeuli and King, 1998 [US]; Hoppe and Korb, 2013 [US]
	Lower net profit	Zeuli and King, 1998 [US]
	Lower return on equity (smaller farm)	Hoppe and Korb, 2013 [US]
	Lower sales value	Kalbacher, 1985 [US]; Elias and Lundqvist, 2016 [SWE]
	Lower farm debt	Kalbacher, 1985 [US]; Leckie, 1993 [CAN]; Rosenfeld and Tigges, 1998 [US]; Zeuli and King, 1998 [US]
	Higher farm value for unmarried women	Rosenfeld and Tigges, 1998 [US]
	Goals other than profit maximisation	Trauger, 2010 [US]; Hoppe and Korb, 2013 [US]; Ball, 2014 [US]
Off-farm work	Lower participation (*women farmers, not farm women)	Hoppe and Korb, 2013 [US]
	Lower off-farm income	Kalbacher, 1985 [US]; Leckie, 1993 [US]; Perry et al., 1995 [CAN]; Rosenfeld and Tigges, 1998 [US]; Zeuli and King, 1998 [US]
	More likely to farm part time	Kalbacher, 1985 [US]; Haugen et al 1993 [NOR]
Age	Older	Kalbacher, 1985 [US]; Leckie, 1993 [CAN]; Hoppe and Korb, 2013 [US]
	Younger	Gidakou, 1999 [GRE]
	No significant difference	Zeuli and King, 1998 [US]
Education	Lower access and participation in agricultural training and education	Haugen and Brandth, 1994 [NOR]; Shortall, 1996 [IRE]; Alston, 1998 [AUS]; Liepins and Schick, 1998; Pini, 2002 [AUS]; Brandth, 2002 [EU]; Safilios-Rothschild, 2006 [EU]; Trauger et al., 2008, 2010 [US]; Brasier et al., 2009 [US]; Istenic, 2015 [SLO]; ScotGov 2017, 2019 [SCOT]
	More highly educated (general education)	Rosenfeld and Tigges, 1998 [US]; Zeuli and King, 1998 [US]; Hoppe and Korb, 2013 [US]
	Younger women have higher educational qualifications	Haugen, 1990 [NOR]; Bock and Shortall, 2006 [UK]; Hocevar and Cernic Istenic, 2011 [SLO]
Land Tenure	Less likely to inherit the family farm	Leckie, 1994 [NOR]; ScotGov 2017 [Scot]; Mann, 2007 [SWI]; Cavicchioli et al. 2015 [ITA]

	Less likely to rent land	Kalbacher, 1985 [US]; Zeuli and King, 1998 [US]; Hoppe and Korbe, 2013 [US]
	Younger women are more likely to inherit farm than older women	Haugen and Brandth, 1994 [NOR]
Labour	Higher labour input	Elias and Lundqvist, 2016 [SWE]
	More reliant upon family labour, lower reliance on hired labour	Elias and Lundqvist, 2016 [SWE]
	Lower record keeping, same time expenditure	Zeuli and King, 1998 [US]
Machinery	Less attracted to farm machinery	Trauger, 2004 [US]; Ball, 2014 [US]
	Less difference between machinery use in younger women than older women	Haugen, 1990 [NOR]; Haugen and Brandth, 1994 [NOR]
Technology	Drivers of tech adoption	Zepeda and Castillo, 1997 [US]; Burton et al., 2003 [UK]; Trauger et al 2010 [US]; Hay and Pearce, 2014 [AUS]
	Higher users of technology	Hay and Pearce, 2014 [AUS]
	No difference in computer use, more men use information services	Zeuli and King, 1998 [US]

Figure 2 reveals clear economic differences between male and female farmers, including smaller farms and lower farm income attained by female farmers. Women farmers are also less likely to inherit the family farm, are less likely to rent land or rely on hired labour, and are shown to have lower access and participation with agricultural training. Issues relating to women’s lack of access to land and education are discussed in greater detail in section 3.3.

Differences in farm size, income and production system may help explain other key differences illustrated between male and female farmers, including women’s higher labour input, a greater reliance upon family labour, and higher participation in part time and off-farm work.

Women farmers are found to favour different types of production to men, commonly opting for livestock, dairy and speciality production, and are less drawn to farm machinery. Within this remit, a higher propensity towards farm diversification is also demonstrated by females. Furthermore, women are revealed to hold different overall business goals than men and it is suggested they are driven by factors other than profit, which may be explained by women’s greater concerns and participation in environmental and sustainability practices. Women are also shown to be high users of technology and drivers of technological adoption.

In addition to differences between male and female farmers, the literature also indicates differences within women farmers. For example, younger women are shown to have higher educational qualifications, be more likely to engage in machinery use, and have a greater probability of inheriting the family farm than older women.

Despite these clear gender differences, Zeuli and King (1998) suggest that where farm size and type are held constant there does not appear to be substantial differences in farm income or profitability that can be attributed to gender. Therefore, further economic research is required to establish the causality of the differences discussed and isolate any gender-specific inferences from the influence of prevalent gender inequalities.

3.2 Occupational choice and identity

Whilst Figure 2 provides insights into the structural organisation of women farmers across the globe and their economic contribution compared to men, it also highlights differences amongst women farmers. The literature reveals differences between female farmers relating to age, including larger farm size, different jobs roles, entry to farming, and contrasting attitudes towards union membership and vocational training (Haugen, 1990). Importantly, the same age-specific differences have not been observed within male farmers, which indicates prominent gender-specific changes in female farmers' attitude and role within agriculture (Haugen, 1990).

Although the number of women in agriculture is increasing, led by young new entrants and farm successors, women still represent a minority of farm holders and managers (DEFRA, 2016). Furthermore, the definition of 'principle farmer' fails to account for a multitude of factors which have traditionally contributed to the subordination and invisibility of farm women, masking their true economic contribution within the sector. As such, there is a clear need to recognise the agency of farm women across a spectrum of involvement to fully understand the true extent of their economic participation.

Figure 3 and Figure 4 amalgamate research to illustrate and explain the occupational farm identities of women and provide a graphical representation of the economic contribution and visibility associated with each identity type. In particular, Figure 3 draws together research to identify and describe three main farm identity types; traditional farm housewife; working farm wife; and women farmer. Dual occupation and off-farm identities are also accounted, as are differences of agency within working farm wives and women farmer groups. The table details the organisation of labour, economic visibility and decision-making power associated with each farm identity. This builds upon findings from Byrant (2002) that farm women's identities are constructed within three parts: firstly, through the work they undertake; secondly, through their critique and understanding of how gender roles are ascribed; and thirdly, through their construction of family/relations.

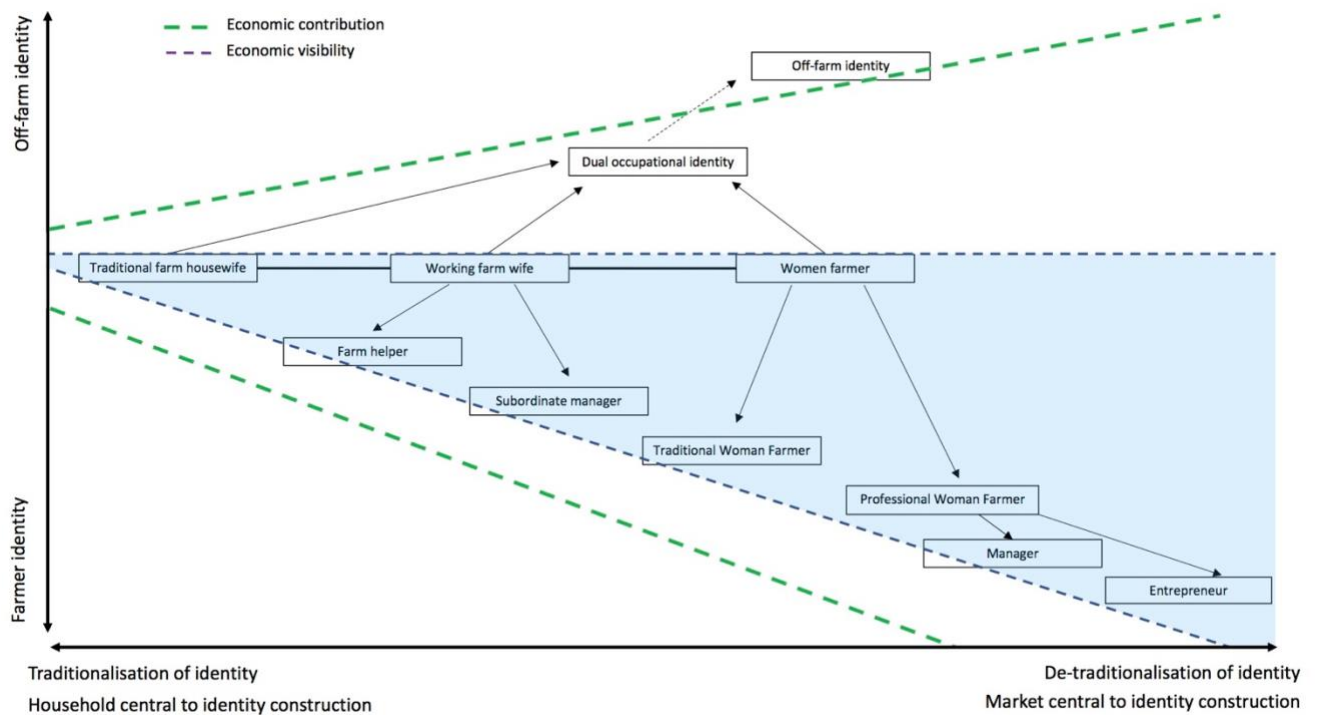
Figure 3. Farm women identity types

Identity type	Overview	Characteristics	Job roles and organisation of labour	Economic visibility and decision making
Off-farm identity	Limited presence on farm, does not identify with farming.	- Entered farming through marriage - Works off-farm	N/A	- Clear acknowledgement - Income differentiated - No input to daily farm decisions - May be consulted over strategic farm decisions affecting household
Dual occupation identity	Pluricative women, identity is attributed to both on- and off-farm endeavours.	- Traditional farm housewives with off-farm employment - Working farm wives / women farmers with both on- and off-farm employment / businesses	Dependent upon farm identity type.	Dependent upon farm identity type.
Traditional farm housewife	Domestically oriented. Does not work on the farm regularly.	- Older - Entered farming through marriage	- Clear gender division of labour - Reproductive/ domestic tasks - Assists farm admin	- Limited acknowledgement - Income undifferentiated - Limited input to daily farm decisions - Consulted over strategic farm decisions.

Working farm wife		Assistant to male farmer. Autonomy varies with spouse power relations.			
	Farm assistant	Farm assistant with limited autonomy.	<ul style="list-style-type: none"> - Entered farming through marriage - Farming background? - May work full/part-time off-farm - Smaller farm size 	<ul style="list-style-type: none"> - Clear gender division of labour Assists with 'suitable' tasks e.g. youngstock/livestock. - Important in farm admin 	<ul style="list-style-type: none"> - Limited acknowledgement - Income undifferentiated - Input to daily and strategic farm decisions
	Subordinate manager	Farm assistant with increasing autonomy, responsible for minor enterprise and/or farm accounts.	<ul style="list-style-type: none"> - Entered farming through marriage - Farming background? - May work part-time off-farm - Larger or diversified farm 	<ul style="list-style-type: none"> - More flexible gender division of labour - Responsible minor farm enterprise - Whole farm admin 	<ul style="list-style-type: none"> - Increasing acknowledgement - Income undifferentiated - Valued input into daily and strategic farm decisions - Responsibility for own enterprise
Women farmer		Clearly defined responsibility and autonomy for farm/major enterprise. May farm independently or in partnership with family/spouse.			
	Traditional farmer	Autonomy over major enterprise. Traditional views and work styles.	<ul style="list-style-type: none"> - Old - May be widowed - Entered farming through marriage - Previously fulfilled 'working farm wife role' - Operates independently - Smaller farm size - Less likely to be interested in union membership or off-farm engagement 	<ul style="list-style-type: none"> - Division of labour not gendered - Prefer traditional methods - Range of tasks but avoids heavy machinery 	<ul style="list-style-type: none"> - Clear acknowledgement - Income undifferentiated - Decision making authority on daily and strategic decisions
	Professional farmer	Autonomy over major enterprise. Progressive views and work styles	<ul style="list-style-type: none"> - Young - Entered industry through choice - New entrant, smaller acreage - Successor, in partnership with family or spouse, larger acreage - Likely to have worked off-farm - Drives innovation and technological adoption - Holds union membership - Engages in off-farm activities 	<ul style="list-style-type: none"> - Division of labour not gendered - Range of tasks including heavy machinery 	<ul style="list-style-type: none"> - Clear acknowledgement - Income differentiated - Decision making authority on daily and strategic decisions.
		Includes 'managers' priding organisational skill to improve processes; and 'entrepreneurs' emphasising innovation and market responsiveness.			
<p>References:</p> <p>Identity categories and characteristics: Gasson, 1981; Haugen, 1990; O'Hara, 1994; Haugen and Brandth 1994; Haugen and Blekesaune 1996; Bryant 2002.</p> <p>Further information from: Gasson, 1981, 1992, 1993; Haugen, 1990; O'Hara, 1994; Haugen and Brandth 1994; Haugen and Blekesaune 1996; Shortall, 2002; Silvasti 2003; Seuneke and Bock 2015; Contzen and Forney, 2017. References included in Figure 2; economic comparisons of male and female farmers.</p>					

Figure 4 builds upon these classifications and graphically maps the occupational farm identities of women on a continuum from 'traditional' to 'de-traditional' whilst incorporating a visual illustration of both the economic contribution and visibility of farm women within this structure.

Figure 4. Farm women identity chart



Here, it is illustrated that the economic contribution of most farm women far exceeds the recognition they gain. Despite providing vital support to the farm and household - often through off-farm employment and unpaid farm/household work - a combination of undifferentiated income streams, gendered division of labour and subordination associated with all but the most de-traditionalised identities masks the true value of the majority of farm women's work.

In this case, the family unit is shown to be pivotal to the formation of women's identity and assumes a central role in the formation of constructions about farming, gender and work roles (Bryant, 2002, Lankester, 2012). As such, women's labour plays a vital yet unrecognised role in farm survival strategies. Amidst the declining influence of farm production in total farm family income (Ilbery and Bowler, 1998), this traditional discourse has been shown to be both supported and encouraged within policy and organisational structures (Price, 2012).

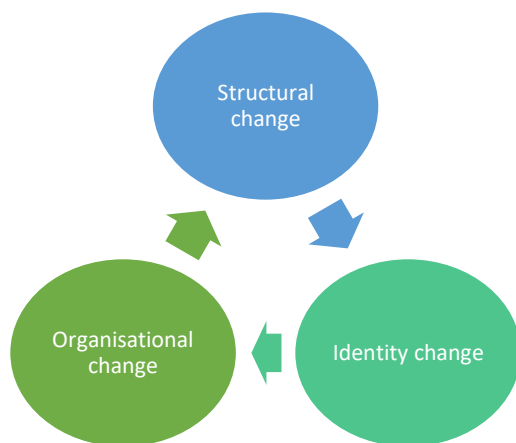
In contrast, women's economic visibility is associated with de-traditionalisation of identity and the adoption of a professional farm identity. These farm women possess clear decision-making power and autonomy over enterprise decisions and their work gains visibility and acceptance both within the household and wider farming community.

Where de-traditionalised identities are shown to occur, a more economical liberal discourse is identified (Ní Laoire, 2002; Coldwell, 2007) whereby market responsiveness is said to replace the household in influencing the construction of farming, gender and work roles (Bryant, 2002;

Lankester, 2012). The development of a self-identity that is less traditional and more business-oriented is enabled by reflexive individualised responses, and managerial and entrepreneurial behaviour employed to survive and manage risk. Haugen (1990) observes that a greater openness to change is observed in female than male farm identities.

Whilst de-traditionalised identities are produced in the context of organisational structure, the process of reflexive construction and reconstruction of identity also drives changes to the structural conditions in which men and women engage with farming, resulting in new structural conditions (Bryant, 2002; Lankester, 2012). Representation of the cycle of ‘self-perpetuating structural change’ (SPSC) is illustrated in Figure 5 whereby market, identity and organisational conditions and responses engage in a constant cycle of cause and effect which ultimately act to stimulate their own progression. This sustained evolution highlights the need and opportunity for new, de-traditionalised identities to occur and for the requirement of farmers to be responsive within ever changing business environments. In turn, it is equally vital that policy is responsive to effectively support and facilitate de-traditionalised identities to emerge and thrive whilst considering the barriers and incentives affecting farm women across a spectrum of economic contribution and visibility.

Figure 5. Self-perpetuating structural change



3.3 Identified barriers and potential incentives

A robust understanding of key challenges and opportunities is essential in any attempt to inform more inclusive, enabling and progressive policy. The literature identifies three prominent themes affecting farm women across a spectrum of economic contribution and visibility. As summarized in the following figures these are access to land (Figure 6a), education and training (Figure 6b), and organisations (Figure 6c).

3.3.1 Access to land

Access to land represents the single largest barrier to women’s entry and participation within agriculture (Scot Gov, 2019). Whether seeking and acquiring land as a new entrant or the succession

of farming businesses within family, access to land correlates with access to other resources including capital, infrastructure, training and networks (Rico and Fuller, 2016).

Across Europe and 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). Despite traditional patterns of succession said to be weakening (Brandth and Overrein, 2013), male and first-born potential successors are still more likely to inherit the family farm (Cavicchioli et al., 2018) and females remain distinctly disadvantaged (Scot Gov, 2019). These issues are of cultural rather than legal origins (Silvasti, 2003; Rossier and Wyss, 2008; ScotGov 2017) and reflect a persistence of traditional normative beliefs.

Women’s lack of access to land can be considered both a cause and an effect linked to other factors discussed in greater detail within this section including female participation and representation throughout agricultural education, organisations and policy. It is also used to explain the segmentation of women in agricultural industries i.e. women’s lower representation on farm, and higher representation in farm related activities such as agricultural advisers or farm secretaries (Shortall, 2020).

With this in mind, a range of economic arrangements including joint farming ventures, share farming and land matching schemes 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; Scot Gov, 2017; Rico and Fuller, 2016; Cush, 2018). Subsequently, where women achieve land ownership status this appears to help facilitate the renegotiation of gendered power relations (Shortall, 1992; Cush, 2018), reinforce identities as farmers, and encourage participation in farm decision-making, production, and investments (Safilios-Rothschild, 2003; Gidarakou et al., 2008; Cush et al., 2018).

Figure 6a. Challenges and opportunities for women in agriculture – access to land

	Challenges	Opportunities
Access to land	Patrilineal succession presents a major barrier to women’s entry and participation within agriculture (Gidarakou et al., 2000; Rossier and Wyss, 2008; Cassidy and McGrath, 2014, 2015; Scot Gov, 2017). However these issues are cultural rather than legal (Silvasti, 2003; Rossier and Wyss, 2008; ScotGov, 2017).	Traditional patterns of succession said to be weakening (Brandth and Overrein, 2013; Wheeler et al., 2012). (However male and first-born potential successors are still more likely to take over the family farm)
	Lack of future business planning/succession is an issue throughout industry, less than 50% farms have a succession plan in place (Cassidy and McGrath, 2014; FWI, 2015).	Significant efforts are observed throughout farming organisations to encourage farm succession planning (FWI, 2015).
	Male and first-born potential successors are still more likely to take over the family farm reflecting a persistence of traditional normative beliefs. (Alston, 1998; Mann, 2007; Voyce, 2007; Rossier and Wyss, 2008; Cavicchioli et al., 2015, 2018; ScotGov, 2017).	Joint farming ventures and policy incentives can help remove some barriers to entry. (Williams 2006; Almas, 2010; Ingram and Kirwan, 2011; Macken-Walsh and Roche, 2012; Scot Gov 2017; Rico and Fuller, 2016; Cush 2018).

	Landownership is associated with recognition of women’s position within farming and their self-esteem. (Brandth, 2002; Safilios-Rothschild, 2003; Cush, 2018).	Where men and women enter farming together, work relations and access to resources achieve greater equality (Cush, 2018; Shortall, 1992).
	The biggest barrier for new entrants is access to land (Williams 2006; Rico and Fuller, 2016; Ingram and Kirwan, 2011; Milne and Butler, 2014; Ilbery et al., 2010)	These issues are cultural rather than legal (Silvasti, 2003; Rossier and Wyss, 2008; ScotGov, 2017).
	Women marrying into the sector face challenges from cultural norms and restricted ownership/access to resources (Shortall, 2002; ScotGov, 2017).	
	Early socialisation and education of offspring linked to the inheritance patterns of land is shown to reduce agricultural socialisation of females (Mann, 2007; Cassidy and McGrath, 2014, 2015; Luhrs, 2016).	
	Access to land correlates with 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).	

3.3.2 Education

Despite in many cases representing a highly educated workforce, women’s access and participation in educational activities is shown to primarily be attained through traditional education and off-farm work rather than specific agricultural education and training (Brandth et al., 2011). Shortall et al (2017) observes that women rarely attend continuing education provisions for people on farms, which in turn affects women’s economic contribution, performance and visibility within agriculture (Slagsvold and Sørensen, 2008).

Much of this is again attributed to cultural factors. For example, gendered socialisation of offspring (Brandth, 2002) means that 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; Scot Gov, 2017). Furthermore, women who married into the farm or undertake off-farm work are shown to gain lower access to training and networks (Charatsari et al., 2013; Scot Gov, 2017). Both entry to farming through marriage and off-farm work are dominant traits possessed by the majority of farm women (Gasson, 1982; Shortall, 1999; Brandth, 2002).

The prevalence of gendered interactions and clearly demonstrated differences between male and female farmers (Figure 2) paints a clear picture of how different educational needs and requirements between farm men and women can arise (Scot Gov, 2017). Despite women’s recognition of the areas in which they require training (Barbercheck et al., 2009; Bock and Shortall, 2017), education services continue to offer only specific programmes which are not consistent with women’s demands or requirements (Trauger et al., 2008; Brasier et al., 2009) and appear to support traditional gendering of farm roles (Trauger, 2010; Charatsari et al., 2013).

Receptivity to women’s needs and the perception of women by those running and promoting educational courses is an important area for discussion. Numerous studies suggest that unconscious gender-bias of women’s interests, capabilities and roles on farm by educators heavily influences women’s access and participation in training events (Trauger, 2008, 2010; Brasier, 2009). Unconscious bias training can help agricultural training organisations to identify, reflect and alter practices which implicitly or explicitly exclude women and minority groups (Scot Gov, 2017). More

women educators and training which exclusively addresses the needs of women farmers can also encourage their participation (Albright, 2006; Trauger, 2008).

Figure 6b. Challenges and opportunities for women in agriculture – education

	Challenges	Opportunities
Education	Women avail less and are targeted less for agricultural training because they are not the owner/holder of the farm (Shortall, 2010; Shortall, 2015; Istenič, 2015).	Women have a positive perception of education (Bower, 2010; Charatsari et al., 2013).
	Education services continue to offer only specific programmes which are not consistent with women's demands or requirements (women require different educational needs than men) (Shortall, 1996; Liepins and Schick, 1998; Albright, 2006; Trauger et al., 2008; Brasier et al., 2009; Trauger, 2010; Charatsari et al., 2013).	Women recognise the areas they require training in (Trauger et al., 2008; Barbercheck et al., 2009; Bock and Shortall, 2017; Scot Gov, 2017).
	Division of educational programmes and content follows traditional division of labour. Divide between 'masculine' and 'feminine' education topics. Feminine equated with domestic (Shortall, 1996; Schmitt, 1998; Charatsari et al., 2013; Trauger 2010).	Training that exclusively addresses women farmers can encourage their participation and tends to be popular among them (Sachs, 1983; Shortall, 1996; Albright 2006; Safilios-Rothschild, 2006; Shortall, 2010; Schultz et al., 2017).
	Despite growing up on a farm, women may not experience the same exposure to on-the-job training as men – highly linked to succession practices (Shortall, 1996; Cassidy and McGrath, 2015; Scot Gov, 2017).	Women prefer personable experience preferred workshops and demonstrations/discussions to presentations as a method of information transfer (Trauger, 2008; Scot Gov, 2017).
	Those who 'married in' to the farm appeared to have less access to training and networks (Shortall, 2002; Williams, 2006; Scot Gov, 2017).	Successful women's groups based upon education and networking increase knowledge and social capital (Bell & Kilpatrick, 2000; Heins et al., 2010; Kiernan et al., 2012; Schultz et al. 2017).
	Training does not always fit around family and work responsibilities (Shortall, 2002; Little and Panelli, 2003; Brasier et al., 2009; Charatsari et al., 2013; ScotGov, 2017).	Short courses for women who are new to farming (particularly those who have married into farming) should be developed (ScotGov, 2017).
	Hard to find smaller, local, non-accredited courses (Brasier et al., 2009; Charatsari et al., 2013; ScotGov, 2017).	There is demand for more women-only courses in the agricultural industry (Trauger et al., 2008; Barbercheck et al., 2009; Brasier et al., 2009; Scot Gov, 2017).
	Women may feel uncomfortable at current training events because the events are primarily attended by men (Shortall, 1996; Trauger 2010; Charatsari et al., 2013; ScotGov, 2017).	Women-only courses should be accompanied with data analysis around course demand and future learning requirements (Kiernan et al., 2012; Scot Gov, 2017).
	Some providers are not aware of demand and are therefore reluctant to run women-only courses (Trauger, 2010; Scot Gov, 2017).	Images of women used in promotional material to ensure that it is clear that women can and should attend (Scot Gov, 2017).
	Influenced by educators perceptions (Shortall, 1999; Trauger et al., 2008; Brasier et al., 2009; Trauger et al., 2010b).	Online training 'hub' can improve access to suitable, local and relevant opportunities (ScotGov, 2017).

	Influenced by perception of promotion and marketing targeted at men (Trauger, 2010; McGowan, 2011; Charatsari et al., 2013; Shortall, 2017).	Women trainers can encourage participation of women and greater address their needs (Trauger et al., 2008; Barbercheck et al., 2009; Brasier et al., 2009; Scot Gov, 2017, 2019).
	Women feel they are not taken as seriously as men (Shortall, 1996; Trauger, 2008; Brasier et al., 2009; Trauger, 2010).	Unconscious bias training can help agricultural organisations to identify, reflect and alter practices which implicitly or explicitly exclude women and minority groups (Scot Gov, 2019).
	Women who are not full time farmers find it harder to access training (Shortall, 1996; Trauger, 2010; Brasier et al., 2009; Charatsari et al., 2013).	Education and empowerment of women improves their skillset – in turn improves their agricultural contribution and performance (Trauger, 2008; Slagsvold and Sørensen, 2008).
	A flexible approach to rural childcare is essential to realising the full potential of women in agriculture and the rural economy (Grace, 1997; Elix and Lambert, 1998; Shortall, 2002; Pini, 2002; Bock and Shortall, 2017; Scot Gov, 2017, 2019).	

3.3.3. Organisations

Shortall (2001) states there is no country where women are well represented in farming organisations. Indeed, women are under-represented in farming organisations throughout the developed world and represent both a higher proportion of lower status workers and hold minimal representation at the highest managerial and executive positions (Liepins, 1998; Alston, 1998, Scot Gov, 2017).

As previously discussed, women’s willingness and ability to participate in agricultural activities is impacted by a lack of confidence and experience which can be linked back to gendered experiences including poorer access to resources including land, capital, training and social networks (Grace, 1997; Alston, 1998; Pini, 2002). However, studies also demonstrate specific organisational factors limiting women’s participation in farming groups including masculinised cultures, informal governance, lack of transparency, and the pervasive operation of ‘old boys networks’ (Grace, 1997; Pini, 2002).

Despite a wealth of evidence in this area, such findings are not necessarily supported by agricultural power holders who may deny there are any constraints for women in achieving positions of leadership, take women’s silence to justify their exclusion and lack of interest, or attribute a lack of female participation to individual rather than organisational factors (Shortall, 1992; Alston and Wilkinson, 1998; Shortall, 2002; Pini, 2002). In such cases, where barriers to female participation are implicit rather than explicitly defined it can be inferred organisational cultures are gender blind (Sinclair, 1994; Gherardi, 1995; Alston and Wilkinson, 1998). Furthermore, in the first study of its kind, Shortall (2020) suggests that implicit social barriers allow occupational social closure to endure through a culture imbued with 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.

Again, unconscious bias training can help agricultural organisations to identify, reflect and alter practices which implicitly or explicitly exclude women and minority groups. Personal development opportunities within groups including training and mentoring can improve women’s confidence and experience (Wiskerke et al., 2003; Scot Gov, 2017) and talent banks can improve female visibility within the industry (Alston and Wilkinson, 1998).

Whilst sometimes a divisive topic, women only organisations can also be highly beneficial in encouraging wider female participation and help address issues pertinent to females in a highly masculinised industry (ScotGov, 2017; Alston, 1998). These types of initiatives tend to be popular amongst women (Safilios-Rothschild, 2006; Shortall, 2010; Schultz et al., 2017) and there are successful examples of women’s groups based upon both knowledge transfer and social capital (Kiernan et al., 2012).

Pertinently, it is in the interest of industry to encourage female participation in farming organisations. Evidence suggests that women and men have essentially different skills, experiences and attributes to bring to leadership in the rural sector and research into discourses of difference suggests gender integrated groups can utilise complementary skill sets to improve performance (Pini, 2003; Sheriden and Mckenzie, 2011). To achieve this, it is essential more women are well represented within farming organisations (Shortall, 2020) to both garner and reap the support of policy.

Figure 6c. Challenges and opportunities for women in agriculture – organisations and leadership

	Challenges	Opportunities
Organisations and leadership	Women are under-represented in farming organisations throughout developed countries (Shortall, 2001; Pini, 2002; Alston, 2003; ScotGov, 2017).	Women and men have essentially different skills and attributes to bring to leadership in the rural sector. Discourses of difference suggest gender integrated workforces utilise complementary skill sets to improve performance (Gillard, Brough and Duffield, 1990; Grace, 1994; Roberts, 1994; Claridge and Chamala, 1995; Buchy, 2001; Pini, 2003; Sheriden and Mckenzie, 2011).
	Women represent a higher proportion of lower status workers and hold minimal representation at highest managerial and executive positions. (Liepins, 1998; Alston, 1998).	Women only organisations can encourage female participation and address issues pertinent to females (Alston, 1998; Scot Gov, 2017).
	Traditional limiting of votes to one per farm may impact female representation due to household power relations (Alston, 2000; Brandth, 2002).	Personal development opportunities including training and mentoring can improve women’s confidence and experience (Kearns, 1995; Alston and Wilkinson, 1998; Wiskerke et al., 2003; Scot Gov, 2017).
	Even confident women may feel uncomfortable, intimidated and not taken seriously when attending meetings primarily attended by men. This is also an issue for young people (Alston, 1998; Pini, 2002; ScotGov, 2017).	Talent banks can improve female visibility (Alston and Wilkinson, 1998; Scot Gov, 2017).
	A masculinist culture (incl language, locations, gender segregation) and 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).	A flexible approach to rural childcare is essential to realising the full potential of women in agriculture and the rural economy (Grace, 1997; Elix and Lambert, 1998; Shortall, 2002; Pini, 2002; Bock and Shortall, 2017; Scot Gov, 2017).
	Due to work and child/household commitments far fewer women attend local groups (Grace, 1997; Elix and Lambert, 1998; Shortall, 2002; Pini, 2002; Little and Panelli, 2003).	
	Women are deterred by hierarchical structures and prefer more open and collaborative organisational structures (Gillard, Brough and Duffield, 1990; Grace, 1997; Elix and Lambert, 1998; Pini, 2002).	

	Informal practices governing the nomination and selection of representatives in farmers' organisations does not support personal development and progression (Grace, 1997; Alston, 1998, 2000; Alston and Wilkinson, 1998; Pini, 2002).	
	Unarticulated 'merit' around personal characteristics leading to progression/election tend to privileged 'masculine identities' (Grace, 1997; Alston, 1998, 2000; Alston and Wilkinson, 1998; Pini, 2002).	
	Women's willingness and ability to participate in agricultural organisations is impacted by a lack of confidence and experience as a result of gendered experiences and poorer access to resources including land, capital, training and social capital (Grace, 1997; Alston, 1998, Pini, 2002).	
	As a minority within organisations, women can struggle to have their views perceived as by their own merit and not as 'women's views' (Alston, 1998; Brandth and Bjørkhaug 2015).	
	Implicit barriers and 'social occupational closure' imbued with culture (Shortall, 2020).	
	Lack of female participation is commonly perceived to be individual rather than organisational despite evidence to the contrary (Still, 1993; Sinclair, 1994; Gherardi, 1995; Elix and Lambert, 1998; Alston and Wilkinson, 1998; Shortall, 2002; Shortall, 2020)	

3.4 Policy

As the UK prepares to exit the European Union (EU), great uncertainty lies ahead for the future of agricultural and rural development policy as the transition begins away from the Common Agricultural Policy (CAP) towards a structure of new domestic Agriculture Bills for England and each of the devolved nations.

From a UK perspective, CAP has provided income support and rural development funds to farmers and has shaped how agriculture has developed across UK, at both individual farm and industry levels. In 2019, UK farmers gained £3.5bn in support, 80% of which was through direct payments (House of Commons, 2020).

CAP is the most important EU agricultural policy, and by accounting for 37% of the EU budget it is also the most expensive EU policy (European Commission, 2019). 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, several 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.

Findings from these studies corroborate with the findings of this systematic review, and include:

- Significant gender inequalities in rural landownership and access to resources (Istenic, 2015; Shortall, 2015).
- Significant gender inequalities in education (Istenic, 2015; Shortall, 2015)
- Masculine definitions and the assumption of the male norm favour masculine working practices and values which can restrict women's access to development funding (Little and Jones, 2000; Midgley, 2006; Shortall, 2008)

- Women are rarely the holder of the farm yet their unpaid contribution to the family labour force and income generated through off-farm work are essential to its viability (Shortall, 2006; European Parliament, 2008; Jack, Moss, and Wallace, 2009; Bock, 2010; Meredith, 2010; Shortall, 2015).

Moreover, research from beyond the EU suggests similarities throughout the developed world and continues to question the gender equality of government support and benefits in countries including US, Canada and Italy (Adinolfi and Capitanio, 2009; Escalante et al., 2009; Chiappini and De Rosa, 2011; McMahon, 2011).

Policy represents a central enabler between research and society, and the way women interact with government support and benefits appears to impact both their identities and participation within agriculture (Safilios-Rothschild, 2003; Gidarakou et al., 2008; Cush et al., 2018). Therefore, as the UK prepares to develop its own domestic Agriculture Bills for England and each of its devolved nations, it is imperative that policy is engaged to transform the economic, social and political position of women in agriculture.

Whilst the broader policy context is critical to advancing gender equality, the mobilisation of women to both create and take advantage of these opportunities is also essential (Pini and Shortall, 2006). Women's groups across developed countries report varying levels of interaction and influence with the state, 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 (Scot Gov, 2019). The force is tasked with acting upon key recommendations from its research including establishing an Equality Charter for Scottish Agriculture, improving access to education and training, and has led to the formation of a Scottish Women In Agriculture organisation.

4. Conclusion

This paper has discussed a range of factors impacting women in agriculture throughout developed countries which has allowed further investigation into the role of women in UK agriculture. Common discourses examined include lack of access to land, education and training, organisations and policy implications.

Key economic differences between the way men and women presently participate in agriculture are illustrated. 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. This is needed to establish if observed differences in economic contributions between male and female farmers in-fact arise from gender-specific differences between males and females, rather than as a result of gender inequalities, such as access to land and other resources.

Still, there is relatively little research focussed specifically upon women farmers and there continues to be concerns about data quality, accuracy, and access in this study arena (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, 2019).

The incorporation of gender considerations into agricultural research practices would facilitate richer data insights into both comparisons between male and women farmers, as well as within farm women as a group. Key differences within farm women and women farmers are illustrated to be

linked to age, family, and identity construction yet little economic data exists to inform a greater understanding of this area.

Despite a lack of economic data, this study is informed by the economic implications of interdisciplinary research including sociology, rural studies and gender studies. Perhaps most prominently, they also provide an insightful backdrop to key cultural discourses which form the backbone of both the implicit challenges and opportunities faced by women in the agriculture sector.

Understanding the implicit nature of many of the challenges faced by women in agriculture in developed countries can help researchers understand the slow rate of change and stubbornness of cultural norms. Enlightened by this approach, further economic research in this area could attempt to quantify such implicit discourses to further the visibility and applicability of these findings within organisations and policy.

Policy represents a central enabler between research and society and plays a critical role in the advancement of gender equality, however the engagement of women to both create and exploit these opportunities is also essential (Pini and Shortall, 2006). The success of initiatives such as the Scottish Government's Women in Agriculture Taskforce (Scot Gov, 2019) demonstrates the need and ability for research and policy to work together to identify, support and deliver on the specific needs of women in agriculture.

As highlighted throughout this systematic literature review, few economic studies focused specifically upon women in UK agriculture exist and therefore many assumptions are based upon the limited results from international research. Whilst similarities can be drawn, the ability of findings to wholly represent or support the specific requirements of domestic production is somewhat limited. In particular, as Britain prepares to leave the EU and CAP behind, UK-wide research will be needed to inform future domestic agricultural policy at this crucial time; it is imperative that future domestic policy is mindful of this important area of development.

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