



Technology adoption by rural women in Queensland, Australia: Women driving technology from the homestead for the paddock



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ABSTRACT

The adoption of Precision Livestock Farming (PLF) technologies to optimize beef cattle production in Northern Australia promises to boost the sector's productivity and profitability. This study examines the roles of grazer women in particular in the current use of and further adoption of on farm technology. It adds to the broader literature on women in agriculture, briefly examining feminist theory and then discussing eco feminism, capital resource ownership, and rural residency. The study considered the adoption of specific rural technologies (such as remote cameras, remote weather stations, bore cameras, and other livestock management systems), but found the current use of these tools to be limited. The limited spread of new rural technologies strongly supports the aim of this study, and ultimately, raises the question of who is driving rural technology diffusion and adoption amongst cattle producers. Data collected through 60 conversational interviews and from 141 participants of an online survey established the centrality of women graziers' roles. The research found that women use most components of online technology three times more often than men. While they were sometimes reluctant to take on the digital homestead tasks, by doing so they feel empowered and valued in their work. More importantly, the study found that as technology diffuses into rural settings and is adopted by grazer women, it is modifying gender divisions, specifically away from traditional separate roles and towards productive partnerships in farming families. Those advocating the further adoption of the new PLF technologies need to be mindful of the women graziers' role as busy users and joint decision makers.

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1. Introduction

New livestock management systems require graziers to manage technology from the station homestead, potentially keeping them from performing outside operations. This research project considers that male graziers may not want to forego paddock and stock work, and station maintenance tasks to complete computer based technology operations from within the homestead (Pannell and Vancley, 2011). This study hypothesizes that remote livestock management technology systems operation may fall to the women in the pastoral partnership.

This paper aims to establish the extent to which rural women use technology and it explores their views on their role in managing emerging livestock management tools. The key objective of

the study is to seek the views of rural women on adopting rural technology and its role in the future. The paper draws on in-depth empirical research about women using technology in rural settings to explore whether or not women are the key to diffusion of farm related digital technology. The article begins with an overview of women in agriculture, which includes feminist theory in a broad sense. Eco feminism, capital resource ownership and rural residency are then discussed. Following the discussion on gender, we examine three important topics related to technology adoption in a rural setting. Firstly, we discuss factors affecting technology adoption and the scale of property size and distances involved in rural Queensland, as well as problems faced by graziers. Secondly, we give an overview of precision agriculture focusing on production benefits, and thirdly, we introduce the Australian cattle industry and its importance to Queensland graziers. The paper presents a case study of precision farming in Australia. The social position of rural women who are isolated by large scale farming, and in turn rely on technology for communication, business management and productivity related tasks, shapes the understanding of problems associated with innovation and the adoption of rural technology

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amongst beef producers in Queensland. The study is viewed as having broader implications for women in other dispersed rural settings both in Australia and elsewhere.

2. Women in agriculture

A focus on women in agriculture has developed over time by exploring social inequality based on gender through the application of Marxist and political economic perspectives (Little, 2009). Although gender was not central to many earlier studies, women's roles were often previously defined in small scale commodity production and survival of the family farm (Bryant and Pini, 2006; Little, 2009). However, a vast amount of research has evolved around eco feminism, which examines women's relationship to the environment and nature (for more about eco feminism read Bryant and Pini (2006) who take a gender lens to agricultural biotechnology and discuss both the virtues and criticisms of eco feminism). In rural Australia, women have been described as invisible. Rural women have appeared infrequently as leaders in producer groups, commodity boards and agricultural bureaucracies or in agricultural research and development (Bryant and Pini, 2006). Until recently, women's work, characteristically secretarial work, feeding the farm workers, caring for house animals and providing emergency labor, was not regarded as important to the business (Alston and Wilkinson, 1998; Little, 2009). In addition, women tended to marry into the farming family, and as such, men were regarded as the owner of the capital resources, and hence, the owners of decision making (Bock, 2006). Capital resources include access to land, credit, education and training, and decision making (Bryant and Pini, 2006). Bryant and Pini (2006) claim that women's "exclusion from farming capital has critical implications for women's position in the public sphere of agriculture for, as feminist have argued, the gendering of private space cannot be segregated from the gendering of public space". In addition, Little (2009) argues that rural women were "double disadvantaged". Firstly as 'rural residents', suffering problems of remoteness and poor services; and secondly because they were women who were responsible only for the "domestic reproduction of the household". Penley (1991) supports Little's views, writing of "women's lack of social and economic equality and having to manage double duty work and domestic life" (Little, 2009; Penley, 1991). To escape the disadvantages of "rural residency" suffered by their mothers, younger generation women have worked off farm (Bock, 2006).

Bryant and Pini (2006) consider that there is a link between gender and technology in rural sociology, especially where the technology is based around heavy machinery and information and communication technologies (see Towards an Understanding of Gender and Capital in Constituting Biotechnologies in Agriculture for a wider view (Bryant and Pini, 2006)). Saugeres (2002a) suggests that "male farmers use agricultural technology to reinforce patriarchal ideologies, which marginalize and exclude women from farming". The author also posits that "tractors have become a symbol of masculine power and domination over women" (Saugeres, 2002a). The same researcher further explored this issue in another French farming community, and found that men have a natural affinity with farming machinery, and argues that this affinity excludes women from rural technology (Saugeres, 2002b). However, "through showing how women are associated with particular parts of the business, and their role in farming diversification", Little (2009) suggests that women can be identified as dominant farmers; this theme became an emphasis of 1990s research. It was around this time that farming families turned to pluriactivity or diversification and women engaged in non-agricultural work off the farm (Gasson and Winter, 1992; Saugeres, 2002a). As well as representing a fundamental change

in women's economic status in family farms, off farm work encouraged equal status amongst farming men and women (Bock, 2006).

More recently, women's roles in farming families have increasingly been recognized as important and necessary (Farmer-Bowers, 2010). Claridge (1998) and other researchers argue that women have valuable skills and attributes to bring to decision making, and that women want to feel empowered, and that they want to increase their skills in leadership and determining actions for the future (Bock, 2006; Farmer-Bowers, 2010; Pannell and Vanclay, 2011; Umrani and Ghadially, 2003). Rickson and Daniels (1999) posit that although the dimensions of power between men and women are not equal, women are seen to be important as decision makers within the rural family. Rural women driving the adoption of technology may help women achieve their goals of leadership and equality in the farming family (Alston and Wilkinson, 1998). However, the complexity and diversity of women's activity on farms may also challenge the masculinity of farming men, who associate masculinity and leadership with technology use (mainly associated with heavy machinery) and the agrarian values of control, toughness, hard work, self denial and of pride and pleasure of work in farming as a way of life (Brandth, 1995; Coldwell, 2007; Saugeres, 2002a). That women can attune themselves to a vast array of farming tasks, which also challenges farmers' masculinity, is in accord with the work of Saugeres (2002b) whose research on the constructions of embodiment in farming families "explores how the discursive representation of women's bodies both reproduces and legitimates unequal gender relations between women and men on the farm". The study concludes that not only do women participate in work that is as physically arduous as men, it is also equally valuable. Therefore, women using homestead based technology to farm may reduce a proposed threat to male grazier's masculinity and the traditional concept of gendered embodied farm work may be maintained.

Using technology (being 'tech savvy') in livestock management reduces women's dependency on male family members and increases self esteem and confidence; as well, it expands women's choices, enabling them to make informed decisions (Umrani and Ghadially, 2003). Haraway (1997) views technology as having a positive influence rather than a negative influence in the post gender world. Pannell and Vanclay (2011) and Alston (1995) argue that women in agriculture are managers, administrators and stock workers, as well as wives, mothers and community workers who contribute significantly to agricultural production. Penley (1991) and van Zoonen (1992) support women using technology to complete such tasks and claim it may be liberating for them. Studies in Australia over the last decade argue "women influence strategic planning, production and marketing policies" in farm management, and that they are "strategic agents in influencing the decisions" in relation to farm outputs (Bock, 2006; Pannell and Vanclay, 2011). Farmer-Bowers (2010) agrees that rural women's contribution to strategic decisions in agriculture is very important to rural livelihoods. Rural women want to be included in decision making, they want to be involved in "information gathering that will have an impact on their livelihoods, their workloads, and the future of their families and communities" (Pannell and Vanclay, 2011). As technology adoption in rural settings becomes more popular, the present study on technology adoption by rural women may help to highlight a shift away from previously studied gender divisions, towards productive partnerships in farming families. This study seeks to contribute to a growing body of research focusing on the adoption of precision agriculture technology. It considers the extent to which rural women use technology and their views on their roles in managing these emerging livestock management tools.

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