Gender and the Use of DSS in the Australian Cotton Industry

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INTRODUCTION

This article provides an overview of an ongoing study that explores farm management practices by Australian women cotton growers using farm management software, most particularly agricultural decision support systems (DSS). The research methodology is interpretive with multiple case studies of women cotton growers and industry professionals. Participants were selected on the basis of indicating an awareness of environmentally responsible and high technology farming practices. Data collection was principally by semi-structured in-depth interviews. The study is informed through a theoretical framework of structuration theory as a metatheory for probing the recursiveness of farm management and technology usage, and diffusion of innovations theory as a lower-level theory for analysing the characteristics of the software.

Evidence from the study suggests that farm women intentionally select specific software modules for implementation depending on the attributes of the software. Further, while computer-based farm management systems, including agricultural DSS, are recognised media for technology transfer of industry research to farms, the study found the cooperation of farming partners to be essential in influencing effective reconstruction of farm management practices and software usage. The study also explores gender homophily, in particular the relationship between husband and wife as partners in a cotton farm business. It is apparent that gender differences and inequalities are still prevalent and indicative of "gender heterophily." Nevertheless, in the main, communication between parties is harmonious, empathetic, and by definition homophilous, thus ensuring effective information exchange.

A notable benefit of using decision support software is an enhanced critical awareness of existing farm management practices. Further, the women are empowered by increasing confidence to contribute in enterprising ways to a greater range of farm management tasks and to more innovative applications of computer-based farm management tools.

BACKGROUND

The cotton industry in Australia is thriving. Nevertheless, cotton management is becoming increasingly complex with the need to sustain reliable crop production while making the best use of water and soil resources, to utilise effective pest and weed management, as well as to limit environmental impacts (The Australian Cottongrower, 2004). Innovative technologies, such as the agricultural DSS, *CottonLOGIC,* are considered keys to the adoption of sustainable farming systems (Hearn & Bange, 2002).

While the literature is sparse in the specific research domain of my study, there has been extensive research in categories such as DSS and farm management, and gender and information technology (IT). Although the portrayal of women in farming has been the subject of many studies both in Australia and overseas, the range is more limited when the study includes the use of computers. One study of rural women embracing computer usage was by Stewart (1997). For her PhD, she explored the gendering of interactive communication technologies (ICTs) in use on Australian family cotton farms. Stewart found that farm women's lack of confidence as controllers of data meant that they often avoided responsibility for utilising computer-based information systems for decision making purposes. Even so, Stewart found evidence that many rural women were increasingly aware of the possibilities of computers for decision making, encompassing new and innovative farm management practices.

In her research into the lives of Australian farm women, Alston (1995) argues that farm roles have developed based on gender stereotypes and that traditional divisions of labour prevail. Male farmers are participants in the "more important" public sphere of outdoor work while farm women have become associated with the less visible private sphere of housework and children. This "domestic work has come to be devalued because it is unpaid and not directly geared to agricultural production and the marketplace" (Alston, 1995, p. 24). The theme of the "invisibility" of women farmers emanated from research by Sachs (1983) and has resonated through feminist studies of Australian rural women. Further, James (1989) claims that despite the increase of legal farm partnerships, the participation of women in decision making on the Australian family farm is unclear. Moreover, there is evidence that divisions of responsibility in farm management, largely based on gender, may actually contribute to poor decision making (Daniels & Woods, 1997).

The value of women's work has engaged sociologists beyond the farm gate. Sharpe (1992) in a reader on human societies edited by Anthony Giddens, discusses the difference between paid work outside the home and unpaid domestic work in a British urban setting. She argues that women's self-esteem may become bound up with the care and services provided to family members, and notes that "this unrecognized work is in effect the service and maintenance of the workers of today and tomorrow. It *is* related to the external world of production, but indirectly" (Sharpe, 1992, p. 56).

DISCUSSION

The following section outlines preliminary findings from the study in three papers written by the author (Gartshore, 2003; Gartshore, 2004; Mackrell, 2005).

Software Attributes and their Relevance

In analysing the use of an innovation such as *CottonLOGIC*, Gartshore (2003) utilises the concepts of divisibility (or modularity) and implementation costs, in particular, intellectual outlay from the environmental model of technology diffusion (Vanclay & Lawrence, 1995). While *CottonLOGIC* is a software package that consists of several modules, for the most part, the women cotton growers deliberately selected modules pertaining to the recording of field and spray operations. These modules enabled them to record the usage of fertilisers, herbicides, pesticides, and so on. This meant that the women were better informed particularly for managing costs of production and improving sustainability. These modules were also envisaged as useful by one of the women cotton consultants whose aim is to provide a more complete record of clients' farming operations.

As elaborated further in the paper (Gartshore, 2003), intellectual outlay takes into account, (1) complexity of the innovation, (2) collaboration by stakeholders, (3) redundancy of effort, and (4) *CottonLOGIC* course participation. Participants in the study acknowledged the varying intellectual expense in the implementation of *CottonLOGIC*. While the *CottonLOGIC* training courses were greatly appreciated, and went a long way to addressing the computer deficiencies of users and the agronomic complexity of the software, the individualistic needs of the women meant that there often remained a mismatch between the skills required to operate the software and the skills possessed by many cotton growers. Further, the notion of redundancy appeared important as an influential factor in the adoption or non-adoption of *CottonLOGIC*. Many participants clearly stated their objections to re-keying the insect count data for the insect prediction models that had been previously entered into *CottonLOGIC* by crop scouts or cotton consultants. As well, communication with partners and agronomists was deemed desirable in achieving optimum results.

The following extract from an interview with Selma, a cotton grower, supports and illustrates the generally harmonious and productive rapport reiterated by women cotton growers. It highlights the importance of collaboration and cooperation in a family farm setting, with few inklings of "invisibility" and of being undervalued.

We work as a team really. I'm more focussed on the administration side of things. X [farm partner] is more focussed on the day-to-day running, and