



# ‘Unearthing farmers’ information seeking contexts and challenges in digital, local and industry environments’



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## ABSTRACT

The information seeking contexts of Australian grain and cotton growers were explored as they undertook self-directed learning to make farming system changes. This investigation provided insights into information seeking and what constitutes ‘information’ that supported learning. Growers’ information seeking contexts were individual, personalised, situated within experiential practices, bounded by locales, and facilitated by social practices. Farmers are agents who must personalise both information content and processes to produce relevant meanings and to progress their own learning agendas and pathways. Information seeking in online, local, and industry environments highlighted differences between available content and farmers’ individual information needs. Information and communications systems that facilitate and empower individual farmer knowledge processes and onfarm outcomes are a necessary strategy of agricultural development.

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## 1. Introduction

In information seeking and needs research, “context” describes the situation surrounding a person’s information seeking. Research into understanding contexts provides unique insights into understanding information activities and into what constitutes “information” for users.

In agriculture, information access for farmers in developed countries has transformed over the past two decades through increasing digitisation of industry and government information and services. This has been accompanied by an explosion of agricultural online content. There is increasing availability to farmers of digital information, decision tools, and communications through online systems and mobile phones. This is accompanied by growth in the use of precision technologies within farming systems to capture on-farm data, and information technologies delivering information from industry, government, and agribusinesses.

The digitisation and voluminous nature of available agricultural information are in strong contrast to the field and person-based targeted extension and training approaches that have traditionally operated in agriculture and are now declining (Hunt, Birch, Coutts, & Vanclay, 2012). This declining availability of people-based extension and information services has meant that the onus is now more than ever with individual farmers to identify their needs for information, and to seek, evaluate, and use new information in learning, building knowledge, and making farming and business decisions. Farmers now have to acquire, evaluate, and analyse a mass of information from many, often unrelated sources in order to make economical and environmentally-sound decisions (Sorensen, Fountas, Nash, Pesonen, Bochtis, Pedersen, Basso & Blackmore, 2010).

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## 2. Problem statement

Australia is one of the top ten producers of grain and cotton in the world and uses highly mechanised production systems. Its 12,000 grain growers are typically dispersed throughout eastern, southern, and western states; while its 360 cotton growers are in eastern states (Australian Bureau of Statistics, 2012). Grain-growing properties are on average 1000 ha (Australian Bureau of Statistics, 2012), and are mostly located up to 300 km from larger regional centres with variable access to local professional consulting services.

In Australia and globally, many rural information studies traditionally have evaluated farmers’ information source preferences or categorised their needs. Less is known about what drives farmers in accessing and using new information. Few studies have described farmers as users or described their perspectives in information seeking. These perspectives are explored in this research as the contexts surrounding and affecting farmers’ information seeking and their ability to use available information. The ability of farmers to access, evaluate, and use new information from digital and other sources is critical, as such information enables them to maximise sustainability of production and farming systems to meet future challenges such as food security, biosecurity threats, and climate variability.

This user-centred (Dervin, 1998), interpretivist (Cibangu, 2013; Schwandt, 1994) study describes the information-seeking contexts of 16 grain and cotton growers in Queensland in Northern Australia. Researching the contexts surrounding farmers’ seeking, access, and use of science and technology-based information is a unique way of exploring the major drivers of their information strategies. This research defines what constitutes “information” as farmers learn to make system improvements. It explores how these contexts affect

farmers' information seeking in online environments. The following research questions directed the study:

- What contexts surround farmers' information seeking in support of self-directed learning to make farming system changes?
- How are these contexts having an impact on farmers' information seeking, especially in digital environments?

The research has implications for farmers' future information seeking and literacies in an increasingly digital world, and can inform directions for future agricultural information system developments. It will help research and development (R&D) providers to develop information and platforms that facilitate farmers' engagement with their content, while helping farmer users to better integrate new science and technology information in their self-directed learning. Information and technology initiatives may then better contribute to rural extension outcomes.

### 3. Literature review

#### 3.1. Use of agricultural information

The enhanced responsibility of farmers in new information roles presents a challenge for farmers, and for providers of agricultural (R&D) information, as past use of agricultural information and decision tools by farmers has been poor (Kuhlmann & Brodersen, 2001; Lynch & Gregor, 2004; McCown, 2001, 2002). There is a mismatch between the science-based information provided to farmers and the information that farmers recognise as usable in their decision making (Kiem & Austin, 2013; Lemos, Kirchhoff, & Ramprasad, 2012; McNie, 2007). This is especially true in relation to the delivery of science-based outputs and the complexity of farmers' information needs in adapting general science principles to a particular place (Coughenour, 2003).

R&D approaches and outputs are often not well resourced to support farmers in making such on-farm changes (Ison & Russell, 2000). Solving this dilemma is a significant challenge (Struik, Klerkx, van Huis, & Röling, 2014), and yet globally there has been relatively little research into farmers' individual learning and decision processes and how they interface with agricultural R&D information outputs (Parker & Sinclair, 2001). R&D providers are investing in information systems to support farmer adoption of science and technology, based on assumptions about farmers' sources and use of information that may be well-removed from realities. Wesseler and Brinkman (2002) suggest that bridging this information gap between farmers and R&D agents requires a tailor-made approach, addressing the interests of stakeholders. McCown (2002) recommends an emphasis on learning what farmers do and how they act when designing information systems. Arnott and Pervan (2008) suggest that research using interpretive case study approaches may help to reduce this gap.

Increasing digitisation of agricultural information has added another dimension to the information use gap in agriculture. Many farmers are less equipped to seek and manage agricultural information now that much of it rests within corporate websites, electronic newsletters and on social media. Their adoption of internet technology will not necessarily equate with 'use' of the technology in current learning processes (Charatsari & Lioutas, 2013; White & Selwyn, 2012). It is electronic skills and preparedness to access and use online information that are important in driving outcomes from digital technologies (Bowles, 2013). Yet lack of awareness and skills is a weakness within some agriculture sectors, along with an uncertainty of return on technology investment (Alam & Shahiduzzaman, 2013). Koutsouris (2010) forecasts that a digital divide will limit sustainable rural development, and calls for more recognition of user experiences within rural development and extension.

#### 3.2. Information and information technology in supporting farmers' learning

The importance of information in supporting farmers' decisions and learning has been widely researched (Fountas, Wulfsohn, Blackmore, Jacobsen, & Pedersen, 2006; White & Selfa, 2013), with studies in agriculture (in Australia and globally) traditionally reporting on information and learning sources and channels. Researchers have investigated farmers' needs (Rubzen & Rola-Rubzen, 2002), and their perceptions of usefulness and quality in adoption and management (Duram & Larson, 2001; Llewellyn, 2007). They have also explored access to and use of R&D technical information in adoption and decisions (Genius, Pantzios, & Tzouvelekas, 2006; Llewellyn, 2007).

Conceptions of "information" in the context of agriculture have not been well defined in research into information use by farmers. Many studies have considered information in the sense of a product (e.g. brochure, web content, electronic newsletter) that is *provided* by R&D organisations or agents or *used* by farmers in making strategic or operational decisions (e.g., choosing crop varieties or fertiliser and pest strategies). Yet making strategic decisions, and learning about and changing farming systems, such as adopting precision agriculture or no-tillage, or adapting to climate change, are complex processes requiring much attention to detail (Coughenour, 2003; Ingram, 2008; Llewellyn, 2007). They are highly information intensive activities and require development of and access to high quality information (D'Emden, Llewellyn, & Burton, 2006; Llewellyn, 2007), and for farmers to be both *skilled and ready to use* new information (Hogan, Berry, Ng, & Bode, 2011).

Research into identifying farmers' operational and strategic information needs is increasing (Glendenning, Babu, & Asenso-Okyere, 2010; Meagy, Rashid, Barker, Islam, & Islam, 2013), and along with this is a growing understanding that their needs are often for more relevant and context-specific information (Elly & Silayo, 2013, p.559) than currently exists. There is also increasing recognition of the value of local information (Lawrence, Christodoulou, & Whish, 2007) and farmers' own expertise (Aubert, Schroeder, & Grimaudo, 2012) as sources of information for learning and decision making.

Social networks, participation in farmer groups, and sharing experiences (Llewellyn, 2007; White & Selfa, 2013) are important means through which farmers access useful information to support their learning about new farming processes. In contrast to this, agricultural content on websites has been found to be of little use in farmer decision making or learning (Suvedi, Campo, & Lapinski, 1999). Farmers' real needs for information to support their learning and innovation appear to be beyond what exists within current information technology environments (Glendenning & Ficarelli, 2012; Sulaiman, Hall, Kalaivani, Dorai, & Reddy, 2012). The role for much extension information on industry websites in supporting farmers' learning and knowledge processes is therefore seemingly unclear (Glendenning & Ficarelli, 2012; Llewellyn, 2007; Walisadeera, Wikramanayake, & Ginige, 2013).

In-depth studies of farmers' information and knowledge processes may identify their information needs, what drives these in learning and innovation, and how information technology-based resources can be more effective. Few studies thus far have centred on farmers' self-directed learning or on farmers as information users. The dearth of this type of research is surprising in light of the high learning demands associated with farming system changes, the influential role of information access on adoption of new farming processes (D'Emden et al., 2006), and the necessity of sustainable agricultural productivity growth globally.

#### 3.3. Information seeking

Research in information seeking from user-centred perspectives (Kuhlthau, 1991) conceives of information seeking as part of a broader process of learning or building knowledge. This approach considers the role of information in supporting this process and facilitates understandings of what actually constitutes "information" for users. By placing the user at the centre, information seeking is positioned as a constructive

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