



## Conceptual and operational understanding of learning for sustainability: A case study of the beef industry in north-eastern Australia

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### ABSTRACT

Extensive attention has been given to understanding learning processes that foster sustainability. Despite this focus there is still limited knowledge of learning processes that create changes in perspectives and practices. This paper aims to increase understanding of learning processes in the context of sustainability and refers to the beef industry in north-eastern Australia. A framework based on adult learning theories was developed and used to analyse the what, why and how of beef producers' learning to improve land condition. Twenty-eight producers were interviewed face-to-face and another 91 participated in a telephone survey. Most beef producers were motivated to learn due to perceived problems with existing practices and described mainly learning new skills and techniques to improve production. Beef producers main learning sources were their own experiences, observing others' practices and sharing experiences with peers and family members. Results showed that organised collective learning, adversity and active experimentation with natural resource management skills and techniques can facilitate critical reflection of practices, questioning of the self, others and cultural norms and an enhanced sense of environmental responsibility.

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### 1. Introduction

Rural production practices that stem from an industrialised and market-driven approach to agriculture have proven to be unsustainable (van der Ploeg, 2010). A range of social–ecological problems exist in agricultural and pastoral landscapes that are related to the degradation of ecosystem services (Millennium Ecosystem Assessment, 2005). These problems have been exacerbated by changes in climate and culture (Lang, 2010). As a consequence of these drivers, rural producers are faced with an increasing rate of institutional and environmental change and uncertainty (Darnhofer et al., 2010b). Society has the challenge of needing to develop strategies that reduce the negative ecological impacts of land use across multiple services and scales while maintaining social and economic benefits (Foley et al., 2005). Achieving sustainability will, therefore, require cultural and personal transitions in the approach to natural resource management (NRM) and food production.

There are many perspectives on what influences rural producers to change the way they think and behave. A rural producer's change

to 'more sustainable' practices will depend on their goals and values which are influenced by a range of personal, social, cultural, physical and economic factors (Pannell et al., 2006). Different farms (farm regions and rural communities) will have different opportunities for enhanced sustainability, depending on levels of social, cultural, economic and moral capital (Wilson, 2008). Changing practices will depend on the extent to which the change matches self concepts and what an individual knows and values and provides symbolic and cultural capital (Burton, 2004; Burton and Wilson, 2006; Tsouvalis et al., 2000). A rural landholder's change to 'more sustainable' land management practices will be mediated through social and cultural contexts, which may or may not be conducive to change.

Achieving the sustainable management of natural resources for food production is widely considered to need and involve learning (Darnhofer et al., 2010b; Keen et al., 2005; Wals, 2009). In particular, learning that is continuous and fosters a shift in the way natural resources are perceived and managed. Collaborative and participatory learning experiences that develop trust, encourage dialogue and prompt individuals to critically reflect on their own and each others' assumptions of the world is an important part of learning that enhances sustainability (Marschke and Sinclair, 2009; Sims and Sinclair, 2008; Tilbury, 2009). Experimental and adaptive learning (i.e. a continuous cycle of action and

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reflection) is another recognised aspect of learning that fosters sustainability (Somers, 1998). Achieving sustainability involves a learning process that fosters critical reflection through participation and experimentation.

Social and individual learning processes associated with the management of natural resources have been extensively studied in Australia and internationally (Cerf et al., 2000; Röling and Wagemakers, 1998; Wals, 2009). Despite the extensive attention that learning processes have been given in relation to NRM, there is still limited understanding of learning processes that create changes in perspectives that foster sustainability. Specifically, there is little work conducted on the identification of aspects of learning that require change and evidence that shows that there has been a change (Rodella, 2011), how and why individuals learn (Henry, 2009), the inter-linkage of learning processes at different scales (Krasny et al., 2009; Stagl, 2007) and the outcomes of learning processes that are transformative (Muro and Jeffrey, 2008; Sinclair et al., 2008). An increased understanding of learning processes that enhance sustainability will help to develop institutions and programs that can foster this learning.

This paper aims to contribute to the theoretical and empirical understanding of learning processes that may foster sustainable NRM. More specifically, a conceptual framework that embodies adult learning theories is developed to capture the how, why and what of individual learning in social learning and the interactions between these dimensions. The framework is operationalised using mixed methods and a focus on the beef industry in north-eastern Australia where there is a myriad of social–ecological problems related to the erosion of ecosystem services (pasture for production). The framework is used to evaluate beef producers' descriptions of their learning processes in relation to changing management practices to improve land condition.

### 1.1. 'Sustainability' defined in the context of extensive grazing systems

The concept of 'sustainability' refers to the replenishment and regeneration of depleted natural resources and ecosystems in a way that ensures the wellbeing of current and future generations. It is widely understood to include three main dimensions: social responsibility, ecological viability and economic viability (Black, 2005; Ramen, 2006). 'Sustainability' is, however, a highly ambiguous and contested concept that has been interpreted in a multitude of ways depending on the different values and interests of people. Contrasting and multiple definitions of 'sustainability' suggest that use of the concept must be accompanied by an understanding of how it is interpreted and what the concept means practically for a particular setting and its social, economic, cultural and political contexts (Loeber et al., 2009).

In this paper I interpret 'sustainability' as a system-wide shift in the way people perceive, understand and manage natural resources. Such a shift involves a change in techno-scientific practices, a *social movement* (i.e. a way of life, a source of identity and solidarity and a new sense of purpose and independence) and a policy goal (i.e. changes in industry, research, environmental health and other policies that apply to agriculture) (Buttel and Shulman, 1997). A cultural transition to sustainability is a lengthy and difficult process that leads to fundamental changes in goals, attitudes, values and institutions (Pretty, 1995; Röling and Jiggins, 1998). Achieving sustainability in this meaning involves the adoption of 'best' practices to address social–ecological problems, but also deep and underlying changes in the approach to land use. This approach embraces 'soft systems thinking'; a holistic view of problem solving rather than predictive or 'hard systems thinking' based on well-defined goals and boundaries. A notable feature of soft systems

thinking is the intention to adapt to changing conditions through a process of learning about changes and adapting to those changes (Darnhofer et al., 2010a; Ramen, 2006).

The beef industry in the rangelands of north-eastern Australia is dominated by production-oriented values (Holmes, 2006). In other words, beef producers' decision-making opportunities are largely bounded by productivist or conventional action and thought (Wilson, 2008). Current best management practices to improve land condition are based on enhancing native pasture quality and quantity, controlling the spread of exotic animal and plant species, sound financial management, appropriate use of fire, managing for a variable climate and conserving biodiversity (MacLeod and McIvor, 2006; NLWRA, 2005). However, the extent to which such practices are adopted will depend on how they are perceived by beef producers to enhance their productivity and viability and generate symbolic and cultural capital (Lankester, 2012; Lankester et al., 2009). Evidence suggests that shifts in conventional producers' understanding and management of natural resources that favours sustainability are likely to be achieved through the promotion of entrepreneurialism and innovation (Burton et al., 2008). 'Cell grazing'<sup>1</sup> is a philosophy and practice of cattle grazing that involves a cultural shift with an entrepreneurial focus that departs from conventional grazing practices and has the potential to be both economically and environmentally sustainable (Richards and Lawrence, 2009). A shift towards sustainability in the beef industry in north-eastern Australia is, therefore, likely to be from 'unsustainable' beef production practices to 'more sustainable' production practices. This paper analyses beef producers' descriptions of their learning experiences for the extent that there is evidence of a shift in their perspectives and practices towards a 'more sustainable' approach to NRM.

### 1.2. Learning for sustainability

'Learning' in this paper is viewed as a continual and integrated psychological and social process of knowledge creation rather than a fixed process focused on outcomes. The conceptual framework (see Fig. 1) developed to analyse beef producers' learning processes is focused on intentional learning, or the clarification and/or reinterpretation of the meaning of an experience. The framework embodies transformative and experiential learning theories and is structured by the perspective of learning developed by Maarleveld and Dangbégnon (1999) that questions: who learns?, what is learned?, why is it learned? and how? The framework builds on previous integrated psychological and sociological frameworks of learning for sustainability and takes an individual-centric perspective (e.g. Brummel et al., 2010; Henry, 2009; Rodella, 2011; Sinclair et al., 2008; Tabara and Pahl-Wostl, 2007). The individual learning processes are represented in the inner circle and squares and the outer circle represents the social dimensions to individual learning. There may be an overlap in the dimensions and processes. For example, some descriptions of 'how' something is learned could also be viewed as descriptions of 'what' is learned. The following sections explain the different parts of the framework in the context of achieving sustainability.

#### 1.2.1. Who learns?

Individuals are the primary learner (Maarleveld and Dangbégnon, 1999). However, individuals can develop shared

<sup>1</sup> The practice of cell grazing involves reducing large-sized paddocks into smaller ones through an increase in fences and water infrastructure. Cattle are rotated around the smaller paddocks so that each paddock is intensely grazed and obtains a period of rest from grazing.

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