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Understanding producers' change to more sustainable grazing practices in the tropical savanna rangelands of North Queensland

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Abstract

Understanding the factors and processes that facilitate and inhibit beef producers to become 'more sustainable' is essential for designing policy that will be effective in achieving sustainability. However, understanding of the social and psychological dimensions of beef producers' natural resource management is still limited. The purpose of this project was to increase understanding of beef producers' learning and self-identity, as it relates to their roles in life and sense of place, through a case study in north-eastern Queensland. Twenty eight producers were interviewed face-to-face and another 91 participated in a telephone survey. Results revealed that beef producers identified with a mix of more and less 'traditional' roles in life, were strongly attached to the family property for belonging, lifestyle, occupation and livelihood meanings, and were mainly engaged in non-organised learning to improve production skills and techniques. Findings of the research also emphasised the importance of collective and experiential learning, experiencing adversity and alternative practices and networks for fostering critical reflection and perspectives that favour sustainability. Further, results showed that producers who had an emotional connection to the family property, identified with a wide range of roles in life, and who were attracted to business innovation were more likely than those attached to the lifestyle and occupation of cattle grazing to favour beliefs aligned with sustainability. These findings suggest that planned interventions to foster sustainability need to be based on learning among all stakeholders that is experiential, collaborative, and involves critical reflection, alternative and business-orientated discourses.

Executive summary

Understanding aspects and processes that influence beef producers to increase their adoption of 'more sustainable' practices is as urgent as ever. Achieving sustainability remains an important issue to industry, communities and beef producers as uncertainty surrounding the capacity of natural resources to maintain goods and services into the future mounts. This uncertainty has increased in more recent times with factors such as climate change, fossil fuel reduction and community concern for animal welfare. Knowledge of the factors and processes that inhibit and facilitate beef producers' sustainability has been well researched over the last couple of decades. There has, however, been less attention focused on understanding key aspects of learning and self-identity. The main aim of this thesis was to increase understanding of learning and self-identity, as it relates to roles in life and sense of place, in the context of sustainability and extensive beef grazing systems. Increased understanding of these dimensions through this research hopes to inform the development of industry-wide strategies that enhance learning and nurture aspects that are critical to producers' well-being while at the same time being socially acceptable and effective in achieving sustainability.

To achieve the aims of the research, a mixed method case study, of 28 face-to-face interviews followed by 91 telephone surveys, was conducted in the beef industry of north-eastern Queensland. The research had four main objectives: (1) develop a framework that characterises learning that fosters sustainability and identify important criteria involved in the learning process (2) describe the process and outcomes of beef producers' learning in relation to changing practices to improve land condition (3) describe the range and depth of beef producers' self-identity, as it relates to their roles in life and relationship to place and occupation, and (4) identify how beef producers' self-perceived roles and relationship to place and occupation may influence their sustainability.

This research developed a framework of learning that fosters change towards sustainability. It integrates dimensions, motivations and processes of individuals' learning and is embedded in social learning processes. The framework was used to analyse beef producers' learning to improve land condition. Results revealed that 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. Main learning sources for producers' were their own experiences, observing others' practices and sharing experiences with peers and family members. Organised collective learning, experiencing adversity, and active experimentation with natural resource management skills and techniques were key aspects that facilitated critical reflections of practices, questioning the self and cultural norms, and an enhanced sense of environmental responsibility.

The research found that beef producers' self-identity showed signs of more and less 'traditional' characteristics. Producers' described a range of more or less 'traditional' roles in their everyday life. Traditional cultural norms and values, such as gender expectations of roles, appear to still be a strong influence on producers' self-perceptions. Producers who also identified with 'less traditional' roles in life, such as 'resource condition monitor' and 'workshop participant', had a desire to re-label themselves to less production-oriented titles and were involved in equal decision-making with their partner in relation to the business and natural resource management. Results also revealed that beef producers with a long, ancestral and lived connection with the family property had a strong place attachment. This attachment was based on feeling a strong sense of belonging to the property and/or being attracted to lifestyle, occupational and business innovation aspects of the operation.

Results of the research further revealed that, the less traditional were beef producers' sense of place and self-perceptions, the more likely they were to favour beliefs aligned with sustainability. Producers who identified with 'less traditional' roles and domestic and administrative roles were likely to favour beliefs that supported nature conservation, learning and/or adapting to change. Producers who identified strongly with domestic, administration and labouring roles were likely to be worried about adverse climatic and economic changes. Producers who felt a strong sense of belonging to the property and who were attracted to the business side of the operation were more likely to have an interest in learning and adapting to change than producers attached to the lifestyle and occupation of cattle grazing.

Implications from this research for policy include (1) there are likely to be a diversity of responses to planned interventions: some interventions may appeal to some producers more than others depending on their self-identity, relationship to their place and occupation; (2) a learning based approach to problem solving could be especially effective; in particular, learning that is participatory, collaborative, and involves all stakeholders and critical reflection.

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1 Background

1.1 Introduction

Social-ecological problems in pastoral landscapes, driven by factors such as environmental degradation and changes in climate and culture, are creating uncertain futures for beef producers. Knowledge of the factors and processes that influence producers to achieve change towards sustainability is, therefore, critical for the design of policy that will be effective in fostering this change. There is still limited understanding of how aspects related to self-identity and learning influence beef producers' change to 'more sustainable' practices. This research aims to enhance this understanding through a case study in north-eastern Queensland of beef producers' learning and self-identity as it relates to their roles in life and relationship to place.

The concept of 'sustainability' has been interpreted in multitude ways reflecting the different values and interests of people. The concept is generally defined as the replenishment and regeneration of depleted natural resources and ecosystems in a way that ensures the wellbeing of current and future generations, and is widely considered to include three main dimensions: social responsibility, ecological viability and economic viability (Black, 2005; Ramen, 2006). Increased understanding of the complexity of social-ecological problems in agriculture and pastoralism suggests that, as well as the adoption of ecologically enhancing practices, an approach to sustainability also needs to involve learning, adaptability and change (Cross and Keske, 2011; LaFlamme, 2011; Ramen, 2006). The ability of individuals to learn, the flexibility of the system and its diversity are characteristics that strengthen the adaptive capacity, and therefore sustainability, of a farm (2007). In particular, learning that is collaborative and participatory and encourages dialogue that prompts individuals to critically reflect on their own and each others' assumptions of the world (Marschke and Sinclair, 2009; Sims and Sinclair, 2008; Tilbury, 2009). It is this conceptual understanding of 'sustainability' that I refer to in this report.

Beef producers' natural resource management decision-making is influenced by a range of social, cultural, economic, personal and ecological factors that interrelate. Where producers rely on food production for their sole income, financial concerns and motivations are highly salient in the adoption of best management practices (Bewsell et al., 2007; Lankester et al., 2009; Vanclay and Lawrence, 1995). However, social values are often as influential, if not more so in some cases, as economic viability when it comes to learning and making decisions about land management (Richards et al., 2005). While studies have examined the influence of factors such as beliefs, attitudes and values on producers' sustainability (i.e. Beedell and Rehman, 1999; Fielding et al., 2005), there has been less emphasis on understanding the influence of culture and aspects of culture such as self-identity (i.e. how one perceives the self in relation to others and the wider world) (Adger et al., 2011; Burton, 2004). The theoretical and empirical understanding of learning processes and outcomes that foster sustainability is also considered insufficient for the design of effective policies and institutions (Henry, 2009; Stagl, 2007). Increased understanding of beef producers' learning and self-identity, and how these factors relate to their sustainability, is even more limited. Increased understanding of such factors should help accelerate the transition toward sustainability (Lambin, 2005; Saunders et al., 2006).

1.2 North-eastern savanna case study

The beef industry in the tropical savanna rangelands of north-eastern Australia (see Figure 1) provides an ideal opportunity for a case study to examine factors related to the sustainable management of natural resources. The adoption of sustainable land-use practices in the tropical rangelands has become critical due to the erosion of ecosystem services (pasture for production), climate variability and other factors such as fluctuating market prices (Stafford

Smith et al., 2007). Escalating environmental degradation has also increased societal pressure on beef producers to operate sustainably. The new leasehold renewal agreements (The State of Queensland, 2007) and regulation to protect the Great Barrier Reef from upstream water pollutants (State of Queensland, 2010) are examples of increasing regulatory pressures on producers to adopt 'more sustainable' practices. Current recommended management to enhance sustainability in the rangelands include: enhancing the condition of native pasture, controlling the spread of exotic animal and plant species, sound financial management, appropriate use of fire, and managing for a variable climate (MacLeod and McIvor, 2006; NLWRA, 2005). Adoption of these recommended practices will depend to what extent they are perceived by producers to also facilitate production goals. The major management issue in the rangelands is "getting the stocking rate right," ; managing stock numbers to maintain desirable perennial forage species given variability and changes in climate, commodity prices and costs of production, government policy, financial pressures, and technological capability (Stafford Smith et al., 2007).

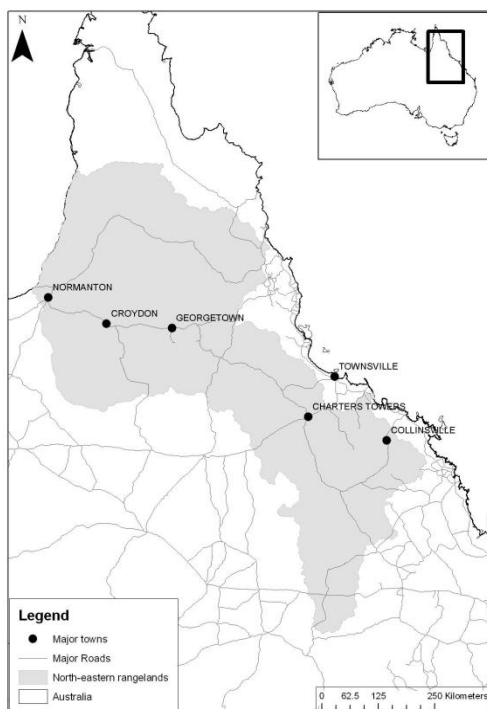


Figure 1: The north-eastern rangelands of Queensland, Australia

The future landscape of north-eastern Australia is envisaged to become less dominated by beef production and more 'multifunctional'. It is predicted that pastoralism will remain the core activity in the rangelands, but with a whole new set of linkages to post-production economy, information, and social networks, and to a more diverse group of land users (McAllister et al., 2006). Climate change is major factor influencing the future direction of the beef industry with the introduction of new schemes such as the Carbon Farming Initiative (Commonwealth of Australia, 2012). Continual bio-physical and socio-economic fluctuations and change will require flexible enterprises that manage for risk and uncertainty (Stokes et al., 2006). These predicted changes will require shifts in Australian producers' learning, perceptions and behaviour.

1.3 Project objectives

This report provides the results of doctoral research that aimed to increase understanding of beef producers' learning, self-perceived roles in life and relationship to place and how these factors influence their sustainability. Knowledge of these factors and processes intends to inform the design of planned interventions that will be effective in facilitating sustainability. The five main objectives of the project are:

1. Develop a framework that characterises learning¹ that fosters sustainability and identify important criteria involved in the learning process
2. Describe the process and outcomes of beef producers' learning in relation to changing practices to improve land condition
3. Describe the range and depth of producers' self-identity, as it relates to their roles in life and relationship to place and occupation
4. Identify how beef producers self-perceived roles and relationship to place and occupation may influence their sustainability
5. Deliver recommendations for accelerating the rate of adoption of more sustainable management practices by beef producers

2 Summary of methodology

This research used an inductive mixed methods approach with a qualitative phase followed by a quantitative phase. The qualitative data was collected through 28 face-to-face interviews and the quantitative data through 91 telephone surveys with a different set of producers. The qualitative data was used to develop variables for the quantitative survey and to help interpret the results of this survey. Content and statistical analyses of the results from the qualitative and quantitative phases of the study, respectively, were used to draw conclusions for the study as a whole. Table 1 provides a summary of the methods used in the research.

¹ The original project objectives were focused on beef producers' decision-making rather than their learning. This part of the objectives changed during the life of the project because I discovered (through the data collection and literature) that learning was the key process in the change to 'more sustainable' practices.

Table 1: Summary of the methods used in the qualitative and quantitative phases of the research

	Qualitative	Quantitative
Sampling	Purposeful sampling No refusals 28 producers interviewed from 22 properties	143 producers randomly selected from 613 sample 91 accepted 64% response rate
Data collection	Semi-structured interviews that went for ~2hrs Open-ended questions	Structured telephone survey Question types: <ul style="list-style-type: none"> • Likert-type/interval • Fixed-alternative • Nominal-dichotomous Pilot test with 8 producers
Data analysis	Content analysis- coded according to themes, group themes and identify links	Descriptive statistics Factor analysis (PCA) Reliability and correlation analysis

3 Summary of results

3.1 Learning for sustainability

Achieving the sustainable management of natural resources is increasingly seen to be a learning process (i.e. Cross and Keske, 2011; Keen et al., 2005; Wals, 2007). Despite the extensive attention that has been given to understanding learning there is still limited knowledge of learning processes and outcomes that achieve sustainability. In particular, learning that is transformative and encourages individuals to critically reflect on their assumptions of the world, leading to changes in frames of reference or mindsets (Mezirow, 1991). A framework of learning for sustainability based on adult learning theories was developed (Figure 2). The framework describes the ‘who’, ‘how’, ‘what’ and ‘why’ of individual learning within social learning in the context of sustainability.

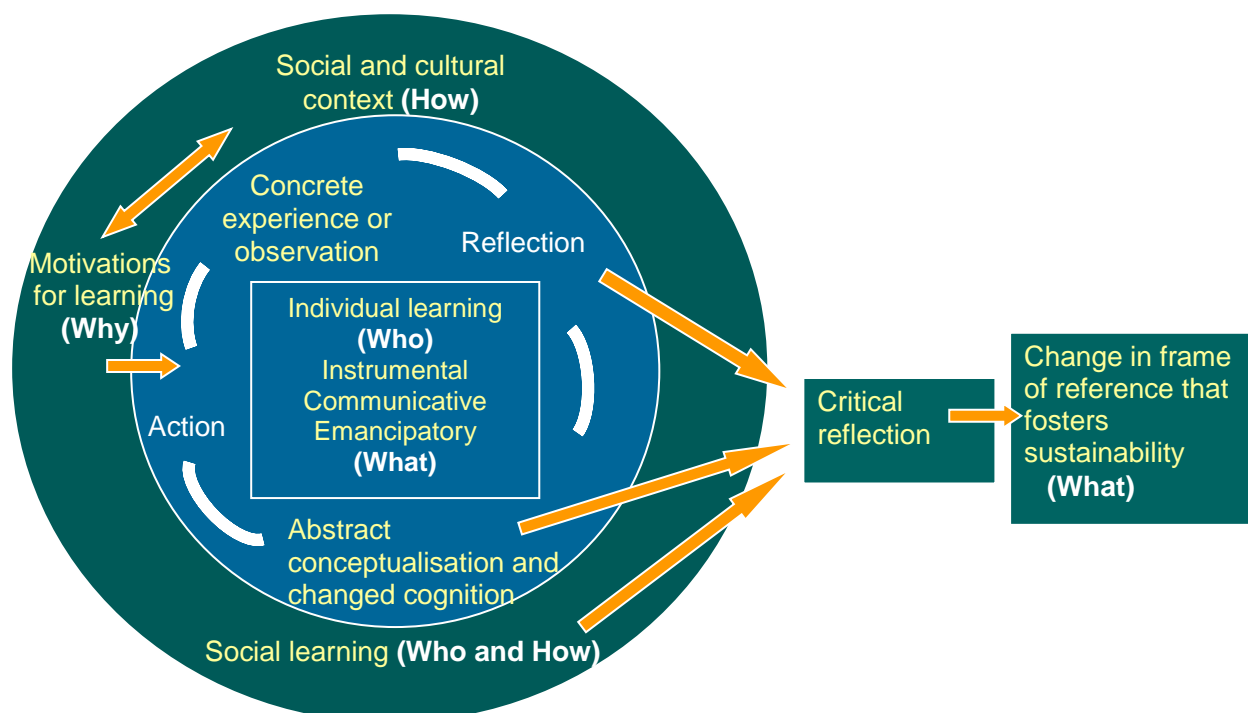


Figure 2: Conceptualisation of individual learning (inner circle) in social learning (outer circle) in the context of learning for sustainability: adapted from the experiential learning cycle developed by Kolb (1984) and Leeuwiss (2004) and the transformative learning framework developed by Tarnoczi (2011).

This framework evaluated interviewees learning in relation to changing practices to improve land condition. Producers learning was mainly: motivated by perceiving a problem with existing practices; through active and practical experience; and instrumental learning (i.e. learning to do things better) to improve cattle and pasture, rather than communicative learning (i.e. being understood by others and understanding others). Analysis of the telephone survey revealed that survey participants consider their own management experiences, observations of others' practices, sharing experiences with peers and family members to be their most important learning sources (see Figure 3).

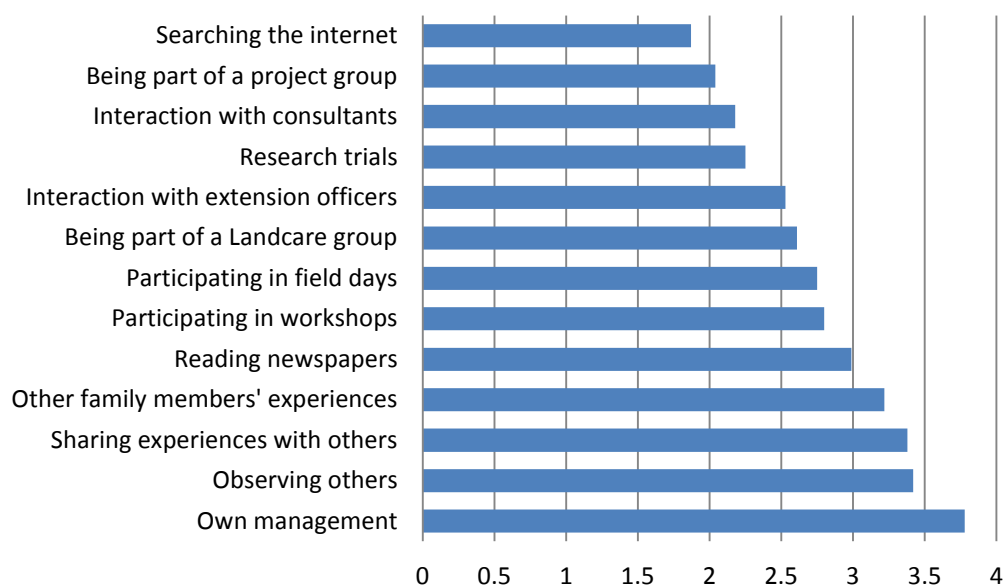


Figure 3: Mean average responses (scale 1 = not at all, 2 = somewhat, 3 = moderately and 4 = very important) for 14 different learning sources by beef producer telephone survey participants in north-eastern Australia (n=91).

Analysis of the interview data showed that active experimentation ('hands on' learning), experiencing adversity and collective learning (i.e. workshops and project groups) were key aspects that facilitated learning for sustainability. Five out of 28 interviewees (from four properties) showed evidence of transformative learning: critical reflection of practices; questioning self, others and cultural norms; and an enhanced sense of environmental responsibility. Interviewees from two of the four properties were actively practicing cell grazing and interviewees from the other properties were spelling paddocks from grazing, but not operating a 'set' system of cell grazing.

3.2 Roles in life and sustainability

The self-perceived life roles for both male and female producers were investigated through a discourse lens. 'Discourses' are socially and culturally constructed meanings and knowledge embodied in metaphors, representations, images, narratives, statements and everyday practices (Long, 2001). Interviewees described a range of different roles in their lives that

were constructed through a mix of more and less 'traditional' discourses. The most important roles for producers were associated with family, production and business. A gender division of labour consistent with a more 'traditional' discourse was evident: males mainly listed labouring, business and parenting roles, while females mainly listed house-based, paddock and community roles, with mother and wife roles usually at the top of the list. Interviewees also perceived themselves having 'less traditional roles' such as 'resource condition monitor' and 'business development manager'. Producers were also re-labelling themselves to less production-oriented titles (i.e. 'landscape manager' rather than 'grazier') and involved in equal decision-making with their partner in relation to the business. A list of self-perceived roles created from the interviews were reduced (with factor analysis) into three types and these 'role types' were then correlated with a set of beliefs aligned with sustainability. Results revealed that survey participants who strongly identified with wider community roles (i.e. 'workshop participant', 'resource condition monitor' and 'community volunteer') and domestic and administration roles were more likely than those who strongly identified with labouring and property planning roles to agree with beliefs that favoured nature conservation, learning and adapting to change. Producers who identified strongly with domestic, administration and labouring roles were also likely to be more worried about adverse changes in the climate and economy. Survey results also found that males were more likely to identify with labouring roles and females with domestic and administration roles.

3.3 Sense of place and sustainability

'Sense of place' refers to the relationship a person has with a place: the symbolic, tangible, instrumental and emotional meanings that people develop through this relationship (Davenport and Anderson, 2005; Manzo, 2003; Relph, 1976; Steele, 1981). Survey analysis revealed that beef producers have a strong place attachment to the family property that is associated with a long, ancestral and lived connection with the property. Analysis of the interviews found that there were four main meanings that the family property and occupation held for interviewees: belonging (emotional ties to the family, property and land), lifestyle (attraction to the lifestyle of being a grazier and rural living), occupation (attached to the occupation of cattle grazing) and business (attraction to the business innovation aspects of the operation). Survey items representing these four place meanings were created from interview data and correlated with the same (above-mentioned) set of beliefs aligned with sustainability. These survey items were correlated with a set of beliefs aligned with sustainability and analysis revealed that participants who feel a strong sense of belonging to the property and who are attracted to the business side of the operation are more likely to have an interest in learning and adapting to change than producers attached to the lifestyle and occupation of cattle grazing. Interview data further revealed that producers with a strong sense of belonging were highly motivated to improve the long term viability of their property.

4 Conclusion

Pastoral landscapes in Australia are experiencing rapid shifts in climate and policy. Adapting to these changes sustainably will increasingly require beef producers to critically reflect on the way they learn, see themselves and the world around them. This research focused on a case study in the north-eastern rangelands of Australia and aimed to improve understanding of beef producers' learning and their self-identity, as it relates to their roles in life and relationship to place, and how these factors influence their sustainability.

4.1 Meeting project objectives

Objective 1: Develop a framework that characterises learning that fosters sustainability and identify important criteria involved in the learning process

The learning for sustainability framework I developed contributes an integrated conceptualisation of learning that fosters change towards sustainability. The framework provides for multiple and integrated insights into the motivations, processes and outcomes of individual learning within social learning in the context of sustainability. The framework provides insights into not just cognitive and relational learning outcomes, but also practical learning processes and outcomes from group or participatory activities. The framework also recognises the influence of social and cultural norms and values on an individual's learning, and may be useful for extension and management practitioners to evaluate learning processes and outcomes.

Objective 2: Describe the process and outcomes of beef producers' learning in relation to changing practices to improve land condition

Results show that beef producers' intentional learning to change practices to improve land condition tends to be motivated by a combination of needing to survive changes in the industry, experiencing financial and personal hardship (usually in association with drought) and participating in organised learning programs. Producers' primarily appear to be learning new skills and techniques to improve cattle and pasture (i.e. instrumental learning) through informal sources. Social interaction and dialogue that enhances understanding of self and others (i.e. communicative learning) appears less common among producers and seems to be mainly happening through group learning processes. Organised collective learning processes, experiencing adversity and active experimentation with natural resource management skills and techniques seem to be key aspects that foster sustainability. Evidence of transformative learning for sustainability includes critical reflections of practices, questioning of self and cultural norms, and an enhanced sense of responsibility.

Objective 3: Describe the range and depth of beef producers self-identity, as it relates to their roles in life and relationship to place and occupation

Beef producers' self-identity shows evidence of more and less 'traditional' cultural influences. More traditional aspects include the gender division of labour, salience of family and labouring roles and attachment to the lifestyle and occupation of cattle grazing. Less traditional aspects include the development of a more entrepreneurial identity, attraction to business innovation, participation in alternative discourses and relabelling the self to less production-oriented titles. Most producers have a strong emotional connection to the family property. Remote living and needing to remain competitive to maintain a livelihood means that participation by producers in less conventional discourses and activities that may generate 'less traditional' ideas of the self is likely to be the exception rather than the norm.

Objective 4: Identify how producers' self-perceived roles in life and relationship to place and occupation may influence their sustainability

This research identified that the beef producers who identify with 'less traditional' ideas of the self and aspects of the operation are more likely to have the capacity to adopt 'more sustainable' practices. Producers who identify with 'less traditional' roles (i.e. 'workshop participant' and 'resource condition monitor'); who feel a sense of belonging to the family property; and who are attracted to the business innovation and solitude aspects of the operation are more likely to have an interest in learning, nature conservation adapting to change than producers attracted to the lifestyle, occupation and labouring aspects of the operation. These results support the conclusion by Burton et al. (2008) that shifts in

conventional producers' understanding and management of natural resources that induces sustainable cultural change is likely to be achieved through promoting entrepreneurialism and innovation (Burton et al., 2008).

Objective 5: Deliver recommendations for accelerating the rate of adoption of more sustainable management practices by beef producers

Implications from this research for policy to accelerate the adoption rates of a 'more sustainable' approach to natural resource management include:

1. That there is likely to be a diversity of responses to planned interventions to foster sustainability: new interventions may be appealing to some producers more than others depending on their sense of self and place. For example, a change to an alternative viable land-use may not be received well by producers who are attached to the occupation of cattle grazing, but may be more appealing for producers for whom maintaining their connection to the family property is the main priority.
2. A learning-based approach to problem solving is likely to be effective; in particular, learning that is participatory, collaborative (with all stakeholders), practical, experiential and involves critical reflection
3. An assessment of how planned interventions may impact on aspects of producers' relationship to place and self-identity is likely to provide insights into producers' attitude and motivations towards, and responses to, interventions
4. Due to women's association with an interest in nature conservation and natural resource management forums, consideration could be given to promoting, and addressing barriers to, women's participation in learning processes and organisations that aim to enhance sustainability
5. Future research and extension programs could focus on further identifying what constitutes the 'change' to 'more sustainable' natural resource management, including developing a greater understanding the role of emotions and experiencing adversity in fostering sustainability.

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