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Farmers' intrinsic motivations, barriers to the adoption of conservation practices and effectiveness of policy instruments: Empirical evidence from northern Australia

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ABSTRACT

The rate and extent of adoption of conservation practices by farmers is influenced, in principle, by characteristics of the practices and those of the farmers. Governments use policy instruments to increase the rate of adoption of practices which generate public benefits if it is deemed that privately optimal adoption rates will not lead to publicly optimal conservation outcomes. Recent nation-wide conservation programs in Australia have attracted criticism for low levels of effectiveness and efficiency. Could it be that program design has ignored key adoption factors, in particular characteristics of the target audience? If adoption is subject to personal factors, such as the motivations for farming, then it is likely that so are farmers' responses to policy approaches and instruments. In this case study, surveys were conducted of farmers in three regions within the tropical savannas of northern Australia, where land-use systems are characterized by large-scale broad-acre beef grazing enterprises. *Inter alia*, these surveys collected data on graziers' motivations, impediments to adoption of conservation practices, and perceived effectiveness of policy instruments in overcoming impediments. The research found that graziers had a very high level of conservation and lifestyle motivation and were motivated to lesser extents by financial/economic and social considerations, pointing to a strong stewardship ethic of graziers, or altruistic motif. Motivational profiles were significantly correlated with farmers' perceptions about what constrained them from implementing conservation based management systems. Motivational profiles also explained differences in farmers' perceptions of and stated propensity to interact with policy instruments, particularly at a regional scale and in the context of historical government interventions. On the basis of the empirical evidence presented, governments would be well advised to harness the diverse set of aspirations and motivations of farmers when designing conservation programs rather than. In particular, conservation programs need to take advantage of farmers' stewardship ethic for maximum effectiveness and efficiency, and minimize the risk of crowding out intrinsic motivation and altruistic behaviours.

Introduction

The past two decades in Australia saw substantial government policy and program design to enhance the adoption of soil, water and biodiversity conservation action on farms. The 1990s were the 'Decade of Landcare' (Australian Soil Conservation Council, 1991). The National Landcare Program pursued agricultural extension and localised, grassroots-based approaches as the key methods to promote land conservation. The philosophy of intervention was principally based on awareness raising and education, but was never sufficient to ensure socially desirable levels of conservation (Pannell, 1999). The 2000s saw the implementation of a regional (catchment-scale) delivery model for natural resource management, supported by well-endowed programs at the national level, namely the National Heritage Trust I and II (~AU$ 2.5 billion, combined) and the National Action Plan for Salinity and Water Quality (~AU$ 1.4 billion), as well as a myriad of state-level programs. Increasingly, agricultural extension services were replaced by grant-based financial incentives to promote adoption of conservation practices, and some programs which emphasised the role of market-based instruments. This latest suite of programs was also generally unable to demonstrate significant results with respect to their intended regional-scale environmental objectives (Hajkowicz, 2009). It would appear that neither policy approach systematically considered the factors which influence adoption

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of conservation practices by farmers, therefore failing to comprehensively engage the policy audience and achieve intended conservation targets.

On-farm conservation action plays a particularly critical role in the achievement of conservation actions across Australia's tropical savannas, which represent some of the most pristine remaining savanna landscapes in the world (Woinarski et al., 2007). The tropical savannas cover one quarter of Australia's landmass (approximately 1.9 million km^2). Soils across the tropical savannas are generally old, weathered and characterized by infertility, which means that the area generally has low potential productivity, even where rainfall is high (Northern Australia Land and Water Taskforce, 2009). Yet, at the same time, these landscapes support an abundance of both plants and animals, many of which are endemic and adapted to the harsh climatic conditions (Woinarski et al., 2007). The tropical savannas are remote from Australia's population centres and are sparsely populated (population <500 000; Garnett et al., 2008). The primary land use is extensive beef production with an approximate market value of AU$ 2 billion in 2005–06 (Martin et al., 2007). Individual beef grazing enterprises are up to 24 000 km^2 in size and carry up to 65 000 head of cattle (Bortolussi et al., 2005). While savanna landscapes appear relatively intact and grazing systems have generally low stocking rates, their ecological condition has widely declined since European settlement (Lewis, 2002), caused in particular by overgrazing and the spread of exotic plant and animal species (Woinarski et al., 2007). Tropical savanna ecosystems are poorly represented in Australia's conservation estate and consequently "the contributions of all property holders and managers are needed to maintain the North's natural values" (Woinarski et al., 2007: p. 88). The question is, how, in such vast landscapes and on such large properties, can the required on-farm conservation efforts can be achieved and best facilitated by policy instruments?

Conceptual model of conservation adoption by farmers

Farmers' investments in the environment provide public as well as private benefits (Hajkowicz, 2009; Reeson, 2008). Economic theory suggests that private investments in a public good will generally occur below the socially optimal level as rational actors will invest in public goods only to the point where their marginal private benefits are equal to their marginal private costs. This model of private conservation investments is seemingly challenged by the observation that many people provide more conservation than would be deemed economically rational from a self-interest point of view (Reeson, 2008). If, however, the notion of utility maximization is taken to be more broadly about the achievement of a person's aspirations rather than a narrow financial goal such as profit maximization (Cox, 1997), then additional conservation action, though altruistic, can be entirely rational and consistent with the economic model (Manner and Gowdy, 2010).

There is, therefore, an important distinction to be made between goals, as short term tangible objectives and means to an ends, and motivations, which are ends in themselves. Goals and motivations play a significant role in explaining adoption decisions (Ahnström et al., 2009; Kancans et al., 2008; De Graaff et al., 2008; Pannell et al., 2006; Kessler, 2006; Maybery et al., 2005; Torkamani, 2005). However, goals, such as making money, are usually only tools for achieving higher order aspirations such as securing family lifestyle (Pannell et al., 2006). Ultimately, these higher order aspirations provide the motivation that driver farmers' decision making. "Motivations represent the material aspirations or feelings that family decision-makers are trying to attain, or want to have on an ongoing basis during their lives" (Farmar-Bowers and Lane, 2009: p. 1137). These same motivations are likely driving many farmers to be farmers in the first place, as motivational factors strongly influence peoples' career choices (Watt and Richardson, 2007). The motivation profile of farmers significantly influences investment decisions. Policy design that considers 'soft values', takes advantage of farmers' intrinsic motivation for conservation and facilitates altruistic behaviour may therefore be more effective than policy that ignores these factors (Manner and Gowdy, 2010; Ahnström et al., 2009; Ryan et al., 2003).

The extent to which farmers succeed in realizing their aspirations and living according to their motivations tends to be moderated by constraints,[1] which can come from a variety of sources including limits in available resources, low returns on investment, risk and uncertainty, and the regulatory framework (Pannell et al., 2006; Marra et al., 2003; Guerin, 1999). In the Australian context, high levels of environmental variability and market uncertainty mean that risk and uncertainty are of particular relevance (Greiner et al., 2009; Pannell, 2003). However, the same level of measurable risk is perceived differently by different farmers. Perceptions about risk and uncertainty regarding future market conditions, regulations, climatic conditions and other factors are entirely personal (Anderson et al., 1988). The effects of personal motivation and risk perceptions on adoption of water conservation practices has been empirically confirmed for farmers, in particular graziers, in the Burdekin Dry Tropics region, which represents the most easterly part of Australia's tropical savannas (Greiner et al., 2009). Graziers with strong conservation and lifestyle motivation reported significantly higher levels of adoption of on-farm land and water conservation practices than graziers with strong financial/economic or social motivation. Similarly, those farmers who reported taking comparatively more risks than other farmers, particularly market and production risks, reported higher levels of adoption.

While much of the adoption literature has focused on socio-economic and demographic factors associated with farms and farmers, such as farm size and age of operator, little attention has been paid to psychological factors and the structural and environmental constraints faced by farmers (Brodt et al., 2006). The research presented here seeks to address this deficiency by providing an integrated view of the adoption sphere—motivation and constraints, as perceived by farmers. It takes a further step and explores whether and how motivation and constraints relate to how farmers view a portfolio of policy instruments that are commonly applied by government to support adoption. If such relationships exist, as we hypothesise, then policy makers are well advised to take them into consideration when designing programs so as to ensure improved effectiveness and efficiency of future government interventions. This paper seeks to provide empirical evidence to demonstrate that many farmers, in this case cattle graziers in northern Australia, are profoundly driven by non-financial motivations. According to the hypothesis, a farmer's type of motivation is associated with her perceptions of what constrains the adoption of conservation measures on her farm. Types of motivation is also hypothesized to be associated with the perceived efficacy of incentives in alleviating these constraints. These relationships are captured in the conceptual framework shown in Fig. 1. The hypothesis is examined by testing for significant relationships between variables measured through social surveys of farmers. These variables are motivational orientation, perceived importance of impediments to the adoption of conservation practices and perceived effectiveness of incentives in alleviating constraints that these impediments impose.

[1] The term 'constraint' is used synonymously with 'impediment'.