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Sustainability in the New Zealand horticulture industry

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ABSTRACT

This paper reports on a study examining sustainability in the New Zealand horticulture industry. Despite the growing body of sustainability literature, there remains a lack of prior research focussed on sustainability views, practices, benefits and barriers. The study contributes to the sustainability literature by providing useful insights into views, practices, benefits and barriers in a specific setting – the New Zealand horticulture industry. In particular this paper focuses on grower views of sustainability, the types of sustainability practices adopted, the achievement of benefits from implementing these practices, and the barriers to implementation of additional practices. A mixed methods approach was taken for this study. First an online survey was conducted and then several follow-up interviews were held with survey respondents. The study finds that a number of common views about the term *sustainability* exist; a broad range of sustainability practices have been implemented by a number of growers; few benefits are expected from growers and even fewer have been achieved; and costs and time are the main barriers to additional implementation. The low survey response rate and resulting small sample means the results may not be generalisable to the entire horticulture industry. This study highlights the need for growers in the New Zealand horticulture industry to be better informed about the adoption process of sustainability practices and the benefits that can be achieved. A number of approaches are possible including the use of education through industry networks and the sharing of best practices.

1. Introduction

Sustainability was defined in the Brundtland report (1987) from the World Commission for the Environment and Development of the United Nations as "meeting the needs of today without compromising the ability of future generations to meet their needs". Since the Brundtland report (1987) numerous other definitions of sustainability have developed (see Glavič and Lukman, 2007; Sumner, 2009). Researchers have begun to acknowledge the need to expand the concept of sustainability (Doxon, 1991; Legg and Viatte, 2001; Pullman et al., 2009) so that economic, environmental and social sustainability dimensions are all considered. These three pillars of sustainability are sometimes referred to as a three-legged stool consisting of economic viability, environmental soundness, and social acceptability (Granatstein and Kupferman, 2006).

Throughout the sustainability literature, what is clear is that "sustainability means different things to different people" (Rigby et al., 2001, p. 464). There is no agreement on a precise meaning or the best way to operationalise sustainability. The vagueness of the concept suggests it could be meaningless, however, this is not the case. The different interpretations of the concept of sustainability provide valuable insights (Rigby et al., 2001). A comparison of "producer and consumer attitudes toward environmental sustainability with their actual practices" was undertaken by Selfa et al. (2008, p. 262) and they found that practices are not always consistent with attitudes. Bhaskaran et al. (2006) found that customers found the use of different terminologies in promoting food products, such as *organic*, *green* and *environmentally friendly* confusing.

Incentives for organisations, particularly small and medium-sized enterprises (SMEs), to adopt sustainability practices exist (Klewitz and Hansen, 2014; Moore and Manring, 2009). Adopting a resource-based view of the firm, sustainability practices can be thought of as part of a business' capabilities, and subsequently sustainability performance has been found to be a dimension of competitive advantage (Galdeano-Gómez, 2008; López-Gamero et al., 2009; Pullman et al., 2009). A number of prior studies have

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examined the sustainability practices adopted by New Zealand businesses (see Collins et al., 2010; Lawrence et al., 2006).

Pullman et al. (2009) acknowledge that, when examining sustainability, particularly environmental sustainability practices, there are potential significant complexities across different industries. Thus, it is important to examine sustainability in industry-specific contexts. The agriculture, horticulture and food sectors, like many others, are affected by growing environmental, social and economic sustainability concerns (Pullman et al., 2009), and are responsible for major environmental impacts (Ingrao et al., 2015). The horticulture industry is of particular interest as growers are intense users of resources across relatively small land areas (Lea-Cox et al., 2010).

Early research identified frameworks for assessing the sustainability of agricultural systems (Yunlong and Smit, 1994), a farmer sustainability index which scores practices according to their inherent sustainability (Taylor et al., 1993), and a farm-level indicator of agricultural sustainability was constructed by Rigby et al. (2001). Fairweather et al. (2009) stated that there are numerous complex pathways toward the greening of agrofood systems. More recently there has been a call for "fuller accounting of both the costs and the benefits of alternative agricultural practices" (Tilman et al., 2002, p. 671). Other researchers have also noted the need to assess the environmental impacts, and to internalise the negative impacts of food production while also making improvements in management practices (Ingrao et al., 2015; Stachetti Rodrigues et al., 2010). Research assessing the environmental impacts of production in the horticulture industry has also been undertaken. Specifically, prior research examines ecological footprint analysis (Cerutti et al., 2010, 2011a); environmental impact analysis (Beccaro et al., 2014; Pluimers et al., 2000); farm performance using agri-environmental indicators (Langeveld et al., 2007); integrated farm sustainability assessment (Stachetti Rodrigues et al., 2010); life cycle assessment, analysis and management (Ingrao et al., 2015; Krozer and Vis, 1998; Mouron et al., 2006; Romero-Gámez et al., 2012, 2014).

Other prior research, focused on the food industry, has examined the factors affecting the adoption of sustainability practices. In particular, prior research has examined the factors influencing the adoption of clean production strategies and environmental technology adoption (Abidin et al., 2010), and the adoption of ISO 14001 (Massoud et al., 2010). The use of social and environmental reporting has also been examined (Guthrie et al., 2008, 2010), environmental performance has been evaluated (Midzic-Kurtagic et al., 2010), environmental impact assessments have been reviewed (Cerutti et al., 2011b; Schmidt Rivera et al., 2014), and eco-efficiency indicators have been developed (Maxime et al., 2006). A review of the food sustainability challenges faced by the European Union also provides useful insights (Rayner et al., 2008).

Numerous studies have also examined various approaches to sustainable agriculture (e.g. Röös et al., 2014) and sustainable horticulture (see Hansen, 1996; Lal, 2006 for an overview), including the use of sustainable horticultural management practices relating to soil and water (e.g. Lal, 2006), and the factors influencing the adoption of improved natural resource management practices on agricultural land (Barr and Cary, 2000). The evolution of the principles driving the changes in environmental management amongst land owners and producers in New Zealand was explored by Valentine et al. (2007) and Manderson et al. (2007) report on a New Zealand survey of environmental farm plan programmes.

Yet despite this prior research in the food and horticulture industries, there is still a lack of research examining: (1) how growers in the New Zealand horticulture industry view sustainability; (2) the sustainability practices they choose to adopt; and (3) the benefits from, and barriers to, operating more sustainably.

The remainder of this paper is structured as follows. Next, an overview of the New Zealand horticulture industry and sustainable horticulture is presented. This is followed by a discussion of the research method used. The results of the survey and interviews are presented and discussed. Conclusions are then drawn, limitations acknowledged, and implications and future research identified.

2. New Zealand horticulture industry

New Zealand's horticulture industry is a $4 billion industry using more than 100,000 ha to produce a wide variety of products. Like a number of other industries in the New Zealand food and beverage sector, the horticulture industry is characterised by a small number of growers (approximately 10 percent) producing a large proportion of the industry output (approximately 90 percent). A lot of the remaining growers have annual sales turnover of less than $100,000 and a number of growers earn revenue from other sources (Personal communication with CEO and Communications Manager, March 22, 2013).

Growers in the New Zealand horticulture industry are represented by the industry association, Horticulture NZ, whose role includes facilitating and raising issues. Horticulture NZ also acts as an 'umbrella' organisation for the 22 affiliated Product Groups: pipfruit, kiwifruit, summerfruit, nashi, citrus, tamarillos, feijoas, avocados, boysenberries, strawberries, blackcurrants, blueberries, kiwiberries, olives, passionfruit, persimmons, tomatoes, vegetables, potatoes (including seed potatoes), kabocha (pumpkin squash), processed vegetables and asparagus. Horticulture NZ is funded by growers via a levy on sales which is collected at point of first sale by wholesalers, exporters, processors and supermarkets. Growers also pay a levy to their respective Product Group which among other things funds research on product specific issues and sustainability initiatives (see www.hortnz.co.nz).

3. Sustainable horticulture

Horticulture is a branch of agriculture and thus, the basic concepts of sustainable agriculture can also apply to sustainable horticulture (Lal, 2006). Prior research has reviewed definitions of both *sustainable agriculture* and *sustainable horticulture* (see Allen et al., 1991; Fretz et al., 1993; Lockeretz, 1988; Webster, 1999). Sustainability, in a farming context, refers to a farm being able to "produce adequate yields of high quality, be profitable, protect the environment, conserve resources and be socially responsible in the long term" (Reganold et al., 2001, as cited in Cerutti et al., 2011b, p. 2277). Despite the latter being widely accepted (Cerutti et al., 2011b), the view is vague with respect to the practical ways of achieving sustainability.

Furthermore, sustainable horticulture, in contrast to organic or integrated farming, does not have a widely accepted set of standards and there are contested viewpoints about the pathways to sustainability (Fairweather and Campbell, 2003). The objective of sustainable horticulture is "to support and enhance biological interactions, the extent to which this can be achieved being influenced by economic and social factors" (Granatstein and Kupferman, 2006, p. 296). It is thought that sustainable horticulture occurs when "production takes advantage of biological relationships that occur naturally on the farm" (Granatstein and Kupferman, 2006, p. 296).

However, what sustainability means in terms of on-farm practice is not always self-evident (Fairweather and Campbell, 2003), and there is a notion that agricultural sustainability should not be

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