

# 1 Introduction

Ethical motivations for economic behaviour have been observed in the marketplace, including food supply chains. Economists and psychologists have reported that this behaviour extends beyond “pure self-interest or egoism” (Colman 1994: 309). In the marketplace, consumers may choose to support ethical production methods through their purchasing choices (Manning *et al.* 2006; Veissier *et al.* 2008) and, through this demand for ethical products, consumers can transmit their values to producers (McEachern & Schroder 2004). This thesis seeks to connect ethical and economic behaviour with regard to the production and consumption of Australian lamb. Ethical behaviour balances the welfare of all stakeholders, represented or not in the market; extending to future generations and sentient animals, and recognising the intrinsic value of biodiversity (Jensen 1999; Mann 2005; Grolleau & Caswell 2006).

## 1.1 Consumer motivations and concerns

Consumers may be motivated to exercise their choices in the market by concerns or fears about the impact of food production on human health, about production methods that are inconsistent with their values and that impact negatively on the environment and animal welfare (Veissier *et al.* 2008). Surveys indicate that significant proportions of Australian consumers have specific concerns about chemical use, environmental impacts and lamb production methods (Smith & Riethmuller 2000; Cox *et al.* 2002; McNamara & Pahl 2004).

## 1.2 Producer motivations and strategies

Producers may be motivated to investigate ethical markets not only to improve profitability but to also satisfy personal values (Allen *et al.* 2003; Renting *et al.* 2003). Colman (1994) suggests that utility maximisation may be too narrow an analytical model for behaviour such as agricultural stewardship which aims to limit negative externalities (public costs) and facilitate positive externalities (public benefits). However, most Australian farmers strongly believe that there should be financial recompense for the opportunity cost of taking land out of production for a public benefit such as conservation of habitat (Reeve 2001).

Randall (2008) argues for market based approaches through pricing that supports conventional agriculture in preventing the depletion of the natural resource base. Colman (1994) posits that a market which internalises the negative externalities of conventional agriculture has faltered because the costs take too long to recover through pricing. However,

this presupposes that a product with ethical credentials could gain access to conventional marketing channels and negotiate a premium in those channels. Whilst marketing costs in the mainstream are relatively low, so too is the possibility of maximising the price received by producers, therefore limiting farm profit margins (Marsh & Brester 2004; Cotterill 2006; Sexton *et al.* 2006; MLA 2008c). Also, the mainstream requires large supply volumes which is commonly not achievable for a new brand (Bhaskaran *et al.* 2006). Most Australian producers are “not very optimistic” about improving their enterprise profitability in the mainstream marketing systems (Connell *et al.* 2000). Farm profitability is adversely affected by declining terms of trade, that is, increasing input costs versus downward pressure on prices received (Williams 1990; Renting *et al.* 2003).

Strategies to improve farm revenues and recoup investment in ethical production practices include value adding and producer-driven marketing. Producer-driven marketing is used here to refer to cases where producers market their own produce and encompasses all supply chains that are developed and managed by producers. The trend towards the emergence of alternative production and supply channels is evident in Europe, the US and Australia. For instance, Lyson (2004: 383) found diverging trends in US agriculture, associating “commodity” agriculture with the primary objectives of increasing productivity and efficiency for supplying a globalised food market, and “civic” agriculture as supplying locally-grown, “high-value” products, with more producer responsiveness to the needs of consumers. The growth of farmers’ markets may indicate a similar trend in Australia (Francis 2002; Coster & Kennon 2005).

Gilg & Battershill (1998) and more recently Venn *et al.* (2006) found that farmers who sold direct sought to retain the marketing margin by differentiating on the basis of product quality. Value adding by meeting emerging market specifications for ethical products can gain a premium (Lusk & Hudson 2004; Veissier *et al.* 2008). However, profitability enhancement also requires that the costs of producing and marketing a differentiated product can be controlled (Verhaegen & van Huylenbroeck 2001). The profitability and feasibility of making significant technical changes to meet consumer expectations is an area that has, to date, had limited investigation (Verbeke 2000b: 536).

### **1.3 Research aims and questions**

The central research interest in this study was the viability of the production and marketing of ethical attributes for lamb in the domestic market. To explore this interest, three research

questions are pertinent given the conventions in for lamb production in Australia and limitations of the distribution system, and are not sufficiently resolved in the extant literature. There are no studies assessing the feasibility of producing and marketing a lamb product that meets consumers' ethical concerns in Australia within the same temporal and geographical context. Market and biophysical conditions can change the feasibility of making a strategic change to a farming enterprise.

Cary *et al.* (2004) suggests further investigation of consumer interest in ethical markets by processors and producers, who at present rely upon the flow of market intelligence from supermarkets. Past consumer surveys have used broad descriptors such as 'environmentally friendly' or 'animal welfare' that do not have commonly understood definitions. To elicit consumer interest in ethical issues Cox *et al.* (2002) recommend using specific criteria to prompt consumers whose knowledge of lamb production is generally low. Despite growing public interest in CGH issues, the majority (63%) of Australian consumers in the city have little or no understanding of farming practices or food safety (McNamara & Pahl 2004; LAL 2006; Coveney 2007).

Any attempt to market a CGH differentiated product needs to clearly communicate the points of difference from the generic product (Peattie & Crane 2005). The points of difference that are important to consumers are currently vague. Toyne (2004) and Peattie & Crane (2005) suggest further research to identify specific product criteria to satisfy market preferences and to establish the feasibility of producers differentiating a brand. Hence, the study aims to establish consumer preferences by raising the following questions.

1. Which ethical attributes are relevant to consumers and what criteria would consumers expect to define the production of CGH attributes?

Carlsson *et al.* (2005) concluded that consumer preferences for ethical product attributes would not drive the development of a new product and marketing channel alone, calling for research that encompassed suppliers and distributors. Given the limitations of gaining a premium for differentiated lamb in the mainstream distribution system (Cotterill 2006), alternative marketing systems are investigated. Recent research into alternative marketing channels suggests that further research is needed to assess the impact of alternative marketing systems on the farm enterprise (Cadilhon 2007) and to learn from past promotional and distribution efforts by farmers for differentiated product (Conner *et al.* 2007). Recognising

that lamb producers need financial return for investment in the production of CGH attributes, this study asks the following questions.

2. To what extent can conventional producers in this study meet consumer expectations and substantiate the ethical claims of branded lamb?
3. Given the constraints for new product entry in the mainstream, is producer-driven marketing a feasible alternative for Australian family-operated farms to market a CGH branded lamb product?

### **1.4 Scope of the project**

Assessing the feasibility of producing and marketing lamb needs to be done within a local context to account for variations within biophysical conditions, production systems such as extensive grazing, enterprise characteristics and market structures (Malcolm *et al.* 2005; Knowler & Bradshaw 2007). The context for this study was small-to-medium family-operated farms in the south-east of Australia using predominantly extensive conventional grazing. Over 90% of farms in Australia are family operated farms (Halpin & Guilfoyle 2005). Family operated farms are distinguished as a means of security for a family (Pannell *et al.* 2006) and as a lifestyle, that is “a way of life considered competitive in respect of other ways of living and working” (Hildenbrand & Hennon 2005: 362). Lifestyle “can be defined as patterns in which people live and spend their time and money” (Steenkamp 1997). ‘Conventional grazing’ refers to mainstream practices with high to low levels of manufactured inputs such as fertiliser and chemicals (McCoy & Parleviliet 1998). The term distinguishes conventional farming and grazing from alternative systems.

Lamb production and consumption is significant in Australia. The total number of lambs slaughtered in 2007-08 was 20,899,000 with a value of \$1.246 billion (ABARE 2008). Victoria produced 44% of lambs in 2008 with the remainder in New South Wales and Western Australia, with most live sheep exported from the latter (ABARE 2008).

Lamb and chicken both represent 12% of total livestock slaughtered in Australia in 2007-08; cattle was 59% of slaughters (ABARE 2008). To compete more strongly against the healthier image of white meats, a series of lamb industry development initiatives emerged between 1988 and 1992 (Pethick *et al.* 2003). For instance, the Trim Lamb Campaign sought to change consumer perceptions about the fattiness of lamb by producing a healthier, leaner carcass

(Pethick *et al.* 2003). Prime lamb marketing groups were established during the early 1990s primarily to introduce producers to the assessment of live animal fat scores, but have continued with broader interests in marketing and meeting emerging market specifications (Farrell & Tozer 1996).

This study focussed on the concerns of domestic consumers, although consumer concerns in export markets are raised as a comparison and indication of market trends. Approximately 60% of the lamb raised in Australia in 2007-08 was consumed domestically (398,000 tonnes), representing a greater proportion of total production than the recent trend as sheep numbers have dropped in recent years due to widespread and severe drought conditions (ABARE 2008). About 152, 000 tonnes of lamb was exported, with the United States being the major destination market and significant amounts shipped to China, Saudi Arabia, Europe, Japan and South Africa (ABARE 2008). Higher prices attained in European and Japanese markets increase the significance of these markets (ABARE 2004). The United Kingdom has consistently been a significant market, consuming approximately 70 per cent of lamb exported to Europe in 2000 (Gleeson & Brittle 2001).

## **1.5 Chapter outline**

Chapter two begins by reviewing the literature to identify consumer concerns, discusses the potential for differentiation, and establishes criteria for producing ethical attributes in the case of lamb. Then, the literature is reviewed relevant to ethical consumption, the mainstream market structure and distribution options. The Chapter finishes with a framework to assess the feasibility of producing and marketing differentiated lamb.

The next three Chapters present the results and conclusions from three pieces of empirical research. Chapter three details the findings of a consumer survey and discusses the findings with reference to the literature. Chapter four presents the outcomes of lamb marketing group interviews, then compares differences and recurring themes across the cases studied. Comparison to the literature was used to indicate whether the identified production constraints confirm or differ from constraints to practices reported elsewhere. Chapter five uses case studies to explore the benefits and risks of enterprises where producers are marketing their own meat products using alternative distribution channels. Chapter six brings the three components of the empirical work together to answer research questions two and three stated above. Finally, Chapter seven summarises the main findings, raises implications for producers and suggests further research.



## 2 Literature Review

### 2.1 Introduction

The conceptual framework for the literature review considers elements that are critical to the supply chain for a product claiming to have ethical attributes (Figure 1). Consumer values and their level of concern about ethical issues may motivate the purchase of ethical product attributes (Schlegelmilch *et al.* 1996; Straughan 1999; Paladino 2005). A review of the literature reveals that the main credence attributes of concern to meat consumers include food safety, environmental management and animal welfare. However, the factors influencing consumption of ethical attributes are more complex than only values and concerns. The purchasing decision becomes more complex where the product attributes are credence attributes, that is, they cannot be experienced and evaluated personally by the consumer (Vermeir & Verbeke 2006). In this instance, consumers assess the credibility of ethical claims using extrinsic information cues such as labels and branding (Northern 2000; Grolleau & Caswell 2006; Vermeir & Verbeke 2006). Aspects of the marketing channel such as limited consumer access to the product, pricing and consumer trust in the label claims also increase the complexity of the purchasing decision (Peattie 2001).

Mainstream marketing channels may constrain production of a new brand such as lamb with CGH attributes as they require large demand and supply volumes at lower prices (Round 2006; Smith 2006b), which may be a barrier in the context of the volume that can be supplied from a single farm or where a premium is sought to cover the cost of production. Barriers in various channels impact on the financial feasibility of producing lamb with ethical attributes and, in turn, may constrain production and determine the products' availability to the consumer (Malcolm *et al.* 2005). The literature indicates there may be alternative means for producers to market their own product. Consumers of ethical credence attributes tend to be highly motivated and may search beyond the mainstream to purchase branded lamb through alternative marketing channels (Steenkamp 1997).

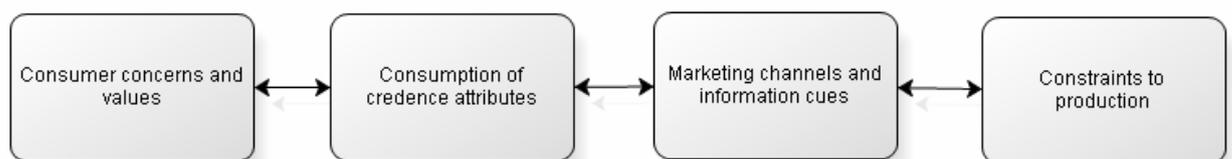


Figure 1: Conceptual framework for the supply of branded lamb

This Chapter aims to review the literature relevant to the conceptual framework (Figure 1) and specifically relating to:

- public concerns regarding the impacts of conventional agriculture (2.2);
- market interest in CGH attributes (2.3);
- the points of differentiation to discern branded lamb from generic lamb (2.4);
- consumer behaviour in relation to consumption of ethical credence attributes (2.5);
- appropriate assurances for lamb with ethical credence attributes (2.6);
- mainstream and alternative distribution options for branded lamb (2.7 , 2.8, 2.9 & 2.10); and
- a theoretical framework for assessing the profitability of producing and marketing branded lamb in the context of the resources of family-operated farms (2.11).

## **2.2 Public concerns regarding the impact of agriculture**

Issues of public concern in relation to Australian agriculture that have been identified as a problem are discussed in this section as potential points of differentiation of ethically produced lamb. International studies are cited for comparison of trends in Australia and where findings are generalisable and applicable to the Australian context. Ethical aspects of the food supply chain described by Manning *et al.* (2006) include food safety, animal welfare and behavioural freedom, and impact on the environment, along with labour and human rights issues. Brouwer and Ervins (2002) compared issues of concern about the impact of agriculture in five competing countries and unions: the European Union (EU), United States (US), Canada, Australia and New Zealand (Table 1).

The EU, US and Australia have similar rules for chemical use which include mandatory training for the safe use, storage and disposal of pesticides, waste and empty containers (Brouwer & Ervins 2002). Chemical use in Australia is low compared to Organisation for Economic Co-operation and Development (OECD) country standards, yet the variety and volume of agricultural chemicals used in Australia per year trebled between 1950 and 2000 (Stringer 2002). The chemical registration authority in Australia reviews compounds as new evidence of the chemicals impact on the environment or human health becomes available and can deregister or restrict the use of pesticides (Brouwer & Ervins 2002). Pesticide residues in food were identified as a problem in Australia, although not a significant concern (Brouwer & Ervins 2002). Dietary testing reports a very low risk of residues in Australian food compared to other industrialised countries (FSANZ 2004).

Table 1: Issues of concern in five countries

Specific Issue	EU	US	Canada	Australia	New Zealand
Eutrophication	***	***	*	*	*
Turbidity	*	***	*	*	**
Pesticide contamination	***	***	*	**	*
Irrigation	**	**	*	***	**
Salinisation	*	*	*	***	-
Soil contamination with heavy metals (e.g. cadmium) & soil acidification	*	*	*	*	*
Soil erosion	**	***	*	***	***
Ammonia	**	-	*	-	-
Odour and nuisance	***	**	***	-	-
Crop burning	*	*	-	-	-
Biodiversity, landscape	***	**	*	***	***
Genetically modified organisms	***	*	*	**	***
Animal welfare	***	*	*	*	*
Hormones (and feed ingredients)	**	-	*	*	*
Pesticide residues in food	**	***	**	**	**
Animal diseases	**	*	*	*	*

Source: Brouwer and Ervin, 2002 KEY: - no issue of public concern \*issue identified as a problem, but not of major concern \*\* issue identified as a problem, and of no significant concern \*\*\* major issue with high priority in policy.

Largely in response to valuable export market concerns, the Australian red-meat industry and government monitor meat residues and randomly audit on-farm practices to be able to substantiate the claim that Australian agricultural produce is ‘clean’ (FSANZ 2003). Australia’s residue monitoring systems comply with the criteria suggested by Benbrook (2003) for making a credible claim. Results of residue monitoring indicate “a very high compliance with good practice in the use of veterinary drugs and pesticides on animals” (Reeves 2005: 151). Most food producers understand their responsibility for meeting consumer expectations of ‘safe’ chemical use and the risk to market access if maximum residue limits (MRL) are breached (Stringer 2002). Meat producers voluntarily make a declaration, the National Vendors’ Declaration, stating that livestock consignments comply with the Livestock Production Assurance (LPA) Level 1. The LPA is a checklist of on-farm actions to minimise the risk of chemical residues. The integrity of the program relies on abattoirs’ preference for

buying assured product, through random on-farm audits, and traced origins of animals randomly sampled at abattoirs (MLA 2004).

Major impacts of high priority in Australian agriculture were found to include soil, water and biodiversity conservation (Table 1) (Brouwer & Ervins 2002). Australian studies have identified soil health, water quality, efficient water use, biodiversity, pests and weeds control as indicators of 'sustainable' resource use (Dore 1997; King *et al.* 2000). Seventy-three per cent of farmers self-reported weed and pest control as a problem and 86% reported soil, water or native vegetation issues in 2004-05 (ABS 2006b).

Land clearing, introduced pasture and cropping are major threats to biodiversity (Stringer 2002). Biodiversity provides eco-system services essential to production such as pest control, nutrient cycling, soil creation and water infiltration of the soil (Magdoff 2007). Over half of the vegetation types in the temperate highlands across Australia are significantly disturbed over more than 75% of agricultural land (Hamblin 2001). Uncontrolled grazing of unfenced remnant vegetation suppresses the regeneration of under-storey and trees causing remnant patches to age and die (Hamblin 2001). Victoria is proportionally the most cleared state (60%), mainly for cropping and grazing (NLWRA 2001a). The Victorian Volcanic Plain is an example of the impact of clearing and grazing, on biodiversity condition where only 1% of the native grasslands remain compared to estimates prior to 1750 (SoE 2006).

Maintaining groundcover is fundamental to protecting soils from erosion, and in turn water courses from turbidity, sedimentation and eutrophication (Magdoff 2007). Over-grazing is the largest contributor to soil erosion (SoE 2006) and rates of soil loss far outweigh the rate of soil formation (up to 5 times on improved pastures) across most agricultural regions (Dore 1997; NLWRA 2001). This is exacerbated in drought, with the worst dust storms occurring since records started in the 1960's occurring recently (SoE 2006). Cultivated land still has high erosion rates despite innovations such as minimum tillage and direct seeding (SoE 2006).

Soil contamination with cadmium is a potential threat to Australia's food safety status which in part is obtained because of the naturally low ambient cadmium levels in Australian soils (Brouwer & Ervins 2002). Higher than acceptable concentrations of cadmium can occur in meat where phosphate fertiliser is sourced from guano rather than igneous rock, and particularly during drought when stock are grazing plant roots and bare soil (Hudson 1995; Rayment 1995; van Straaten 2002; Loganathan *et al.* 2003; Warne 2005). Cadmium is a

monitored residue because it accumulates in the liver and kidneys causing dysfunction and can cause osteopenia (loss of bone density) (FSANZ 2003). The National Cadmium Minimisation Strategy adopted by the Fertiliser Industry Federation of Australia aims to maintain safe levels in food (Rayment 1995; FSANZ 2003; Warne 2005). The Australian Total Diet Survey estimated a tolerable exposure to cadmium for all age groups, based on the National Nutrition Survey of 13,800 people conducted in 1995 (FSANZ 2003).

Irrigation and salinity have been previously assessed as threats to natural resource conditions. Water resources are over-allocated with 67% of surface water used in agriculture, and irrigation continues to increase in area, up 22% from 1996-2001 (SoE 2006). Cold water released from the bottom of irrigation storage dams result in ecologically significant temperature modification that impact on river systems (Whittington 1998; EPA 2003). Salinity, as a result of irrigation and altered hydrology, is a major threat in the Murray-Darling Basin with levels in 50 years predicted to “severely restrict water use” (EPA 2003: 4.3).

Brouwer and Ervins (2002) found animal welfare was a problem, but not a major concern in Australia. Although, there may be heightened awareness of some issues such as mulesing and live export as a result of media campaigns by animal rights activists in recent times. Welfare encompasses physical health, mental health and quality of life and natural living (Matthews 2008; Fitzpatrick *et al.* 2006). Humane husbandry and stockmanship is essential to ensure the welfare of farm animals (Moberg 2000; Grandin 2003; Hemsworth 2003; Mann 2005; Bureau of Animal Welfare 2007). Humaneness is defined in the literature as the removal of physiological and mental suffering (Hemsworth 2007). Dawkins (2006) and Sandoe (1996) go beyond alleviation of suffering to include positive affective states, as does the Australian Veterinarian Association (2008: 15) by taking the position that welfare refers to “quality of life”. Consumers tend to regard quality of life, mental health and natural living as most important, whereas producers are more concerned with physical health to define animal welfare (Kjarnes *et al.* 2007; Matthews 2008).

From the above discussion it appears that these issues can be encompassed in the phrase ‘clean, green and humane’ (CGH). Australian agriculture is promoted as ‘clean and green’ relying on the perception of a vast and sparsely populated Australian landscape as a natural and clean place to grow food (Chang & Kristiansen 2004). This promotional strategy is a response to concerns about food safety and human health issues relating to the use of chemicals, particularly in export markets (Table 1) (Stringer 2002). For instance, the

Victorian government makes the claim that Victorian agriculture has a competitive advantage because of clean water, extensive, low input production, and skilled and responsible farmers (Victorian DPI 2002). The Australian beef industry is promoted as “clean, green, safe, natural products, from Australia’s wide open spaces” to allay consumer fears about food safety and negative environmental impacts (Lugsdin 1999). Research indicates there is some market interest in these attributes although it is vague on exactly what needs to be done to produce ‘clean, green and humane’ attributes that meet consumer expectations. The next section reviews market interest followed by a discussion of CGH attributes as points of difference for branded lamb.

### **2.3 Market interest in CGH attributes**

CGH attributes in relation to lamb encompass consumer concerns about meat safety, environmental impact of grazing and humane treatment of lambs. Consumers are primarily concerned with food safety, and then animal welfare as it impacts on food safety particularly in intensive systems, and then about the environmental impacts of agriculture (Verbeke & Viaene 2000; La Trobe 2001; Cox *et al.* 2002; Jonker & Takahashi 2002; Dickinson *et al.* 2003; Frewer *et al.* 2005). Internationally and in Australia, the literature indicates a niche market for these attributes, and a difference in the level of concern in Australia compared to major export markets which also determine production requirements for Australian producers.

#### **2.3.1 Food safety concerns of Australian consumers**

‘Safe’ food is defined by maximum limits for harmful levels of bacteria, transmittable disease, heavy metals and chemical residues from veterinarian drugs, fertilisers and pesticides (FSANZ 2003; Posri *et al.* 2007). Australian consumers viewed meat safety as not adversely affecting health, and free of chemicals, hormones or disease (Cox *et al.* 2002). Australian consumers felt that meat safety was not a point of differentiation but that it was expected (Cox *et al.* 2002). Most consumers were confident that the producers, the government and supermarkets were assuring the meat’s safety, that it is guaranteed to be disease, chemical and hormone free (Smith & Riethmuller 2000; Cox *et al.* 2002).

Nation-wide surveys have repeatedly found about a third of Australian consumers were concerned about chemical residues in lamb (Smith & Riethmuller 2000; Cox *et al.* 2002). However, these studies had contradictory results when comparing the concern about residues across meat types. Smith & Riethmuller (2000) found twice as many consumers were

concerned about lamb than were concerned about residues in beef, chicken or pork. Whereas, Cox *et al.* (2002) found that lamb was of less concern than beef, chicken or pork (Table 2).

Table 2: “Safety and Integrity Concerns” from (Cox *et al.* 2002).

	<b>Beef</b>	<b>Lamb</b>	<b>Chicken</b>	<b>Pork</b>
	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>
<i>The way they rear the animals bothers me</i>	27	19	66	28
<i>Worries me that meat may contain chemicals/hormone</i>	43	32	76	38
<i>The meat is environmentally friendly</i>	35	33	32	23
<i>Trust the quality and safety of this meat more than others</i>	64	50	37	28

Australian consumers are apparently more confident than northern hemisphere consumers that government and industry assure and regulate food safety effectively (Smith & Riethmuller 2000; Paterson *et al.* 2001; Cox *et al.* 2002). There is growing consumer awareness in Australia’s major export markets about how food is produced and the impact on human health, largely as a result of chemical contamination, intensive livestock production, hormone use, novel animal feeds and associated food safety scares (Brouwer & Ervins 2002; Mazzocchi *et al.* 2008). Seventy-seven per cent of French consumers surveyed consider production conditions prior to purchase (Food & Drink Europe 2004). Belgian consumers were found to be primarily concerned with human health, while ‘animal friendly production’ was of secondary, but growing, importance in purchasing decisions due to recurring meat safety crises in the late 1990s involving hormones, bovine spongiform encephalitis (BSE), antibiotics, tranquilizers and dioxin contamination (Verbeke & Viaene 2000). Similarly, in the US 72% of consumers have concerns about the health risks associated with pesticides, hormones antibiotics and other chemicals used in food production (Roper Public Affairs 2004).

In the US and United Kingdom (UK), supermarkets are differentiating their services by accommodating consumer concerns about food safety and animal welfare standards

(Bhaskaran *et al.* 2006). UK supermarkets require compliance with the EurepGAP standard, that covers 20 control points for feed, housing, hygiene and handling of livestock (FoodPLUS 2005). In 2003, approximately half the sheep sold in the UK were assured under the EurepGAP scheme for good agricultural practice (FoodPLUS 2005). Alternatively, consumers are seeking direct contact with the producers through farmers' markets to allay concerns. La Trobe (2001) found that 87% of UK shoppers at farmers' markets were motivated by concerns about production methods, 25% about chemical use and 22% about human health.

Japanese consumers demand chemical free foods on the basis of taste and protecting personal health, rather than on environmental or animal welfare grounds (Jonker & Takahashi 2002). The concept of purity (which includes the idea of perfection and normalcy) is very important in Japanese purchasing decisions (Jonker & Takahashi 2002). For instance, Australian beef and lamb filled up to 50% of the Japanese needs when US beef samples were found to be contaminated with BSE, building on Australia's "natural and safe image" (MLA 2006).

### **2.3.2 Environmental concerns**

Researchers, in Australia and elsewhere, have used the terms 'green' and 'environmentally friendly' to describe production systems that are perceived to have low impact on the environment (On-Kwok 1993; McCoy & Parleviliet 1998; Ure 1999; Pretty 2000; Hanulakova & Prockova 2001; Lyons *et al.* 2001). However, research indicates that consumers don't have a consistent meaning for the terms 'green' or 'environmentally friendly' (Blamey *et al.* 2000; Bhaskaran *et al.* 2006). Consumers see the term 'green' as a descriptor for food that is both 'environmentally friendly' as well as minimising the perceived and actual health impacts of agri-chemicals, antibiotics, genetic engineering and animal diseases (Lockie *et al.* 2000; Toyne *et al.* 2004). Cary *et al.* (2004: 29) conclude that there is "no clarity regarding what a green, sustainable or environmentally friendly production system really means".

Australian consumers are choosing organic or 'environmental friendly' products because of the perception that there is less chemical used and the product is therefore 'good for me' (McNamara & Pahl 2004). A national survey found that Australian consumers associated organic food with health, nutrition, food safety, social justice, as well as flavour, longer shelf life and fresher appearance (Lockie *et al.* 2002).

Thirty-three per cent of Australian consumers surveyed thought lamb was ‘environmentally friendly’ (Cox *et al.* 2002). Given the noted confusion over this term and the lack of knowledge of farm practices and degradation processes amongst Australian consumers (Cox *et al.* 2002; McNamara & Pahl 2004; Cashel 2005; Stanton 2005), it could be argued that consumers are not responding to surveys with an informed opinion.

### **2.3.3 Animal welfare concerns**

About 20% of Australian consumers reported being concerned with the production method for lamb, there were slightly more consumers concerned about beef and pork production, and 66% of consumers were concerned with chicken production (Table 2) (Cox *et al.* 2002). This question appeared to encompass all aspects of production including animal welfare, environmental or health aspects of production that bothered respondents.

The level of concern regarding animal welfare in Europe is possibly much higher. A pan-European study found an average of 80% (range 69% to 87%) of consumers considered animal welfare to be important, were concerned about production conditions, transportation and slaughtering, and thought about these issues when shopping. However, Kjarnes *et al.* (2007) noted that the level of concern was higher than the market share for ‘animal-friendly’ products (the intention-behaviour gap is discussed in 2.5) and poses that the discrepancy may indicate that the label offerings don’t satisfy consumer preferences. Kjarnes *et al.* (2007) concluded that, while consumers are detached from and were uninformed about the realities of livestock production, the ethical issues were understood.

The literature indicates some market interest in CGH both in Australia and in export markets. The potential to differentiate a lamb product with these attributes from the standards currently expected in the lamb industry requires better definition of what these attributes mean in practice.

## **2.4 CGH attributes as distinguishable points of difference**

There is no widely understood definition of CGH attributes or consumer awareness about how these terms translate to on-farm production practices for lamb. Differentiation of a brand on the basis of ‘clean, green and humane’ does not appear any different to the promotion of generic offerings of Australian lamb. Consumers might perceive these attributes as a bundle although the production aspects require different technical criteria for each attribute. The

potential points of difference between branded and generic lamb are discussed below. Then, the literature is reviewed to establish criteria applicable to the production of lamb in Australia.

#### **2.4.1 Differentiating on the basis of pesticide use**

The Australian lamb industry is in a relatively good position to make the claim that pesticide residues in conventionally produced lamb are 'safe', that is, within maximum residue limits. Despite chemical residue management and monitoring there remains a level of uncertainty about the cumulative human health impacts due to the paucity of conclusive experimental and clinical evidence (Fragar & Franklin 2000; Rigby *et al.* 2001). Epidemiological studies, particularly of occupational exposure to agricultural chemicals, act as a substitute for more direct evidence (Fragar & Franklin 2000). Associations are indicated between continuous low-level exposure and a range of health issues from allergies, hypersensitivity, toxicity effects on the neurological system, reproductive system and endocrine disruption, and cancer (Steingraber 1997; Kennedy *et al.* 1998; Fragar & Franklin 2000; Beve *et al.* 2005; Scott 2005; Leu 2006). New methodologies for toxicity studies should reduce the uncertainty about the safety of registered chemicals, by radiolabelling to indicate dispersal patterns through the carcass and degradation rates, and using molecular biology to assay the interactions with specific human cells (Reeves 2005).

Consumers seeking to further reduce the health risks could perceive a benefit in a product claiming to be further along the 'clean' continuum (McCoy & Parleviliet 1998; Lyons *et al.* 2001). McCoy & Parleviliet (1998) referred to a 'clean' continuum extending from industrial production systems with high inputs of chemicals used at 'safe' levels, to minimal pesticide use, to chemical free and then to more natural systems that use ecology and biology to overcome pests such as organic production. The opportunity to use natural pest control hinges upon the management of biodiversity and the environment on farms.

#### **2.4.2 Differentiating on the basis of environmental management**

Since European settlement there has been a significant change to the Australian landscape as a result of farming and management practices including clearing and biodiversity loss, over-grazing, soil erosion, salinity, over-allocation of water resources, water quality, infestations of feral animals and weeds (ABARE 1998; Hamblin 2001; NLWRA 2001a; NLWRA 2001c; Stringer 2002; SoE 2006). Productivity has grown on average 2.7% per annum over an extended period largely due to the investment in research and development of new technology

(Stoneham *et al.* 2003). However, there is evidence that natural resources have declined whilst agricultural productivity has increased steadily over the past 30 years (Randall 2008).

There is a significant gap between the adoption of ecologically sustainable practices and the area or number of farms where the recommended practices are applicable, according to an Australian Bureau of Agricultural and Resource Economics (ABARE) assessment of sheep farm management (NLWRA 2001). For example, maintaining perennial pastures was adopted by 40% of farms but was applicable to 90% of farms, and the gap was similar for managing conservation areas, soil testing and replanting native species (NLWRA 2001). Producer self-assessment of their “environmental credentials” also indicated a variable response to environmental management with 40% of producers not implementing recommended practices (Walker 2007: 4). Sixty per cent of graziers self-reported their environmental credentials by stating that they used rotational grazing, maintain groundcover, control grazing in native vegetation, adjust stocking rates to protect native pastures and control weeds (Walker 2007). Thirty per cent of producers reported that they have undertaken revegetation since 1990, 20% monitor and benchmark groundcover, 40% control grazing in riparian areas and 51% control access to wetlands (Walker 2007).

Given the variable response of producers to environmental management, a significant point of difference could be claimed and substantiated by implementing best practices for issues relevant to the sub-catchment as well as national or global scale. Recommended best practices for conventional agriculture embodies current research and technology that aims to ameliorate negative externalities and in situ effects by stipulating conditions for the use of inputs, machinery and management (Lockie 1998; Magdoff 2007). The research tradition is underpinned by a paradigm of high input and output agriculture (Lockie: 1998), which would need to be moderated to accommodate reduced pesticide use and animal welfare.

### **2.4.3 Differentiating on the basis of ‘humane’ production**

Animal welfare issues of concern to the Royal Society for the Prevention of Cruelty to Animals (RSPCA) in the Australian sheep industry include the mulesing, the live export of sheep, transport to distant abattoirs, as well as the lack of shelter and protection from drought and bushfire (Wirth 1998). Surgical procedures carried out without anaesthetic or antiseptic, such as tail docking and castration, are part of the farm animal campaigns currently being run by animal welfare advocates (ALO 2006; HSI 2008). Such campaigns target consumers

whose purchasing power has the potential to shape production systems (Lund *et al.* 2004; Mann 2005; Matthews 2008).

Each Australian State has voluntary codes of practice with supporting legislation. The Victorian Prevention of Cruelty to Animals Act 1986 defines cruelty as the lack of provision of adequate food, water and shelter, causing pain, fear and distress (Victorian Government 1986). In 2007, the Victorian government updated the code pertaining to the welfare of sheep to include feed-lotting and mulesing. The code covers lot feeding issues such as the dryness of manure (which takes longer to breakdown), waste management, the level of pathogens in manure and impacts on food safety by recommending good ventilation and keeping air free of dust and pathogens (Dowling & Crossley 2003). Under the code, procedures for mulesing are detailed and must be undertaken by an accredited operator. The code recommends that mulesing is only carried out in circumstances that are in the best interest of the animal such as high risk flystrike areas and on merino breeds that have a wrinkled breach area. The code also recommends that painless alternatives are used as soon as they are proven effective.

Codes of practice tend to avoid being prescriptive for most practices allowing the judgement of the stock-handler to assess varied circumstances and animal responses (Bureau of Animal Welfare 2007). This is the case because of the difficulty in screening compliance with legislation and voluntary codes on an industry scale (Fitzpatrick *et al.* 2006). Unfortunately, an individual stockperson's assessment of pain and suffering is subjective and there are no objective measures and standards to assess good stockmanship anywhere in the world (Hovi & Padel 2000; Matthews 2008). Hemsworth (2007) calls for the development of stockmanship standards based on available science, as well as recognising the interests of all stakeholders including producers, stockman, consumers and advocacy groups.

Humane stockmanship requires a knowledge of the species biology, husbandry, handling skills and behaviour towards livestock, as well as an ability to observe and understand animal behaviour so as to intervene appropriately to resolve a problem (Hemsworth & Coleman 1998; FAWC 2007b). The attitude of the stockperson shapes their behaviour towards livestock in their care and in turn impacts on the level of fear when handling livestock (Hemsworth 2007). For example, producers in extensive grazing systems can reduce the risk of injury when animals balk or flee by understanding that occasional human interaction or predominantly negative handling experiences create the fear of humans causing livestock to naturally avoid contact (Hemsworth & Coleman 1998). Attitude also affects the frequency of inspection and

prompt intervention when welfare issues arise (Hemsworth 2007). Lamb production could be differentiated on the basis of the stockmanship which attends to both the physical well-being of animals and their quality of life (Kjarnes *et al.* 2007; Matthews 2008). The following section will elaborate the criteria that may be useful to substantiate that production is indeed ‘humane’, as well as criteria for ‘clean and green’ attributes.

#### **2.4.4 Criteria to operationalise CGH credence attributes**

A review of public concerns and market interest in CGH attributes can reveal the key points of difference that may be perceptible to consumers, which are minimising pesticide use to further reduce the risk of ingesting residues, conservation of natural resources and biodiversity, and stockmanship which attends to both physical well-being and quality of life.

This section reviews the literature to operationalise the CGH credence attributes in terms that are specific to farm management outcomes as suggested by Rigby *et al.* (2001). The criteria relevant to on-farm production of CGH lamb is an aggregation of issues that were raised in four recent investigations (Table 3). Two national comparative studies were specific to the regulation of meat safety and market demand for on-farm assurances (Cox *et al.* 2002; Pahl 2003). An international study investigates issues across the food industry and agriculture with a broader scope than this project (Batt 2006). Batt *et al.* (2006) and Cox *et al.* (2002) focussed on the details of food safety with broad criteria for animal welfare and environment. Pahl (2003) had a focus on the environmental impacts of grazing in detail with broad criteria for animal welfare and chemical residues. Brouwer & Ervin (2002) identified issues of public concern with more issues relating to environmental impacts and food safety than animal welfare. To compensate for the lack of detailed criteria for animal welfare in these studies the ‘five freedoms’ are incorporated, which have been widely adopted and used as a standard for the Australian Veterinarian Association for livestock production (AVA 2008). The Victorian government code for the welfare of sheep encapsulates these same principles (Bureau of Animal Welfare 2007). The ‘five freedoms’ represent an ideal standard for humane treatment of livestock proposed by the Farm Animal Welfare Council, an advisory body financed by government in the United Kingdom since 1979 (FAWC 2006). The five freedoms include (i) free from hunger and thirst, (ii) free from discomfort, (iii) free from pain, injury and disease, (iv) free to express normal behaviour including providing space and company of their own species, and (v) free from long-term fear and distress. Three of the studies identified aspects of greenhouse gas emissions as issues in Australian agriculture, including crop burning and

food miles (Table 3). Livestock grazing is a major contributor to greenhouse gas emissions through the digestion and production of methane.

Results available from Cox *et al.* (2002) and Pahl (2003) indicate consumer interest in these issues in the domestic market. However, in relation to consumption of credence attributes there are a number of distinctive aspects that producers need to be aware of, which are covered in the following section.

Table 3: Criteria relevant to on-farm production of CGH lamb based on previous research

Criteria for CGH lamb production	Brouwer & Ervin (2002)	Batt <i>et al.</i> (2006)	Eco-Range (2003)	MLA review (Cox 2002)
<u>Human health:</u> All chemical risks managed so that meat residues are within Maximum Residue Limits	Pesticide residues Growth hormones Animal diseases	Pesticide residual Growth hormones Heavy metal residue Biocides/vaccines Microbial contamination Food additives	Chemical use/Residues Hormones	Chemical residue status Growth hormones Details on feed contents Animal health treatments Disease status Fed animal by-products
<u>Water conservation</u> Efficient water use on-farm No pollution of stream-water	Irrigation Eutrophication Turbidity	Water use and pollution Chemical contaminants	Decline in water quality and quantity	Environment
<u>Soil conservation</u> Minimal soil erosion Noxious weeds controlled Grazing & pastures managed to avoid bare ground Soil fertilisers free of heavy metals Maintain soil health Soil salinity controlled	Soil erosion Soil contamination with heavy metals (e.g. cadmium) Soil acidification Salinisation	Land degradation Salinity	Soil degradation/erosion Overgrazing Loss/decline of pastures Land pollution Salinity	Environment
<u>Biodiversity conservation</u> Farm native bush and grassland maintained Control grazing in bush land Native wildlife maintained Culling of kangaroos under permit only Control of feral animals	Biodiversity Landscape  Pesticide contamination	Conservation and biodiversity	Tree clearing Land development Chemical use Weeds, pests & diseases Feral animals Loss of wildlife	Environment
<u>Air pollution:</u> Reducing greenhouse gas emissions	Crop burning	Waste management Carbon credits Minimising food miles	Greenhouse gas production	Environment
<u>Animal welfare</u> Free from hunger and thirst Free from discomfort Free from pain, injury or disease Free to express normal behaviour Free from long-term fear and distress	Animal Welfare	Animal welfare	Animal Welfare	Animal welfare Minimal damage or bruising Minimal stress

## **2.5 Ethical consumerism in relation to CGH attributes**

Ethical consumerism can be defined as “purchasing decisions that are made with consideration for moral dimensions of how products are produced” (Arnot *et al.* 2004: 556) and the “environmental impact of production” (Auger & Devinney 2007: 361). These consumers have been described as ‘green’ consumers, who make purchasing choices that reduce the environmental impact of products consumed (On-Kwok 1993; Shrum *et al.* 1995; Lockie *et al.* 2000; Blackwell *et al.* 2007). Pedersen & Neergaard (2006) describe the green consumer as someone who incorporates their environmental concerns in their purchasing decisions.

Previous research has concluded that consumers use purchasing power to be supporters of particular production systems (Thomas 1997), to take responsibility for the impact of their consumption (Conner *et al.* 2007), or because they believe their decisions have an impact on the specific issues (Dembkowski 1998; Shaw & Shiu 2003). Sixty-two per cent of Australian consumers believe that their purchasing choices can make a difference to the environment (McNamara & Pahl 2004). However, only thirteen per cent of consumers said they thought about the environmental impacts of meat production all the time when purchasing fresh meat and thirty per cent thought about it occasionally. Carrigan & Attalla (2001) found that consumer purchasing behaviour was more often influenced where a firm’s unethical actions may have a direct impact on the consumer. They explain this selectiveness as a result of the pressure of time which reduces information search activities and leads to “less discriminating choices” (Carrigan & Attalla 2001: 573).

### **2.5.1 Predicting market potential**

Psychographic variables, discussed below, rather than socio-demographic variables have been shown to have greater predictive power for green behaviour (Straughan 1999). Research attempting to characterise the ‘green’ consumer using socio-economic variables has been inconsistent and contradictory (Peattie 2001). Only a few characteristics appear to have even weak predictive ability of behaviour including higher income and education (Hines 1987; Hanulakova & Prockova 2001; Vermeir & Verbeke 2006) and gender (Paladino 2005). Women have been found to be more willing to pay more for food assurances and labelling than males (Paterson *et al.* 2001; McCann-Hiltz *et al.* 2004). Women exhibit “more concern about environmental quality” and are “more likely to participate in green activities” (Diamantopoulos *et al.* 2003: 471).

Ajzen's theory of planned behaviour (TPB) from the field of psychology is widely used as a model of how beliefs, attitudes and subjective norms affect people's intentions to perform behaviours (Ajzen 1991). Intention or motivation to behave a certain way can be hindered by a lack of resources or opportunity, and by the importance an individual places on conforming to cultural or social norms (Ajzen 1991). This model or aspects of it have been widely supported for 'green' consumption although several authors have pointed out greater complexity (Hankins *et al.* 2000). According to a meta-analysis of 128 studies by Hines *et al.* (1987) favourable attitudes in concert with knowledge and personality factors lead to actual environmental behaviour. Dembkowski (1998) observes a slightly stronger link between behaviour and knowledge of product attributes than knowledge of environmental issues in general. Paladino (2005: 91) concluded that various factors in the theory of planned behaviour model "bypass mediating variables to have a significant and direct impact" on intentions and behaviours. For example, altruism was correlated to consumers' perceived influence to "personally change environmental problems" rather than directly related to purchase intentions or behaviour (Paladino 2005: 89).

Concern about the environment or environmental consciousness has been strongly linked to green purchasing intentions and behaviour (Schlegelmilch *et al.* 1996; Straughan 1999; Paladino 2005). Straughan and Roberts (1999), like Stern (1993), showed the importance of altruism (i.e. that others also benefit from the consumer's actions), and 'perceived consumer effectiveness' that consumers' actions will influence the environmental outcome. Environmental concern was found to be a factor contingent upon 'perceived consumer effectiveness' which is in accordance with the TPB (Straughan 1999).

Kalafatis *et al.* (1999) found that TPB was appropriate for green marketing research, however the subjective norm element fitted better where environmental awareness and 'green' products are already established in a society. Similarly, Diamantopoulos *et al.* (2003) concluded that knowledge and attitudes were affected by different levels of environmental politics, activism and legislation in the US compared to Britain.

Shaw & Shiu (2003) showed that the TPB only partially explained ethical consumption, and added constructs to separate external behaviour controls and internal reasoning to explain behavioural intention. Cultural influences were very strong in determining external behavioural controls. However, external factors were off-set with factors for internal reasoning such as ethical obligation to others and self-identity.

Follows and Jobber (2000) confirmed a hierarchical relationship between values and product specific attitudes and purchase intentions and then purchase behaviour. Bredahl (2001) also found a strong relationship between attitudes and purchase intention for specific products such as genetically modified foods.

Pedersen and Neergaard (2006: 25) point out the limitations to characterising a “stable group of consistently green consumers” because preferences, values and beliefs are not fixed throughout life, and therefore these variables are unreliable predictors of market demand for environmental attributes. Korthals (2001) observed a phenomenon described as ‘floating’ consumers who appear to contradict their own values, by selecting healthy, green consumption on one occasion and on another occasion choose junk food.

Some research suggests that predicting consumer behaviour has to be specific for a product (Peattie & Crane 2005). Schlegelmilch *et al.* (1996) found that predicted market size and predictive variables were dependent on product category across the five categories examined. Follows & Jobber (2000) confirmed a hierarchical relationship between attitudes to specific products, the intention to purchase and actual purchase. Confirming this, Bredahl (2001) found a strong relationship between attitudes and purchase intention specifically for genetically modified products.

Product attributes other than credence attributes also influence food purchases. Past research has determined that consumer evaluation criteria for food purchases include price, brand, quality, healthiness, habitually choosing the same products to limit search costs and product availability, convenience and packaging (Steenkamp 1997; Dembkowski 1998; McCoy & Parleviliet 1998; Vermeir & Verbeke 2006). Increasingly, time-poor families are choosing convenient, ready-prepared food; approximately 60% of two-parent households have both parents working (Cashel 2005; Stanton 2005). Choosing between meat alternatives, consumers were reported to compare prices, consider diet variety, product image, origin and their experience of physical aspects such as taste and fattiness (Steenkamp 1997).

Ariely & Norton (2007) provide experimental and real world evidence that consumer characteristics can not accurately predict consumer preferences which are frequently constructed in the moment. The memory associated with a past purchase situation may well confound the memory of utility, that is the situational utility (pleasure of the shopping

experience) can unconsciously influence decisions and be remembered as a preference (Ariely & Norton 2007). Camerer *et al.* (2004) explains that the human brain attaches emotion to most concepts and objects, and the emotional response is automatic when recalling a particular concept or object. The immediate reaction takes considerable effort to change (Camerer *et al.* 2004). Tadajewski (2006) suggests more research emphasis on the context of the purchase from a cognitive anthropology perspective, referring to how individuals improvise and act spontaneously, rather than always being rational information seekers. In conclusion, characterising the market segment for ethical attributes appears to have low reliability as a predictor of market potential. A new research direction is investigating the factors at the point of sale and how these might influence purchasing decisions.

### 2.5.2 Point of sale influences on ethical consumption

Peattie (2001: 192) proposes a model for considering ‘green’ purchasing, the “green purchase perception matrix” (Figure 2), emphasising the purchase context as a means of facilitating green consumption. In the model Peattie (2001: 193) defines “win-win purchases” as being beneficial for consumers, the firm (producer) and the environment. From the consumers’ perspective such a purchase would have a low degree of compromise (e.g. transaction costs such as information search effort, risk, time and psychological effort) and high degree of confidence (e.g. trust in product quality and claims) (Peattie 2001). Salient factors to the purchase of CGH lamb are availability and accessibility, price, information search and flow, and consumer confidence in the product claims which are discussed in the following sections (Steenkamp 1997; Peattie 2001; Vermeir & Verbeke 2006; Conner *et al.* 2007).

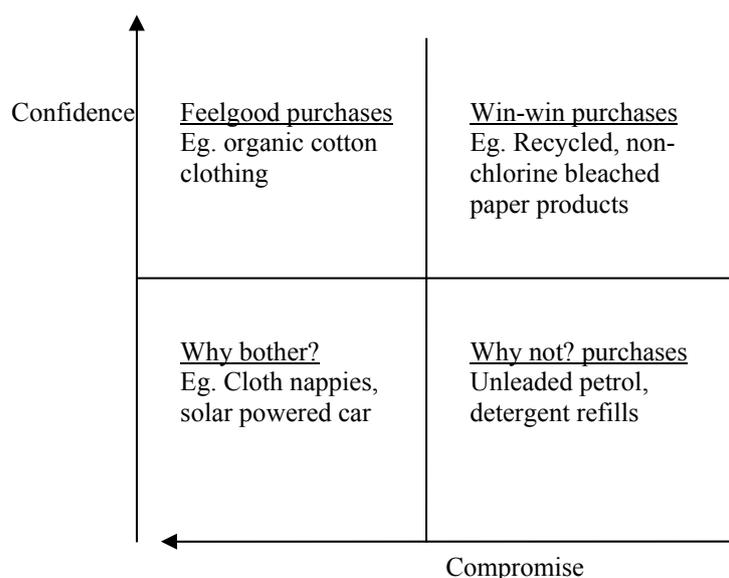


Figure 2: Peattie’s “green purchase perception matrix”

### **2.5.2.1 Consumer compromises to purchase ethical credence attributes**

Consumers have shown a reluctance to choose green products if the choice compromises their willingness to pay (WTP) or inconvenience (Wong *et al.* 1996; Dembkowski 1998). Although highly motivated consumers might trade-off personal inconvenience to make a difference to an issue (Dembkowski 1998; Follows & Jobber 2000). For example, members of a community supported agriculture program in the US traded off some inconveniences such as being at home to receive food orders, variable quantities and seasonally available varieties in order to support low pesticide use, reduced packaging and local production (Cone & Myhre 2000).

### **2.5.2.2 Accessibility and availability**

Accessibility refers to the convenience of the point of sale to the shopping habits of the consumer and the consistent availability of the product at that location (Vermeir & Verbeke 2006). However, to be accessible products firstly needs to be available for distribution. The most accessible food products are those found on the supermarket shelves. Buying direct from producers is not the most convenient way of shopping because consumers will need to visit a grocery store as well as a farmers' market or place an order in advance to maintain a balanced diet due to the seasonality of farm produce (Tippins *et al.* 2002).

Several studies conclude that the increased search effort by consumers buying direct from producers or specialty retailers is rewarded by product quality (Gilg & Battershill 1998; La Trobe 2001; Lyson & Guptill 2004; Coster & Kennon 2005; Keeling Bond *et al.* 2006). Keeling Bond *et al.* (2006) found that direct shoppers had higher expectations of intrinsic qualities, such as nutrients, texture, colour, taste and freshness, but also expected good value for quality, just as mainstream shoppers do. The inconvenience may also be compensated by the shopping experience at farmers' markets, which is reported as a leisure activity or as an opportunity for social interaction in Australian, English, American and French studies (Gilg & Battershill 1998; La Trobe 2001; Coster & Kennon 2005; Keeling Bond *et al.* 2006).

Previous studies have found availability to be a barrier to consumers who want to purchase a product differentiated on the basis of 'green' or other credence attributes (McCoy & Parleviliet 1998; Vermeir & Verbeke 2006; Conner *et al.* 2007). An Australian study found that 15% of respondents gave the lack of availability as a barrier to buying 'environmentally friendly' food (McNamara & Pahl 2004). The most common reasons consumers gave for not shopping for "pasture-based animal products" was the lack of availability, cost and

uncertainty about label claims and lack of interest (Conner *et al.* 2007: 67). Schroder & McEachern (2004: 176) found that limited availability weakened consumer intention to purchase “welfare-friendly” products.

In a survey of distributors, Conner *et al.* (2007) found that products with credence attributes lacked coordination effort to distribute the required volume through the mainstream supply chains. Barriers to distribution of a differentiated product were found to be the lack of brokers or distributors to reduce the search effort for buyers and marketing effort for small farmers, finding markets for the whole animal, and variations in supply due to seasonality which may be overcome through horizontal partnerships (Conner *et al.* 2007). Producers found it difficult to get processors for small and seasonally fluctuating volumes (Conner *et al.* 2007). Processors who did co-operate tended to share the same values about high quality products (Conner *et al.* 2007).

Supermarkets lack the incentive to initiate the differentiation of a product on the basis of credence attributes due to the small demand volume to cover costs (Cary *et al.* 2004; Bhaskaran *et al.* 2006). Consumer interest in product attributes will determine whether there is sufficient turn-over volume for retailers to continue to stock a product (On-Kwok 1993). Binnekamp and Ingenbleek (2006) concluded that the lack of availability of animal friendly products was a result of strong retailer price competition and a lack of consumer involvement (interest).

In conclusion, CGH lamb producers need to ascertain the level of search effort consumers are prepared to undertake to purchase the attributes and determine viable marketing channels either through the mainstream or alternative supply chains.

### **2.5.2.3 Consumer evaluation of price**

Socio-economic circumstances and personal characteristics influence the importance that price has in purchase decisions (Piggott & Wright 1992; Paterson *et al.* 2001). The perceived affordability of a purchase is determined by socio-economic factors such as income, debt levels, family stage and size (Evans *et al.* 2006). Food consumption has been found to be generally price inelastic, that is consumption is reduced as the price rises (Steenkamp 1997). Owen *et al.* (2002) found that budget constraints, rather than income, were significant. Price was a barrier to buying ‘environmentally friendly’ food for most Australian consumers (68%) (McNamara & Pahl 2004).

Piggott and Wright (1992) contend that when faced with a choice between meat types consumers use price to narrow the selection amongst possible substitutes, for instance the comparative prices of chicken versus beef may factor early in the decision making process. Owen *et al.* (2000) propose that individuals utilise the signals learned over time from their surroundings to efficiently deal with price and other product attributes. Carlsson *et al.* (2007) also suggests that price is a dominant deciding attribute for many, particularly when preferences are not well-defined. That is, preferences are constructed in the moment or are discovered with increased knowledge about the surrounding issues and product attributes.

The literature refers to different categories of consumers: price conscious, value-conscious and less price conscious (Piggott & Wright 1992; Owen *et al.* 2002; Evans *et al.* 2006). Price conscious consumers tend to do business wherever the lowest price is offered (Blackwell *et al.* 2007). Owen (2002: 219) found most fresh food shoppers (66%) were “value-conscious”, but the search effort was limited to locating better value. The search for value was simplified by using heuristics, such as shopping at locations or times that have been beneficial in the past (Owen *et al.* 2002). Despite most of the sample being in the value-conscious profile, price was mentioned in less than half of all the purchase decisions observed (Owen *et al.* 2002). Other product attributes will influence the choice where personal circumstances and preferences enable the consumer to be less conscious of price (Owen *et al.* 2002).

Price is sometimes used as a cue for quality. Quality can imply origin, sustainability, naturalness, animal welfare and healthiness (Venn *et al.* 2006), as well as freshness and naturally ripened flavour (Tippins *et al.* 2002). For fresh produce, the link between price and quality is obscured by seasonality and over-supply, which can affect price, and pest damage or climate, which could affect quality (Owen *et al.* 2000). Japanese consumers prefer a reasonable price rather than the lowest assuming they are receiving reasonable quality (Jonker & Takahashi 2002). However, when products become widely available, they expect the price to be lower, which happened when organic produce became available through supermarkets (Jonker & Takahashi 2002).

Previous research suggests that WTP for branded product is based on the perception of better quality, performance and the opportunity for expression of consumers’ views and self-image (Jin *et al.* 2008). Branding can assure consumers of eating quality and maintain the product’s position in the higher valued and price elastic end of the market such as restaurants or

boutique butchers (Farrell & Tozer 1996). In lower quality and lower priced markets, consumers are more inclined to substitute other meat types when lamb is perceived to be too expensive (Farrell & Tozer 1996).

A stated preference survey of US consumers found that 78% were willing to pay a premium for branded fresh produce over generic product, and were willing to pay an average premium of 22% (Jin *et al.* 2008). Lyson (2004) found that direct marketed produce is frequently promoted as a high quality, high value product and thereby attracts shoppers prepared to pay a premium. Gilg & Battershill (1998) noted that a premium could be asked in return for information about production practices.

Other research of farmer-direct marketing indicates that customers might be described as value-conscious, seeking quality at a price comparable to conventional product (Gilg & Battershill 1998), or fresh produce at lower prices by removing intermediaries costs (Tippins *et al.* 2002), or negotiating bulk prices for specifications such as pesticide free food, as is the case with Japanese consumer co-operatives, known as sanchoku groups (Pretty 2000).

Research on meat products suggests that consumers are willing to pay a premium for credence attributes (Table 4). The research is most often hypothetical rather than observed actual behaviour which introduces bias and overstates the market potential. Consumers were willing to pay similar premiums for food safety and animal welfare suggesting the perceived connection between intensive production systems and food safety (Dickinson *et al.* 2003; Frewer *et al.* 2005). Research indicates that consumers in European and North American markets are willing to pay for traceability and product information. Consumers in the US are willing to pay more for environmental management and chemical free production than consumers in Australia. Sixty per cent of Australian consumers were willing to pay a 10% premium for ‘environmentally friendly’ meat (McNamara & Pahl 2004).

Table 4: Willingness to pay for ethical products

Product and Country	Research findings
Organic food, Global (FAO 1999)	WTP 20% more for organic than conventionally produced food
Certified pork, United States (Lusk <i>et al.</i> 2007)	WTP 35% more for environmental certification. Consumers high on the altruism scale would pay 23% premium for animal well-being certification.
Pork, Sweden (Liljenstolpe 2008)	WTP for animal welfare attributes related to housing and feed, but not if they are perceived to impact on food safety such as no castration, mobile abattoir

Labelled beef, Finland (Latvala & Kola 2003)	59% of respondents were willing to pay a premium for information about production
Beef, United States (Dickinson & Bailey 2002)	WTP 16% more for humane animal treatment, 20% for food safety, 7% for traceability and 35% for the bundle of attributes.
Beef, Canada (Dickinson <i>et al.</i> 2003)	WTP 19% more for humane animal treatment, 18% for food safety, 9% for traceability and 37% for the bundle of attributes.
Food, United States (Wimberley <i>et al.</i> 2002)	81% (n189) were willing to pay more for food produced on farms using good environmental practices; and 60% were willing to pay for chemical free production
Meat, Australia (McNamara & Pahl 2004)	82% of respondents (n = 605) stated they were 'very likely' to purchase 'environmentally friendly' meat if it was the same price. 60% of consumers were willing to pay 10% more per kilogram for 'environmentally friendly' meat 35% were willing to pay 25% more per kilogram.

In conclusion, the findings in the literature suggest that consumers who are likely to search for CGH attributes beyond the mainstream are likely to be less price conscious, will pay a premium and will expect the brand to be of superior quality. More value-conscious consumers that search beyond the mainstream are more strongly motivated by their preference for CGH attributes than price consciousness but may still expect a price comparable to the mainstream.

### 2.5.3 Consumer confidence in product claims

McNamara and Pahl (2004: 35) found that consumer health and animal welfare were motivators for purchasing 'green' products and concluded that purchasing behaviour for an eco-label was primarily influenced by "price, value for money, quality, taste and packaging" and secondarily by trust in the assurance scheme, and understanding the product's environmental benefits. Grolleau & Caswell (2006) also found that confidence in credence claims can be adversely affected by poor eating quality performance therefore eating quality must be at least as good as a generic brand. Consumer confidence in the product qualities increase through experience of the product and knowledge of how credence claims are substantiated (Hale 1996; Verbeke 2000b; Farnworth 2003). Product benefits in this case might include psychological benefits such as perceived consumer effectiveness or fulfilment of personal responsibility (Straughan 1999; Paladino 2005). Mann (2005: 367) describes animal welfare as a "psychological externality", that is, knowledge of the animal production system can have either a positive or negative emotional impact on the consumer that is not reflected in the price of the meat.

To be influenced by credence claims consumers need to be confident that the production process will mitigate genuine problems and that their purchase contributes to a positive outcome (Peattie 2001). Consumer confidence in product claims is established by providing information that makes the claims clear and transparent (Hale 1996; Farnworth 2003). Caswell and Mojdzuska (1996: 1252) suggest that, for consumers, food labelling “transforms credence attributes into search attributes”. The length of the supply chain can change the mode of information exchange and consumer confidence in product claims.

### **2.5.3.1 Consumer involvement and information search effort**

The level of consumer interest or involvement in the purchase decision determines the effort made to search for information and evaluate the alternative choices (Mittal 1989; Steenkamp 1997; Vermeir & Verbeke 2006). Steenkamp (1997) concludes that higher education levels facilitate the seeking and processing of information. Also, the employment status of the household shopper determines the time and income available for information and product search (Steenkamp 1997).

Involvement in food purchase decision-making may be higher where consumers are concerned about food safety. Many consumers are reported to be seeking more information about the origins of food and assurances about how food is produced, often in response to media reports and food safety scares, particularly in Europe, the US and Japan (Verbeke & Viaene 2000). A survey in the US found that 59% of consumers were willing to pay more for additional information about meat production (Latvala & Kola 2003). Australians, however, appear to expect and trust that the government will regulate the safety of meat (Cox *et al.* 2002). Research has shown that promotion and communication about a product’s ethical credence attributes can have a positive affect on sales through increasing consumer involvement in the purchase decision (Hale 1996; Vermeir & Verbeke 2006; Blackwell *et al.* 2007).

Australian consumers were found to rely on television news and current affairs as the major sources of information about food and farming, which is often contradictory and confusing (Paterson *et al.* 2001). Lockie (2006) found no causal link between media reporting and public concern from newspaper articles in Australia, the UK and the US. However, Lockie (2006) observed a mistrust of regulators as a result of downplaying the risks when communicating issues to the public. Media attention can increase consumer involvement in food purchasing decisions having both a positive or negative effect (Cary *et al.* 2004). Rivera-

Camino (2007) found an adverse effect on Spanish firms' reputations from environmental organisations' campaigns and negative press. Verbeke (2000a) found that negative publicity had an adverse effect on fresh meat sales. Consumers' perceptions of risk have increased due to media attention to poor animal welfare, disease outbreaks, microbial contamination, pesticide residues, routine antibiotic dosing and genetically modified organisms (Rowlands *et al.* 2002; Toyne *et al.* 2004; Manning *et al.* 2006; Thøgersen 2006).

Distorted or false environmental claims and advertising erodes consumer trust in product claims in general (Prakash 2002; Peattie & Crane 2005). After many false claims made in the 1990s, many consumers are sceptical of credence claims (Peattie 2001). Sixty per cent of European consumers were found not to trust the ethical claims made by major producers and retailers regarding sustainable development, fair trade or environmental protection (Food & Drink Europe 2004). An Australian study concluded that respondents doubted the honesty of labelling claims, especially health claims and expected strong regulation of food safety and quality (Coveney 2007). More Australian consumers would trust labels claiming that meat production was environmentally friendly if it was part of a system regulated by government (67%) than if the label was endorsed by an environmental group (46%) (McNamara & Pahl 2004). Caswell and Mojdzuska (1996: 1252) argue that government regulation of product claims is more cost-effective than regulating product qualities, and that regulation of claims aims to ensure that they are "truthful and credible".

Findings in the literature suggest that Australian consumers may apply more search effort where their interest has been raised by media attention to environmental or animal welfare issues or false product claims or specific product food safety issues. Otherwise, Australian consumers expect regulatory authorities to assure food safety.

### **2.5.3.2 Label information and controlling information flow**

Consumers rely on label information to disclose mandatory food safety and nutritional information, and to differentiate benefits over alternative brands (Gardiner & Quinton 1998; Grolleau & Caswell 2006). For example, an Australian in-store survey indicated that approximately a third of shoppers compared the label information on more than one product in the same category; and that brand name was most influential in food purchasing decisions (23%), followed by price (17%), specific ingredients (15%), general ingredients (14%) and nutritional values (13%) (Paterson *et al.* 2001). Grolleau and Caswell (2006) describe the function of a label as an aid to consumers to make an informed choice. Labels that provide

adequate information and assurances make purchasing decisions easier (Verbeke & Viaene 2000).

To avoid being overwhelmed by the complexity of information about ethical production practices, consumers rely on heuristics like “image, price, brand, or past buying behaviour” (Binnekamp & Ingenbleek 2006: 173), or they limit the number of attributes evaluated (Blamey *et al.* 2000; Steenkamp 1997). To expedite the information search effort, consumers rely on brands as a promise that claims are valid and reliable (Gardiner & Quinton 1998; Malcolm *et al.* 2005). Brand value can extend beyond specific product attributes to include the historical commitment of the firm to credence claims (Hanulakova & Prockova 2001; Prakash 2002).

Labels provide consumers with the opportunity to use their purchasing power to support production methods (Brom 2000). Peattie (2005) points to the difficulty in reducing complex issues into simple marketing messages, particularly given the lack of consumer knowledge about the environmental impacts of production. Richards *et al.* (2006) are of the view that consumers are not provided product information to indicate the implementation of best practices, and that government has a role to coordinate a cohesive and widely promoted assurance system.

Consumers who aren't confident in their own knowledge may trust the recognisable logo of accreditation programs or advocacy groups (Bhaskaran *et al.* 2006). Pedersen & Neergaard (2006) state that, without knowing the accreditation criteria consumers may not be able to discern labels that use rigorous verification of claims from other labels on the shelf. Where consumers don't have knowledge of the verification process, then the purchase choice is subjective and open to opportunistic behaviour by the manufacturer and/or supplier (Pedersen & Neergaard 2006). Less active information seekers will interpret the label subjectively (Pedersen & Neergaard 2006), in which case they might make their purchase decision based on the “marketing imagery for any evidence of a traditional low intensity farming system” for example animals grazing on green pastures (Gilg & Battershill 1998: 25).

Consumer attitudes towards label claims are more favourable where they have more knowledge of product benefits and attributes (Verbeke 2000b). However, Tadjewski (2006) suggests that greater knowledge of the impact of products may be detrimental to consumers'

green purchasing choices as suitable products are less attainable, and increasing apathy and cynicism can result in fewer 'green' purchases.

Ariely (2000: 245) suggests that for new or complex information, consumers need to be in control of the information flow (i.e. content, order and duration), being free to search for information through "interactive communication" to satisfy their questions. This research showed that self directed learning improves peoples' ability to "remember and understand" information when making purchase decisions (Ariely 2000: 245). Tadjewski (2006) also suggests supplying the facts on a progressively more detailed basis from brand name on labels to full information on websites to avoid overwhelming green shoppers. Canavan *et al.* (2007) found that websites for specialty foods were more important as marketing or information channels than as sales channels.

To summarise, the literature indicates that consumers of a CGH brand are likely to rely on the reputation of the brand or assurance scheme to reduce the information search effort and that more detailed information than the succinct messages on a product label may be sought, perhaps through websites or face-to-face interaction with the product supplier.

### **2.5.3.3 The impact of supply chain length on information flow**

Renting *et al* (2003: 399) categorised the relationship between consumers and producers according to the length of the supply chain, observing that in face-to-face supply chains "authenticity and trust are mediated through personal interactions" and that as the parties were distanced from each other they relied on "certification labels, production codes and reputation" to transmit production standards and values. Third party accreditation is preferred by intermediaries and consumers in long supply chains, and substitutes for the absence of a direct relationship with producers (Farnworth 2003). Latvala and Kola (2003) conclude that there is a lack of information about most goods and because there are few quality and price signals to differentiate between products in long supply chains the minimum standards become acceptable.

Shorter supply chains provide consumers with the opportunity to develop a relationship with the producers (Farnworth 2003). Consumers can assess first hand the suppliers' credibility and whether they will act benevolently (protecting the consumers' rights) and not opportunistically (Hoyt & Huq 2000; Hingley & Lindgreen 2002; Sahay 2003; Evans *et al.* 2006). Gilg & Battershill (1998) found that direct marketing developed trust between

consumers and producers through sharing information and dialogue. French consumers were looking for reassurance about the quality of food through direct contact with producers (Gilg & Battershill 1998). Communication with butchers reassured consumers about the safety of Belgium beef after negative media coverage of disease outbreaks and contamination (Verbeke 2000b). For direct shoppers in a US survey, traceability was found to be important (Keeling Bond *et al.* 2006). Gordon (2000) states that consumers value relationships with suppliers to reduce risks, simplify the search effort and to share product information.

## **2.6 Producer assurances for CGH products**

Assurance schemes commonly used to substantiate ‘clean, green and humane’ claims are either self-declared or third party accredited through international standards or a labelling program. Some widely used options are discussed in terms of consumer recognition and appropriateness to the bundle of ‘clean, green and humane’ attributes and to lamb production. Assurance systems discussed include eco-labelling, environmental management systems (EMS), self-declared environmental claims and Safe Quality Food (SQF) 1000 Code, and current requirements in the mainstream supply chain.

Currently, most producers voluntarily comply with the requirements of the Livestock Production Assurance (LPA) Level 1 which aims to minimise the risk of chemical residues exceeding limits set internationally largely because mainstream buyers require this assurance (MLA 2004). Compliance with similar previous voluntary programs such as Cattlecare and Flockcare was very low, at less than 2% of all beef or sheep producers (Cox *et al.* 2002). A national study indicated that most producers who had not joined these programs expected a market premium to compensate for this additional effort which didn’t eventuate (81%), thought the costs were too high (39%), felt that record keeping was a burden (34%), couldn’t comply without significant changes to their production and management systems (19%) and believed that mainstream buyers didn’t require compliance (78%) (Cox *et al.* 2002).

Less than 10% of Australian farmers reported that they participated in a quality assurance (QA) scheme (Connell *et al.* 2000). In other Australian studies, producers were concerned with over-regulation and government control, and the cost of compliance with environmental assurance schemes (Pahl 2003; Dibden *et al.* 2005). However, most medium-to-large enterprises that had a QA program were aware of future market directions for assurances and perceived benefits such as improving meat quality, meeting buyer requirements and avoiding litigation (Cox *et al.* 2002).

Without an underlying CGH production paradigm it is likely that producers will only meet minimum requirements to capture market share at minimum cost (Lyons 1994; Lockie *et al.* 2000; Lund *et al.* 2004). Veissier *et al.* (2008) found that European farmers were motivated to join animal welfare schemes either by their ethics or were attracted by premium prices. Both groups incurred the cost of compliance and reported being disappointed by the lack of market response (Veissier *et al.* 2008).

Labelling of products in Australia is regulated under the Trade Practices Act (1974) and prohibits misleading or deceptive conduct and false or misleading statements, claims or implications about products (ACCC 2006). Food production claims should be expressed using common definitions of terms such as natural or pure (ACCC 2006). However, with inconsistent monitoring across issues and States, the ACCC often relies on consumer complaints to initiate enforcement, and therefore the risk of getting caught mislabelling in Australia is apparently low (C. Hughes pers. comm., 2006). The incentive to make false claims increases as the premiums increase, and the risk of getting caught is low (Baksi & Bose 2007). Kirchoff's (2000) modelling showed that firms tend to voluntarily over-comply with monitored environmental standards when premium were higher, and where it was highly likely that cheating would be discovered.

### **2.6.1 Eco-labelling**

Eco-labelling programs tend to be run by independent organisations that verify product claims against technical criteria (Gallastegui 2002). The term eco-labelling has been used to describe programs that differentiate products on the basis of any ethical credence attribute, environmental, pesticide free or humane animal treatment (Gallastegui 2002; Pedersen & Neergaard 2006). Recently in Australia, the World Wildlife Fund in conjunction with technical and industry bodies has lead the development of 'stewardship councils' to certify on-ground performance for forestry, fisheries and rangeland grazing (Toyne *et al.* 2004). Notable eco-labelling programs used in Australian agriculture include the National Association of Sustainable Agriculture, Australia and Australian Certified Organic (Toyne *et al.* 2004). Whilst these programs include the three credence attributes of interest (i.e. CGH), they prohibit artificial fertilisers and pesticides (Benbrook 2003), making these schemes a major change to production systems for conventional producers.

Brand success hinges on consumer recognition of the organisation's logo and sharing the organisations' values, as well as the credibility of the certification process (Toyne *et al.* 2004; Pedersen & Neergaard 2006; Steele 2008). Advocacy organisations value their reputation and credibility therefore they only endorse products that fit with their core values. For instance, the RSPCA does not authorise their logo for use by livestock producers without certification against a welfare standard (Steele 2008). Transparency is important to maintain the credibility of programs and to do so accreditation organisations tend to make the assessment criteria publicly available (Gallastegui 2002).

### **2.6.2 Environmental Management Systems**

EMS are self-regulated evaluation systems whereby producers can continuously improve environmental management based on their own objectives and targets (Standards Australia 1996). Where a producers' EMS complies with the International Standard for EMS (AS/NZS ISO 14001) they can be independently accredited and utilize the logo to promote the product (Carruthers 2005). The standard applies to the single issue of environmental management (Noonan & McAlpine 2003; Richards *et al.* 2006). As at December 2005 there were 1778 firms across all sectors carrying ISO 14001 certification in Australia (ISO 2006), up from 341 in 2000, indicating increased interest, possibly driven by changing consumer expectations (Carruthers 2005).

Consumer recognition of ISO certification logos in relation to agricultural production is low due to a lack of use and lack of promotion (Toyne *et al.* 2004). Australian supermarkets have not demanded environmental standards to the same extent that they have required food quality and safety standards from producers (Carruthers 2005). The ISO logo is generic and can be associated with a multitude of different standards across product categories (Toyne *et al.* 2004). Substantial promotion is needed before more producers use the program and before consumers are able to differentiate the products using the ISO logo, or before consumers will be willing to pay a premium (Cox *et al.* 2002; Toyne *et al.* 2004; Linden & Huhn 2005a).

Case studies from beef producers in Australia report that a lack of consumer recognition of EMS accreditation has meant that their time and effort has not been fully financially rewarded despite the product attracting a premium (Higgins *et al.* 2008). Carruthers (2005) found that approximately one quarter of primary producers implementing an EMS, considered it worthwhile attaining ISO 14001 certification for market access and some reported having achieved a premium or greater sales volume (Carruthers 2005). Eighty-five percent of

producers studied saw reduced legal liability as a potential benefit for adopting an EMS (Carruthers 2005).

Government policies support the development of industry based EMS as a cost-effective alternative to regulating farm practices (Standing Committee to the Natural Resource Management Ministerial Council 2002). Rowland *et al.* (2005) are of the view that EMS are the most relevant, internationally accepted and widely used documentation tool. Primary industry bodies have adapted existing programs and tools so they can be accredited because farmers are already familiar with them (Rowland *et al.* 2005). For example, the Victorian Department of Primary Industry has produced an EMS to guide lamb producer self-assessment and objective setting (Linden & Huhn 2005a; Linden & Huhn 2005b). Web-based software (*MyEMS*) guides on-farm EMS development, developed in response to the perception of burdensome documentation. The software links property level EMS to catchment and regional targets. This was achieved through a consortium of private and government authorities, and is offered under the auspices of the Australian Landcare Management System (ALMS 2008).

### **2.6.3 Standard for self-declared environmental claims (AS 14021)**

Self-declaration of environmental claims under Australian standard AS/NZS 14021:2000 doesn't require third party accreditation, reducing compliance costs (Standards Australia 2000). In 2000, Standards Australia adopted AS/NZS 14021:2000 for self-declared environmental claims with the goal of reducing consumer confusion as a result of misleading claims and to promote demand for products with verifiable claims (Standards Australia 2000). Public recognition relies upon the reputation of Standards Australia as the authorising body. From a policy perspective, self-declared labelling was found to be optimal over third party labelling when the incentives to cheat are low and the cost of monitoring is high (Baksi & Bose 2007). Conroy (2001) argues that self-assessed, industry codes of conduct have weak credibility with consumers in mainstream distribution channels.

The specific requirements of the AS/NZS 14021 standard present some challenges for succinct marketing messages and product information on a CGH label. The standard is congruent with sections of the Trade Practices Act which make it “an offence to mislead customers about the nature, manufacturing process, characteristics, suitability for purpose or quantity of any goods or services” (Martin 2005: 4). Claims cannot be made about product “features which have never been associated with the product category” and must be “relevant

to the area where the corresponding environmental impact occurs” (Standards Australia 2000: 5). The standard stipulates that certain vague terms such as green, environmentally friendly, sustainable or free “shall not be used” (Standards Australia 2000: 4). Marketing symbols such as natural objects can only be used where there is a “verifiable link between the object and the benefit claimed” (Standards Australia 2000). The standard mandates that information to substantiate environmental claims are made available at the point of sale (Standards Australia 2000: 6). This means the firms’ objectives and targets are easily accessible to consumers, which is not a requirement under an EMS 14001 standard.

#### **2.6.4 SQF 1000 Code**

SQF 1000 Code has risen to international prominence as an assurance for food safety but can accommodate any consumer specifications for production and processing (Noonan & McAlpine 2003). SQF is based on the principles of Hazard Analysis Critical Control Point (HACCP), identifying potential hazards and critical limits or tolerance limits, monitoring for exceedence of those limits and implementing corrective actions (SQFI 2005). Hazards can include food safety, environmental and animal welfare hazards, and ethical production (Noonan & McAlpine 2003). Many European HACCP based QA schemes incorporate the ‘five freedoms’ standard for animal welfare (Wood *et al.* 1998; FAWC 2007a). SQF has been implemented for prime lamb production in Western Australian (Noonan & McAlpine 2003). Whilst this standard is appropriate for CGH lamb, consumer recognition is low, as with other international standards (Toyne *et al.* 2004).

#### **2.6.5 Conclusion of producer assurances**

The literature indicates that certification program logos lack consumer recognition and that endorsements through advocacy groups such as the RSPCA afford better recognition, although there are no groups that cover all three attributes. SQF 1000 and self-declared product claims can accommodate all three of the credence attributes (CGH).

### **2.7 Mainstream marketing of lamb in Australia**

In 2006, it was estimated that 46, 029 sheep properties across Australia supplied 354,000 tonnes of lamb, mostly produced in Victoria (ABS 2006a). However, the number of properties quoted include all sheep properties, whereas the number of prime lamb producers is closer to 21,000 and specialist lamb producers (more than 200 sheep and 20% cash receipts from lamb) are only about 5,500 (Connell *et al.* 2000). Approximately 50-55% of the lambs are sold on the domestic market, although this percentage fluctuates with supply, prices and exchange rates (ABARE 2004; Weeks & McRae 2008). If the season and prices are favourable

producers can meet the specifications for heavier lambs (> 50kg live weight) required for the export market. Recently, more lamb was sold domestically due to the high Australian dollar (Weeks & McRae 2008), and early de-stocking (at lighter live weights) due to drought conditions and lack of feed (Piggott *et al.* 2000).

Lamb can be sold in a number of ways: directly from the paddock to retailers or wholesalers, through auctions at sale yards or direct to abattoirs, known as over-the-hook (Hayes *et al.* 1998). For instance, in 1998, 50% was sold in the paddock, 45% per cent was sold at auction, and only 3% of lambs were sold direct to abattoirs (Hayes *et al.* 1998). Auctions provide a price reference point each week for sales over-the-hook or in the paddock (Hayes *et al.* 1998).

In 2005, the two major supermarket chains in Australia bought half of the lamb sold on the domestic market and a third was sold to retail butchers (MLA 2008a). Comparable market share was evident for beef sales in 2006, supermarkets had 60% of the market share and retail butchers had 30% (Bowtell 2007). Retail butchers mostly source their product from reputable wholesalers to assure food safety (AMIC 2005). The remainder is sold through food services and manufacturers (Farrell & Tozer 1996).

The concentration of ownership of meat processing has increased more than livestock production, with the number of processors nearly halving between 1974 and 1996, but concentration is still low compared to other sectors (Hayes *et al.* 1998). In 1998, Hayes *et al.* observed that competition appeared to be relatively healthy at all levels in the Australian meat value chain. However, through a series of mergers of wholesalers and the exit of a large retail chain the sector has become more concentrated since the early 1990s (Walker & Webber 2004).

The two major supermarket chains compete on price and marketing services to earn consumer loyalty to the chain (Smith 2006b). Marketing services focus on convenience and include convenient location, store amenities, parking, advertising, customer assistance and product quality and range (Smith 2006b). Convenient, quick-to-prepare prime cuts are in demand, and at a premium because these cuts are a smaller proportion of the carcass (Piggott *et al.* 2000).

One of the two smaller chains competes with a similar bundle of marketing services through local, independently owned supermarkets (who set their own retail prices) under a national marketing umbrella, and the other offers prices 25-30 per cent cheaper than the major

supermarkets through its bulk pallet ordering and display (Round 2006; Smith 2006b). Smaller retailers find it difficult to compete with the economies of scale and scope, further concentrating market share (Cotterill 2006; Round 2006).

Competition for customer loyalty is expensive and supermarkets are on record as stating their margins are low (Bhaskaran *et al.* 2006; Round 2006). Woolworth's claim it costs 85% of the retail price to break down a beef carcass itemised as follows: 38% for the live animal, 9% for slaughtering and boning with 15% of the carcass being waste, 1% for transport, ageing and cool storage, 14% for butchering and packaging with 7% waste (Thomson 2008). The retailing costs, such as wages, advertising and building overheads are recovered from the 15% that remains of the retail price (Thomson 2008). A substantial cost for mainstream retailers is the search cost to procure quality product from a large number of producers (Buhr 2004). The costs are exacerbated by a distribution network spread across long distances with increasing transportation costs to service a relatively small population (Cotterill 2006). Supermarkets recover the costs of competition through economies of scale and scope, vertical integration (Smith 2006b), and with "hard bargains" on prices to suppliers (Piggott *et al.* 2000: 25). Whilst Australian retail supermarkets have not vertically integrated to produce meat they do buy quality assured meat from feedlots on forward contracts, and have vertical alliances with producer groups (Clothier 2005).

There are major benefits in supplying the mainstream with a commodity product. These include ready access to the majority of consumers without taking on the marketing beyond the farm-gate (Smith 2006a; Smith 2006b), allowing producers to focus on production of a quality product. In addition, more animals can easily be sold in the one consignment, food safety is the only credence attribute to substantiate, transaction costs are low, and producers can elect to enter forward contracts with supermarket chains to provide certainty of price and future income (MLA 2008c).

### **2.7.1 Declining terms of trade for producers**

Declining terms of trade mean that producers have less profit margin to invest in machinery and to increase the scale or intensity of their operations to become more efficient (Williams 1990; Renting *et al.* 2003). Pressures on farm income include the increasing costs of inputs, particularly labour, land and energy and growing power of supermarkets in determining farm gate prices, which is discussed further below (de Wolf & Schoorlemmer 2007).

As incomes rise in a market, the marketing component of the retail price of produce becomes a larger proportion than the production component due to the demand for variety, convenience and value adding (Steenkamp 1997). The percentage return to producers has dropped over time. The farm-level value for animal products dropped from 58% to 51% of the retail price from 1964 to 1981 (Tangermann, 1986 in Steenkamp 1997). In 2005-06, a period of historically high prices to lamb producers and consumers, the return to producers on retail prices was approximately 35% (ABARE 2006).

### **2.7.2 Downward pressure on prices to producers**

Cox *et al.* (2007) suggest that the Australian lamb supply chain has features that indicate buyers have greater power than producers. Features include many sellers and few buyers, a concentration of market share among a few retailers, and an increasing concentration of processors. Greater market power enables the retailers to control terms of trade and prices paid to suppliers, as well as prices charged to consumers (Cotterill 2006; Sexton *et al.* 2006). Marsh & Brester (2004) found that increased retail concentration in the United States accounted for one-fifth of the decline in cattle prices in the decade 1987 to 1998, and that retailers are incurring increasing costs to meet consumer demand for food safety, marketing services and value adding. To cover these costs retailers are gaining efficiencies through large volumes and by negotiating lower prices with suppliers (Marsh and Brester 2004).

Hayes *et al.* (1998) pointed out that competition and prices paid for livestock will differ between regions according to the number and location of buyers and distance to the main market. Prices paid at auctions fluctuate each week due to variations in the volume of supply and demand from buyers (Piggott *et al.* 2000). Supermarket buyer competition at sale yard auctions can lift the prices achieved for quality lambs that meet their specifications (MLA 2008c). The supermarket buyers have a choice of suppliers apart from auctions and can easily make up supply through accredited abattoirs, thus putting downward pressure on the price offered to producers in the paddock (Smith 2006b).

Smith (2006b) observed that Australian producers were reliant on a few mainstream selling options to gain access to a sizeable market, whereas buyers have many alternative agents and suppliers. Opportunistic swapping between supermarket buyers run the risk of losing the loyalty and market access built through the relationship with the buyer (Batt 2003). However, buyers can readily switch to a similar commodity readily available elsewhere with relatively low search costs (Cox *et al.* 2007).

Prices received by mainstream meat producers are also kept low when there is an increase in volumes of supply due to seasonal de-stocking (Piggott *et al.* 2000). Cotterill (2006: 26) concurs that “price spread increases with volume of produce marketed” due to increased supermarket buying power when supplies are ample. Circumstances, such as lack of rain or increasing grain and fuel prices, can make the sale of good condition stock an imperative and leave the producer in a weaker bargaining position (Piggott *et al.* 2000).

Based on complaints of a lack of price transmission from farm gate to consumers, a Joint Select Committee on Food Retailing Sector reviewed competition in 1999 and found no abuse of market power under the Trade Practices Act (Griffith 2004). Sexton *et al.* (2006) found that models of perfect competition (prices highly correlated) and traditional models of market power (collusion) didn't explain the lack of price transmission from farm-gate to consumers but that pricing and marketing strategies were likely to keep prices low to consumers and to suppliers. Smaller producers' lack of bargaining power was thought to be particularly detrimental when retail prices are held constant despite shifts in supply or demand because the retailer must compensate by adjusting prices paid to other producers (Sexton *et al.* 2006).

## **2.8 Lack of incentive for intermediaries to initiate a credence attribute value chain**

Australian supermarkets are unlikely to initiate a change to product environmental specifications based on a lack of consumer demand for these attributes (Cary *et al.* 2004). Intermediaries did not envisage sufficient market demand in the short to medium term to provide the economy of scale that would cover the costs of a supply chain standard and make it commercially viable (Cary *et al.* 2004; Bhaskaran *et al.* 2006). Bhaskaran *et al.* (2006) reported that Victorian food processors believed the power of the two main supermarkets was a major barrier to the promotion of environmentally sustainable foods because they are not interested in stocking low volume products.

To maintain credibility and validity of environmental claims in the mainstream a whole chain approach was thought necessary including processing, packaging and waste recycling, and a commitment from all members of the supply chain (Bhaskaran *et al.* 2006). The majority of intermediaries were of the view that the costs of production, inspection and accreditation would be prohibitive and high enough to suppress demand when passed on to consumers (Bhaskaran *et al.* 2006). The costs of skills development, implementation, monitoring and

accreditation are substantial and often beyond the financial capacity of most suppliers (Bhaskaran *et al.* 2006). Key supermarket decision makers weren't conscious of the environmental impacts of food production and didn't think it was important, nor did these informants believe that their customers would perceive any benefit from food labelled as environmentally sustainable (Bhaskaran *et al.* 2006).

By contrast, consumer concern about food safety in Europe and the US has promulgated the development of whole-of-chain standards for animal husbandry such as EurepGAP that are required by major supermarket chains (FoodPLUS 2005). Experience from the UK and Europe suggests that producers bear the costs of credence attribute schemes to retain market access (Hubbard *et al.* 2007). Many UK producers have been disappointed by the lack of market response to animal welfare schemes with small volumes, little promotion through retail chains and continued importation of cheaper meat (Veissier *et al.* 2008).

## **2.9 Strategic alliances to distribute branded lamb**

Instead of supermarkets initiating investment in whole-of-chain assurance programs, strategic alliances have the potential to supply branded lamb in the volumes required by retail chains. Strategic alliances can be either vertical partnerships between supply chain businesses where the businesses remain independent or horizontal collaborations between producers (Fearne 1998; Hayes *et al.* 1998). Forming strategic alliances has enabled producers to meet supermarket requirements for consistency of quality, large volume, predictability of service, planned delivery, low prices and low costs (Plunkett & Kingwell 2001; Gattorna 2006). Hobbs and Young (2000) suggest that uncertainty and costs are usually increased by product differentiation in a mainstream commodity market. Research indicates that alliances may not improve farm-gate prices much more than spot marketing, unless the product has added value for the customer (Fearne 1998; Plunkett & Kingwell 2001) and that the point of difference is not easily replicated by other producers (Farrell & Tozer 1996). Collaborations between producers have focused on buyer specifications for improved eating quality at the volumes required (Fearne 1998; Hayes *et al.* 1998). For example, a lamb industry case study of an Australian lamb marketing group found producers were receiving a premium of \$2 to \$4 on a 20 kilogram carcass as a result of their alliance with a retail butchers' buying co-operative (Farrell & Tozer 1996). In Western Australia, a lamb brand alliance assured their product as lamb, not hogget, and provided consistent eating quality to stabilise prices and gain a slight increase (Thatcher 1997). In the US, the difference in prices received for cattle sold under an alliance and the spot market was about one per cent extra (Hayes *et al.* 1998).

### **2.9.1 Horizontal alliances**

Horizontal alliances that offer a quality assurance and reduce transaction costs can regain some power to negotiate with mainstream retailers (Hayes *et al.* 1998; Cotterill 2006). Membership of an alliance can remove some of the barriers for producers wanting to market their own produce such as increasing prices, sharing marketing costs and employing marketing skills (Thatcher 1997; Fearn 1998; Hayes *et al.* 1998; Plunkett & Kingwell 2001; Verhaegen & van Huylbroeck 2001). The Southern Agricultural Producers' Co-operative Ltd in south-west Victoria is an example of an alliance with these benefits. The group of 28 producers was started in 1994 to reduce weekly price fluctuations at the sale yards and be rewarded for assuring the quality of lambs (Gill 2000). They employ a live animal assessor to check weights and fat-scores prior to transportation directly to processors. The processors openly share market and production data with producers (Gill 2000).

Horizontal alliances between producers are a means of increasing scale to approach that of the buyers, and are a precursor to vertical alliances with the buyers, who would not invest in the formation of producer marketing groups (Hayes *et al.* 1998). To produce specific product attributes, members would need to be like-minded and prepared to consistently meet the criteria (Gattorna 2006).

### **2.9.2 Vertical alliances for distribution of branded lamb**

Vertical alliances for distributing branded lamb through retail chains need to provide a larger volume than is generally produced from one property and be able to do so all year round (Farrell & Tozer 1996). The benefits of vertical alliances between producers, processors and retailers are better security and certainty on forward prices, less downgrading as animals meet all specifications, maintenance of brand identity (Hayes *et al.* 1998; Hobbs & Young 2000; Clothier 2005; Gorter 2008), and improved efficiency along the supply chain (Farrell & Tozer 1996). Buhr (2004) found in case studies with branded pork producers in Canada that the main incentives to develop vertical alliances were to retain ownership throughout the supply chain to control quality, reduce price risk and reduce search costs.

There are few Australian examples of vertical alliances. Alliances such as Q Lamb in Western Australia and the Casmark Alliance in Victoria both aim to assure eating quality and sell through supermarket chains. Casmark sells 'pasture fed' heavier lambs through the export market, as well as domestically through the parent company, a smaller supermarket chain, which offers a premium of approximately \$10 more per animal (Story 1998; Clothier 2005).

## **2.10 Alternative distribution channels for branded lamb**

Alternative supply chains to the mainstream that have been described in the literature include direct marketing, alternative food networks (AFN) and value chains. Direct marketing is defined as avoiding intermediate traders to sell direct to consumers (Gilg & Battershill 1998; La Trobe 2001). AFN are characterised as non-conventional supply channels which reconnected consumers and food producers, although producers don't necessarily drive the marketing (Venn *et al.* 2006). Product quality, trust and community are central to the exchange in AFN (Venn *et al.* 2006). Direct marketing and AFN distribute through various channels such as farmers' markets, online or phone ordering and home delivery, collection of seasonal produce called 'box schemes', farm-gate sales, mobile food shops and producer cooperatives or direct to specialist retailers or wholesalers (Venn *et al.* 2006). These distribution concepts don't include extended supply chains where producers might sell to specialist retailers, restaurants or food service companies. Value chains differ from supply chains in that retailers have more developed supply chain partnerships than conventional chains, with the goals of "sharing risks, information and benefits" (Conner *et al.* 2007: 67).

Many researchers have focused on alternative supply chains as economic opportunity for not only the producers, but consumers and the community (Norberg-Hodge *et al.* 2002; Allen *et al.* 2003; Appleby *et al.* 2003; Renting *et al.* 2003; Lyson & Gupitill 2004). Alternative supply chains are seen as a response to declining farm incomes, and to increasing consumer concerns about the impacts of conventional agriculture on their health, the environment and animal welfare (Allen *et al.* 2003; Renting *et al.* 2003).

Similar to producers elsewhere, producers in New Zealand (NZ) and Australia have reported that the motivation for changing marketing channels was that the supply chain intermediaries set tough prices and supply conditions (FDIS 2001; Lawson *et al.* 2008). Farmers report increased profits through direct marketing in the UK (Pretty 2000), in NZ (Lawson *et al.* 2008) and in the US (Francis 2002; Buhr 2004). Direct marketing was reported to be a means of obtaining a reasonable price, supplementary income (Lawson *et al.* 2008; Coster, 2005) and steady cash flow (Lines-Kelly & Mason 2001). Other benefits of marketing direct to consumers that were most often reported through empirical studies are:

- direct contact and feedback from consumer (FDIS 2001; Coster & Kennon 2005; Lawson *et al.* 2008);
- ownership and control through the supply chain (Norberg-Hodge *et al.* 2002); and

- reward for commitment to improving eating quality and low input or traditional production (Gilg & Battershill 1998; Venn *et al.* 2006).

Benefits specifically related to selling through farmers' markets include providing a low cost business incubator to develop new businesses, test new products or brands, networking with other marketers to learn marketing skills, links to gain access to other markets, and an increase in the customer base and volume of sales (Coster & Kennon 2005; FDIS 2001; Conner *et al.* 2007). A further benefit is the opportunity to promote products to restaurants and retailers, and link in with the regional promotion of produce (FDIS 2001; Coster & Kennon 2005; Lawson *et al.* 2008).

In regard to alternative supply chains, there is a need for further research into the revenues derived (Sage 2003) and transaction costs (Verhaegen & van Huylenbroeck 2001). The margin between farm-gate price for product and retail price incurs costs such as transport, slaughter, processing, wholesaling and distribution to retail outlets, as well as the 'bundle' of retail marketing service (Sexton *et al.* 2006; Smith 2006b). No previous research has apparently been attempted to quantify the revenues and costs associated with producers distributing a differentiated meat product in Australia. A cost-benefit study of a farmer co-operative selling various products direct to consumers was conducted in the Netherlands (Verhaegen & van Huylenbroeck 2001). The following section outlines a framework for assessing the feasibility of producer-driven marketing.

### **2.11 Assessing a strategic change to production and distribution of CGH branded lamb**

The constraints to production and marketing a CGH branded lamb raised in the conceptual framework (Figure 1) and described in the above sections determine the financial feasibility of undertaking a strategic change to a conventional farming operation. Good business decisions involve research and planning, including an assessment of the benefits, costs and human resources required (Mazzarol *et al.* 1999; Ronen 2002; Simatupang *et al.* 2004; Malcolm *et al.* 2005; McElwee 2005). Assessing the value of a strategic change for family farms (operated by a family as security and a way of life) from mainstream supply of a commodity to production and distribution of CGH branded lamb should consider the contribution of that change in terms of profit as well as other goals that producers may have. The analysis of adequate returns and acceptable risk is then subjective and relative to individual circumstances (Malcolm *et al.* 2005).

Table 5 presents a framework for assessing the profitability of mainstream supply and producer-driven ventures. The criteria in Table 5 and descriptions that apply in the two marketing channels are largely from the work of Verhaegen & van Huylenbroeck (2001) who proposed this framework for comparing the profitability of direct marketing with mainstream marketing by identifying and describing whether costs were higher or lower between the scenarios. Hobbs (1997) applied a framework of transaction costs to compare options for producers' selling cattle in Scotland, which informs the descriptions of transaction costs and uncertainty in Table 5. Key factors are revenue (price and quantity), direct costs incurred to produce and commercialise products, transaction costs recurrent in each exchange and uncertainty (Hobbs 1997: 1083; Key *et al.* 2000; Verhaegen & van Huylenbroeck 2001).

Table 5: Criteria for estimating the profitability of selling options for 'clean, green and humane' branded lamb.

Adapted from Verhaegen & van Huylenbroeck (2001) and Hobbs (1997).

<b>Criteria</b>	<b>Producer-driven ventures</b>	<b>Mainstream supply</b>
<b>Revenues</b>		
Prices	Level of premium captured.	Level of premium captured.
Quantity	Carcase yield, volume sold.	Carcase yield, animals sold.
<b>Direct costs</b>		
Production	Labour and operational costs. Substantiation of credence claims.	Labour and operational costs. Substantiation of credence claims.
Commercialisation	Labour, brand promotion, transportation to slaughter and processing costs.	
<b>Transaction costs</b>		
Market	Tracking WTP and price setting.	Price discovery.
Information		Carcase specifications.
Negotiation	Time and transportation costs to search for customers or deliver orders.	Time taken to find buyers and negotiate the sale price. Transportation to sales or slaughter. Sales levies and agents' commissions
Monitoring	Checking for substitution of generic for branded lamb.	Ensuring livestock condition during transportation to sales.
<b>Uncertainty</b>		
Price	Less variability and uncertainty	Price uncertainty
Quantity sold	Estimating sales volume	Grade uncertainty

### **2.11.1 Revenues in marketing channel options**

Producer-driven marketing rather than mainstream distribution may be an appropriate strategy for producers aiming to create a value chain to differentiate on the basis of credence attributes and capture the marketing margin (Conner *et al.* 2007). US research suggests that farmers receive about one fifth of the consumer dollar and that farm income can be increased by 100% or more by direct selling (Tippins *et al.* 2002). Producers must decide how to benchmark and set product prices to fall within a range acceptable to the mainstream buyer or target segment and that internalises any additional costs (Evans *et al.* 2006).

### **2.11.2 Direct costs and benefits**

Direct costs include production and commercialisation costs. Commercialisation costs are those incurred in preparing to market a product (Verhaegen & van Huylenbroeck 2001). Production costs include the operationalisation of credence attributes at the farm management level (Malcolm *et al.* 2005). Labour costs have been found to be a significantly higher cost for commercialisation of products in alternative distribution channels than in the mainstream (Tippins *et al.* 2002).

Verification costs for credence attributes may be treated as production costs since they, like all expenditure on the provision of product information, are incurred independent of sale (Vic Wright, 2008 pers. comm.). Different assurance systems (2.6) incur different costs and administrative burdens. The cost of an eco-label includes fees or royalties charged for the use of the accrediting body's logo for a prescribed period of time, and the cost of compliance and auditing (Gallastegui 2002). Costs of compliance with organic eco-labels are estimated to be \$1,000 in the first year which includes joining fees, auditing, and soil and tissue tests (DPIF QLD 2008). Thereafter, annual fees are generally less depending on the certifying body (DPIF QLD 2008). The cost of implementation of Safe Quality Food (SQF) 1000 verification for small enterprises was estimated to be \$1,000-1,500 initially plus \$600-1,000 per year for ongoing certification (Noonan 2004).

Some evidence suggests that implementation of an accredited EMS, such as ISO 14001 is considerably more expensive. A producer evaluation of an industry specific EMS equivalent (Linden & Huhn 2005b), reported audit and certification costs of \$7,000 in the first year and \$4500 each year to remain certified (Linden & Huhn 2005a). The cost of implementation and accreditation of an EMS for companies with more than 5 full-time employees can be more than \$20,000 and ongoing audits and accreditation are expensive (Noonan 2004). A high cost

of compliance, certification and auditing has also been reported for EMS in Europe (Pedersen & Neergaard 2006). Carruthers (2005) argues that these costs could be reduced through group EMS development and auditing.

Carruthers (2005) argues that the barriers to EMS adoption such as the burden of paperwork, time to implement changes and costs are perceptions that are dispelled by actual experience. However, these findings might be a feature of the participants' acceptance and implementation of environmental assessment and monitoring. Carruthers (2005) observed a positive attitude toward EMS among many of the cases selected from a group of environmental leaders. Enterprise size may be a factor in EMS adoption, as other studies have found small-to-medium sized enterprises are reluctant to invest time and expense in accreditation until the significant accreditation costs are rewarded with a market edge or premium (Cox *et al.* 2002; Toyne *et al.* 2004; Linden & Huhn 2005a).

Record keeping and assessments may be more onerous where there is value added food processing (Noonan & McAlpine 2003). Under the SQF 1000 program producers are obliged to complete a food safety plan as well as compliance with a production plan for credence attributes (SQFI 2005). Internal audits and annual reviews must be verified by a SQF expert who can either be a trained staff member or a consultant, both of which incur additional training costs (SQFI 2005).

### **2.11.3 Transaction costs**

Rindfleisch & Heide (1997) reviewed research on transaction cost analysis, categorising types of transaction costs as asset specificity, environmental uncertainty and behaviour uncertainty. Asset specificity most often referred to the new knowledge required by employees of a firm. Environmental uncertainty is defined as the unpredictable aspects of every exchange, such as “communication, negotiation, and coordination costs” (Rindfleisch & Heide 1997: 46). Behavioural uncertainty includes monitoring compliance with contractual agreements (Rindfleisch & Heide 1997). Transaction costs that recur with every exchange were succinctly classified as “information, negotiation and monitoring or enforcement costs” (Hobbs 1997: 1083). Transaction costs are not always expressed in monetary amounts and a common reason for failure of ventures is that these costs are not accurately accounted for (Verhaegen & van Huylenbroeck 2001).

In the mainstream, transaction costs are a low percentage of the value of livestock and include agent commissions, sale yard levies, transport costs to auctions and abattoirs, as well as the cost of compliance with government regulations such as National Livestock Identification System (NLIS) and the LPA (MLA 2008c). Whilst many of the mainstream transaction costs don't apply to PDM, the complexity of the transaction of a differentiated, branded product is greater because of the need to find and develop trust with a buyer (Hobbs & Young 2000).

### **2.11.3.1 Negotiation costs**

Negotiation costs include transporting product to market (Hobbs 1997: 1083; Key *et al.* 2000), and time to locate buyers. Chavas *et al.* (2000) include the search for a customer or market by producers, and delivery to the buyer in alternative supply chains as negotiation costs.

Transportation costs for direct marketed product are a function of the distance to population centres and processing plants (Francis 2002). For mainstream producers, Hobbs (1997: 1083) includes transportation to auctions or abattoirs and the producers' time as negotiation costs. Supplying the mainstream in Australia incurs freight costs to and from sale yards, which are negotiable when selling from the paddock and are generally a price per head. Commissions are charged to sell at mainstream auctions or through agents (Hobbs 1997).

The cost of entry to a market can be a significant barrier for agricultural producers (McElwee 2005). Coster & Kennon (2005) found that stall fees, public liability insurance and regulatory costs were insignificant when selling through Australian farmers' markets. The opportunity to market a new product in the mainstream is limited by the competition for shelf space, fees charged by supermarkets to list, handle and promote a product, and promotional costs (Cary *et al.* 2004; Smith 2006b).

### **2.11.3.2 Information costs**

Information costs include the cost of "price discovery" and product information such as carcass specifications for each buyer (Hobbs 1997: 1085). Producers in well developed markets generally have low information costs because market reports indicate trends in prices (Hobbs 1997). Australian producers rely on retrospective market reports to decide when to sell, but prices paid will reflect future orders, marketing and pricing strategies of the buyers creating information asymmetry and price uncertainty (Hayes *et al.* 1998; Sexton *et al.* 2006).

Cox *et al.* (2007) determined that asymmetric information contributed to an imbalance of power in mainstream meat supply chain relationships in the UK. Selling direct to abattoirs

entails further information asymmetry. Different carcass trim standards are used at domestic and export abattoirs and it is up to the producer to discover whether dressed weights include payment for pet food grades (McLeod 2003). Producers commonly don't know the value of by-products and cannot factor in price rises or falls into the overall price paid, which in the case of offal or render can be 2% of the revenue from a carcass (Hayes *et al.* 1998; McLeod 2003) or 5 to 20% for skins depending upon wool length and contamination, mainly with seeds and plant matter (MLA 2008c). Issues with asymmetry of information about prices are largely negated by producer-driven marketing where the producer owns the carcass through the supply chain.

### **2.11.3.3 Monitoring costs**

In a review of studies using transaction cost analysis to make governance decisions within strategic alliances, monitoring costs are defined as the costs of ensuring that agreements are complied with and avoiding opportunistic behaviour within vertical or horizontal organisational relationships (Rindfleisch & Heide 1997). Key *et al.* (2000) referred to screening costs to ensure that buyers' credit was reliable as a monitoring cost. Verhaegen & van Huylenbroeck (2001) identified monitoring costs within collective selling arrangements (e.g. horizontal alliances) to control product quality and compliance with codes of practice. Hobbs (1997) identified monitoring costs as ensuring that livestock are handled well during transportation and sales to maintain their value, as well as producers' taking the time to observe grading of carcasses to reduce uncertainty.

### **2.11.4 Uncertainties**

Uncertainty pertains to circumstances where the probability of an outcome is unknown or only partially known and is distinct from risk which involves known probabilities (Hansson 2005). According to decision theory, rational decisions are made with account taken of different levels of knowledge about the likelihood of outcomes, that is, quantifying risks and describing and anticipating uncertainty (Hansson 2005). Recognition of uncertainties and monitoring changes that impact on the market are critical to assessing the feasibility of marketing options (Malcolm *et al.* 2005).

Van der Vorst & Beulens (2002) propose that identifying sources of uncertainty should lead to supply chain redesign that reduces uncertainty. They identified a generic typology of sources of uncertainty (Table 6). Of particular interest for producer-driven ventures are demand quantities and product specifications, the lead time between ordering and distribution,

product quality after storage and throughout the supply chain, carcass yield and wastage (van der Vorst & Beulens 2002). For mainstream suppliers, uncertainty related to ‘information availability and accuracy’ are more relevant and are expanded in later sections. Conventional producers tend to trade-off reduced uncertainty about demand and profitability against potential personal and financial costs (Pannell *et al.* 2006), and farmers tend to avoid risk by testing new ideas on a small scale first (Ohlmer *et al.* 1998).

Table 6: Typology of sources of supply chain uncertainty and the aspects they concern. Reproduced from van der Vorst & Beulens (2002: 421)

	<b>Quantity aspects</b>	<b>Quality aspects</b>	<b>Time aspects</b>
<b>Supply</b>	Supply quantities	Supply qualities	Supplier lead time
<b>Demand and distribution</b>	Customer demand for product qualities	Customer demand for product specifications	Customer order distribution lead time
<b>Process</b>	Production yield and scrap; write-offs	Produced product quality; product quality after storage	Production throughput times; storing time
<b>Planning and control</b>	Information availability	Information accuracy	Information throughput times

#### **2.11.4.1 Price uncertainty**

Hobbs (1997) identified “price uncertainty” as a type of information cost, where producers selling at auction do not know the price prior to the sale. Price uncertainty tends to occur at livestock auctions where the price can be affected by the number of buyers present at an auction (Hobbs 1997: 1083). At auctions, producers do not know in advance of transporting livestock whether major buyers will be present nor how many buyers will be bidding competitively (MLA 2008c). The order of the sales of livestock at auction can also impact on the price received as buyers’ volume requirements are filled, adding to price uncertainty (Hobbs 1997). At the time of sale, producer-marketers experience less price uncertainty where they negotiate the price with buyers prior to sale (Buhr 2004). Verhaegen & van Huylenbroeck (2001) found much less uncertainty relating to price for farmers selling to a co-operative.

#### **2.11.4.2 Grade uncertainty**

Mainstream suppliers risk penalties for carcasses that are not within a specified dressed weight range and fat score (‘the grid’) when selling over-the-hook (MLA 2008c). Hobbs (1997: 1092) identified “grade uncertainty” ... as ... “the risk that cattle sold directly to a packer may not grade as expected”. From visual inspection of the live animal, producers must estimate the dressed carcass weight range to avoid penalties (MLA 2008c). Producers are paid cents per kilogram for the dressed carcass weight after trimming and gutting. Penalties can be

significant and are incurred whether the carcass is heavier or lighter than the grid (MLA 2008c). Mainstream producers do not usually monitor the grading and processing and are paid after processing by the abattoir. In the UK, the penalty is only applied where the carcass is light (Hobbs 1997). According to a study in the UK, beef producers found it difficult to estimate dressed weights accurately, with a substantial proportion of carcasses falling outside the target grade (Fearne 1998). Producers were therefore not willing to risk the penalties that might be applied in over-the-hook selling and preferred auctions as a method of selling (Fearne 1998). Hobbs (1997) found that grade uncertainty over-the-hook increased the proportion of cattle sold through auctions by 6.2%.

The Australian meat industry is implementing initiatives to reduce producers' risk, such as assessment guidelines and electronic monitoring of livestock. Meat Standards Australia guidelines help producers calculate fat scores and dressed weights accounting for breed, sex, skin weight, fat score, age and time off-feed (MLA 2008c). Pilots are underway to develop E-sheep, a Sheep CRC initiative (electronic ear tags and scanners) to monitor weight gain, growth rates and maternal pedigree (Murphy 2006). However, the benefits will need to cover the estimated start up cost of \$16,000 per producer (Murphy 2006). For full traceability from paddock to plate or from live weights to dressed weight, abattoirs will need to support electronic tagging by transferring data from the producers on carcass weights recorded on farm and animal identification (Carter 2006).

Another type of grade uncertainty concerns condemned carcasses at abattoirs due to bruising or disease. Producers are not paid for any part of the carcass and must take the processors word about carcass condition (MLA 2008c).

Producer-marketers are not affected by grade uncertainty as they can grade their carcasses to suit a range of niche markets (Farrell & Tozer 1996). The market for light carcasses has been declining as younger animals have lower yield of meat compared to waste increasing the cost of this grade of carcass (Farrell & Tozer 1996; Pethick *et al.* 2003). However, higher value markets can cover the additional costs of processing smaller carcasses of 3-4 month old lambs, for example (Farrell & Tozer 1996).

#### **2.11.4.3 Variability in volume of demand and supply**

Features of food supply chains that adversely affect scheduling and product quality control are the high variability in demand, seasonality, production yield and perishability (van der Vorst

& Beulens 2002). Perishability increases uncertainty for sellers as they are often unable to store product and must reduce the price or find a buyer (Hobbs & Young 2000).

There is usually a lead-time from orders being placed to goods being received. In the case of producer-driven marketing this lead-time includes slaughtering, processing, packaging and transportation (van der Vorst & Beulens 2002). Unpredictable demand can be mitigated by providing ordering facilities by telephone or online and securing regular repeat orders (van der Vorst & Beulens 2002; Gattorna 2006). Verhaegen & van Huylenbroeck (2001) found that for direct marketers there was more uncertainty relating to volume sold.

#### **2.11.4.4 Uncertainty related to strategic enterprise change**

Uncertainty about strategic changes to farm enterprises include: unknown outcomes of practices, the possibility of technical failure of the practice, unknown lag time before the benefits are realised and the potential for financial loss, competition from existing businesses and new entrants, and the impact of government regulations (Moschini & Hennessy 2000; Marra *et al.* 2003; Malcolm *et al.* 2005; McElwee 2005; Pannell *et al.* 2006). Mazzarol *et al.* (1999) found that uncertainty about access to external resources affected business formation, including:

- economic aspects such as the availability of capital, recession, and unemployment;
- social aspects such as producers' networks and socio-political influence;
- political support through agencies;
- infrastructure such as access to education and information, labour and premises availability;
- niche market growth or new technologies.

#### **2.11.5 Acquiring new skills**

Several researchers consider available skills, experience, abilities, and producers' goals as fundamental to the feasibility of strategic enterprise change (Ronen 2002; Malcolm *et al.* 2005; McElwee 2005). A strategic change to a producer's relative involvement in the enterprise output and the marketing channel is a change in the traditional role of the producer that can be described as entrepreneurial (McElwee 2005). Entrepreneurship is a creative business endeavour in an environment of risk and uncertainty (McElwee 2005). Critical entrepreneurial skills include recognising the opportunities, resourcefulness and strategic planning (McElwee 2005; de Wolf & Schoorlemmer 2007). Strategic planning skills included

information seeking, setting goals and managing time, monitoring performance and growth (de Lauwere 2005).

### **2.11.6 Summary of revenues and costs in making a strategic enterprise change**

Changing the production and marketing system of an enterprise is likely to require new skills and incur training costs and the producers' time. Revenues may be increased by capturing the marketing margin but there is a cost in doing so. Labour and certification costs are likely to increase in PDM. Transaction costs may not necessarily increase but are likely to be more complex. There are different types of uncertainty experienced in the mainstream and PDM. Whilst largely unaffected by price and grade uncertainty, PDM experience greater variability in demand and supply volumes and must manage the technical and financial uncertainty of making a strategic change.

### **2.12 Conclusion**

The perception of Australian agriculture as a clean and natural environment to grow food is used relative to the conditions in our major export destinations in the northern hemisphere and our major competitors. However, the terms used to promote Australian agriculture are not commonly defined by consumers. The term 'clean' is used interchangeably with food safety and 'green' is applied as a general description of reduced impact on the environment with legislation precluding certain activities. 'Humane' is defined by industry codes of practice that act as minimal standards. Minimal production standards are variably implemented by Australian farmers. Points of difference between generic lamb and CGH branded lamb would be produced by implementing a standard that minimised pesticide use, conserved natural resources and biodiversity and improved stockmanship.

Figure 3 outlines the complexity inherent in the consumption of credence attributes alluded to in the conceptual framework (Figure 1), and summarises the key facets identified in the literature review that are relevant to production and marketing of CGH lamb. Specific gaps for further investigation are indicated with darker shading.

Consumers of ethical credence attributes are likely to respond to a CGH lamb product where product information describes the benefits and substantiates the claims to maintain consumer confidence, where the price is acceptable, and the product is accessible. There is evidence that market segment involvement in CGH issues and search effort is high, indicating that

consumers may purchase directly from producers. Consumer trust in the product claims is built through direct relationships with producers and through assurance schemes. Consumer recognition of information cues such as international standards is low, whereas endorsements by a widely recognisable advocacy groups may have greater promotional benefits. Assurance schemes tend to accredit only one attribute; few schemes can efficiently accommodate all three CGH attributes. Consumer preferences specifically for CGH lamb production and expectations of CGH label claims are unknown. The development of a supply chain for such a product would warrant further investigation in this area.

Availability of a CGH choice for consumers is hindered in the mainstream distribution system in Australia as retail chains show little interest in implementing value chains for credence attributes in the medium term. Premiums for CGH lamb may be more difficult to negotiate in the current mainstream retail structure than alternative channels. Producer-driven marketing may be a stepping stones for small scale producers or new brands to grow their client base and cover their costs. A comparison of the profitability of producer-driven marketing options would illuminate whether this is a viable option in the context of an Australian family farm. A profitable distribution option would encourage production of CGH attributes and remove the constraints to availability and choice for an apparently significant market segment. The literature review revealed a framework for consideration of a strategic change such as differentiating and marketing CGH branded lamb. The framework can be used to compare revenues, costs and uncertainties in mainstream and alternative distribution channels.

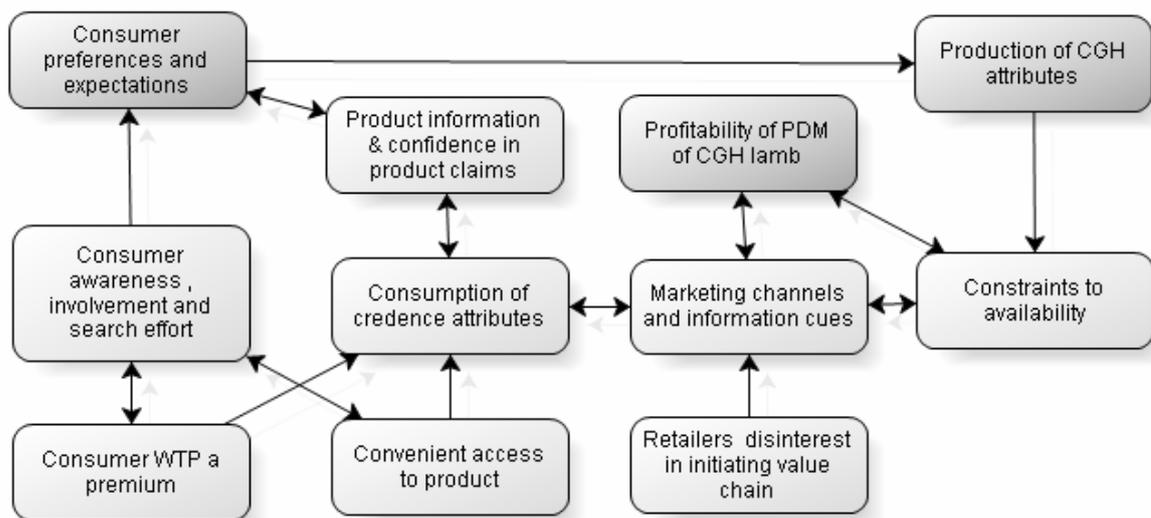


Figure 3: Key facets and gaps of production and marketing of clean, green and humane lamb



### **3 Consumer preferences and expectations of a CGH label**

#### **3.1 Introduction**

Consumer interest in ‘clean, green and humane’ attributes and the preferred production standards for this bundle of attributes in the case of lamb were investigated to determine whether a market might exist in Australia. Lamb claiming to be ‘clean green and humane’ (CGH) must first identify the standards that consumers expect to substantiate such a claim (Malcolm *et al.* 2005). The purpose of the consumer survey was to elicit the public’s interest and answer the research question: *What criteria would consumers expect to define the production of CGH attributes?* Factors that contribute to the success of a new product are investigated including whether there is sufficient levels of consumer interest in the product attributes, and consumer expectations of product availability and accessibility (Malcolm *et al.* 2005; Binnekamp & Ingenbleek 2006). The framework suggested by Peattie (2001) and expanded upon in section 2.5.2, suggests that successful marketing of a CGH product increases consumer confidence in the product qualities, as well as reduces search effort to access information about the product, to find points of purchase, and discovering the price that consumers are willing to pay for the product benefits (Wong *et al.* 1996; Dembkowski 1998; McNamara & Pahl 2004; Toyne *et al.* 2004; Vermeir & Verbeke 2006). This survey included measures to investigate stated preferences for lamb production, willingness to pay (WTP) a premium, sources of information about food and preferred distribution channels. Accurate prediction of market share and cross-price elasticity (substitution with another lamb brand or meat type) is not covered here and may warrant further research.

The consumer survey also contributes to the broader research question regarding whether it is feasible to produce and market a new CGH branded lamb product. The feasibility of producing and marketing CGH attributes to the standard expected by consumers is investigated through two other empirical components; a producer evaluation of on-farm practices and case studies with meat producers who currently marketing their own product.

Whilst research conducted in the northern hemisphere has established that market segments exist for clean, green and humane attributes individually (2.3), there is justification for conducting a survey to establish specific criteria for producing these attributes in the Australian context. Firstly, meat production in Europe and North America tends to be more

intensive and has experienced food safety crises, which has largely driven consumer concern regarding how food is produced. Research suggests that standards need to be customised for local biophysical conditions and production systems (Cary *et al.* 2001). Also, previous Australian industry surveys have used a generalised statement for each attribute rather than specific criteria to describe consumer expectations for production of CGH attributes (Cox *et al.* 2002; McNamara & Pahl 2004). Cary *et al.* (2001) and McNamara & Pahl (2004) both recommend using specific prompts in future consumer surveys to compensate for the lack of knowledge about production methods. Paladino (2005) suggested research to establish consumer preferences for standards for specific products rather than generalised statements about preferences relating to credence attributes.

The criteria presented in the consumer survey are relevant to the issues raised in the extant literature rather than ascertaining current understanding of the terms ‘clean, green and humane’ which is covered elsewhere (2.4). The purpose here was to advance the research beyond consumer perceptions of the terms to ascertain standards that translate readily to farm practice for the production of lamb that can substantiate ‘clean, green and humane’ claims.

### **3.2 Sampling method and size**

The sampling method selected was random interception of shoppers which is a widely used method of collecting marketing data in European countries (Malhortra & Peterson 2001). Kaye-Blake *et al.* (2007) used intercept interviews in supermarkets to improve the response rate and avoid the self-selection bias from mail survey respondents who felt strongly about the survey topic. In this case, consumers generally lack knowledge of on-farm practices and environmental processes; therefore, face-to-face interviewing had distinct advantages (Schegelmilch *et al.* 1996; Cox *et al.* 2002; McNamara & Pahl 2004). Advantages included the use of visual memory aids, clarification of question wording, control of question order which might influence the responses and control of data recording (Czaja & Blair 1996; Bredahl 2001; Neuman 2003; Cooksey 2007). The visual memory aid (Table 7) lists different levels of the three attributes and was printed on a laminated card. The visual aid reduced cognitive burden and improved validity by making constructed measures specific rather than general (Blamey *et al.* 2000).

The sampling frame was ‘buyers of meat’ and stratified only on the basis of gender. The sample was 60% female which is representative of the general population of household shoppers (Chrysohoidis & Krystallis 2005; Wangcharoen 2005). Weightings were used for

grocery buyer characteristics such as age and gender in an Australian survey (McNamara & Pahl 2004). Interviews were conducted Saturday mornings between 9am and 1pm at all sites, and Friday afternoon at conventional shopping centres to increase the heterogeneity of shoppers being interviewed (Czaja & Blair 1996). Shoppers passing a designated place in a thoroughfare were approached seeking consent to participate in the survey; the only reason to restrain an approach was to consider the convenience of the shopper (for instance, not interrupting a conversation, or when they were carrying a load, or under some form of duress such as unhappy children). To reduce bias and adhere to ethical standards interviewers were inducted to ensure they understood protocols for business-like appearance, neutrality in body language, tone and wording as well as protocols for eliciting consent, and for prompting and recording responses (Czaja & Blair 1996; Neuman 2003). A record of refusals identified gender and any stated reason for not consenting, as these were the only variables evident without further interaction (Czaja & Blair 1996).

Table 7: Contents of visual memory aid used to select level of each attribute  
Standard title appears in the table in italics.

<b>‘Clean’</b>	<b>‘Green’</b>	<b>‘Humane’</b>
<i>Pesticide free</i>	<i>Production practices only:</i> minimising soil erosion, maintaining soil fertility, efficient water and fossil fuel use, salinity controlled	<i>Survival practices:</i> Livestock have adequate food, water, disease treatment
<i>Pesticides used within safe limits</i>	<i>Production practices and legal obligations:</i> minimising soil erosion, maintaining soil fertility, efficient water and fossil fuel use, salinity controlled no pollution of streams, controlling noxious weeds and feral animals, culling kangaroos only with permission	<i>Survival &amp; Code of practice:</i> Livestock have adequate food, water, disease treatment, experience minimal stress, fear and pain, and shelter
	<i>Production, legal obligations and conservation practices:</i> minimising soil erosion, maintaining soil fertility, efficient water and fossil fuel use, salinity controlled no pollution of streams, controlling noxious weeds and feral animals, culling kangaroos only with permission reducing greenhouse gases native bush land and wildlife conservation	<i>Survival , code &amp; five freedoms:</i> Livestock have adequate food, water, disease treatment, experience minimal stress, fear and pain, shelter and are able to express natural behaviours

The sites selected (Table 8) attracted a diversity of shoppers from across a region not just the local suburbs, for example both Chadstone and Frankston Shopping Centres service the metropolitan and south-eastern suburbs of Melbourne, and Bendigo and Albury are regional shopping and services locations (Yam-Thang 1998; Verbeke & Viaene 1999; Walley *et al.* 2000; Diamantopoulos *et al.* 2003; Kaye-Blake *et al.* 2007). Responses at farmers’ markets were specifically sought as these venues are considered to be business incubators to test the demand and build a client base for new products (Gardiner & Quinton 1998). Farmers’ markets with high visitor numbers were selected in inner suburban locations at St Kilda and Albert Park, and at Daylesford and Albury. Sampling different populations at different times improves reliability; indicating that people respond to the instrument similarly across sites or that significant differences should have some explanation (Carson *et al.* 2001). The different sites also provided useful comparisons, for instance, attitudes and interest between rural and

urban consumers or checking the representativeness of responses at market venues against shopping centres where it is more likely that the broader population is represented (Czaja & Blair 1996; Malhortra & Peterson 2001; Duffy *et al.* 2005).

Table 8: Site selected for the consumer survey

	<b>Shopping centre</b>	<b>Farmers' markets</b>
Urban	Bayside Shopping Centre, Frankston Chadstone Shopping Centre, Chadstone	Gasworks Farmers' Market, Albert Park Veg Out St Kilda Farmers' Market
Regional	Centro, Kiewa Street, Albury Hargreaves Mall, Bendigo	Hume Murray Farmers' Market, Albury Daylesford Farmers' Market

Sample sizes recommended for preference testing range from 40 to 200 depending upon the method (Naes *et al.* 2001; Paterson *et al.* 2001; Chrysohoidis & Krystallis 2005; Wangcharoen 2005). A sample size of 226 was considered sufficient to calculate stable averages (Moskowitz 1997; Wangcharoen 2005). This was calculated with a probability level set at 90% (90% chance that the sample includes a given population characteristic), a confidence range of  $\pm 0.05$  and assumed variance of 0.3 and 0.7 (Czaja & Blair 1996). An expected variance of 0.7 was based on previous research indicating that conservatively 70% of the sample would be interested in the issues (Czaja & Blair 1996).

### **3.3 Survey design**

Constructed measures were factors that influence consumption including: involvement (interest in the issues), quality, accessibility and price (Steenkamp 1997, Vermeir and Verbeeke 2006). The survey instrument is attached (Appendix 1). Consumers rated their interest in the issues using a five point bipolar Likert-type scale adapted from Duffy *et al.* (2005). Respondents tend to give more thoughtful responses if they have an interest or care about the issues, where the attributes are comprehensively described and supply is plausible (Carson & Groves 2007). A level of interest is antecedent to consumer involvement in the purchase; that is the importance or relevance of the issues to the consumer (Mittal 1989).

Sources of information about food and farming were also recorded to measure the level of information search that the segment is likely to undertake (Duffy *et al.* 2005). To minimise consumer search effort, information should be in an accessible medium (Duffy *et al.* 2005). To avoid information overload, product information needs to be available at various levels of detail and it is suggested that websites may be an appropriate communication tool for the

target segment (Ariely 2000; Tadajewski 2006; Canavan *et al.* 2007). Duffy (2005) advocates more research to identify where potential consumers obtained information about food and farming. McNamara and Pahl (2004a: 35) recommends “measuring degrees of environmental awareness” and in relation to the type of media viewed and level of viewing.

Respondents were asked to select the level of attribute preferred for pesticide use, environmental management and humane lamb production (Table 7). The survey stimulus used here describes the standards for all three attributes using criteria compiled through a literature review (2.4.4). The simplest format, described as a ‘one-shot multinomial choice’ between three alternatives, was appropriate for intercept interviews (Malhortra & Peterson 2001; Carson & Groves 2007). Due to the low level of consumer awareness of meat production practices, specific criteria were used as prompts (Cox *et al.* 2002; McNamara & Pahl 2004). This simplified the process to three choices rather presenting respondents in the field with many choice sets; eighteen (two clean by three green by three humane) in a full factorial design. For each attribute consumers were asked: *Which category best describes your preference for lamb production?* Then asked why or prompted to reveal any environmental or animal welfare issues of concern. Responses were taken at face value as indicators of both personal preference and the socially desirable level for each attributes (Fisher & Katz 2000). Also, there was little incentive for strategic behaviour where respondents may be acting to influence the outcome for their own utility (Carson & Groves 2007). Media attention and activists would have raised public sensitivity to environmental management and humane treatment of animals, alerting respondents to the socially desirable responses (Auger & Devinney 2007). Pro-environmental values have repeatedly been found to be strong in western culture (Aldrich *et al.* 2007).

Multiple measures were used as an internal check for construct validity (Auger & Devinney 2007). The level of interest (asked first) was compared to preferences, and the neutrality of interviewers was checked by cross-tabulation of variables by an interviewer variable. The social desirability bias (SDB) indicates the degree to which consumers perceive the criteria as socially acceptable and the utility consumers gain by being altruistic (Peattie 2001). Ethical behaviour is seen as socially desirable by many consumers (Diamantopoulos *et al.* 2003). Sometimes people model the behaviour they believe to be socially desirable to appear to be altruistic (Ariely & Norton 2007). The extent of SDB may be indicated by comparing urban and rural responses, on the assumption that rural respondents’ cultural norms differ from

urban norms, given their familiarity with production methods (Fisher & Katz 2000; Carson *et al.* 2001).

The estimation of market demand is beyond the scope of this study, largely because the product was hypothetical which introduces bias that can distort the results as respondents don't have to actually pay for the product (Carson *et al.* 2001; Lusk & Norwood 2006). However, the frequency of WTP across categories is of interest to the extent that it identifies a premium for a niche market (Lusk & Hudson 2004).

A contingent valuation format was considered appropriate because the research interest at this stage was not price-performance trade-off but to establish the preferred level of CGH attributes (Peattie & Crane 2005). Jin *et al.* (2006) compared contingent valuation methods with choice experiments within the same survey and concluded that the WTP estimates were not significantly different. Part-worth utilities to reveal the relative appeal of product attributes (Murphy *et al.* 2000) to consumers weren't necessary because previous research has already established that significant interest in all three attributes could be expected (Duffy *et al.* 2005), and the order of consumer interest in the attributes; food safety is the highest priority, then animal welfare where it impacts on food safety and lastly the environment (Verbeke & Viaene 2000; La Trobe 2001; Jonker & Takahashi 2002; Dickinson *et al.* 2003; Frewer *et al.* 2005), and that consumers expect the same or better food safety and eating quality with or without credence attributes (Belcher *et al.* 2007; Cox *et al.* 2007).

Respondents' WTP for the chosen alternative was determined by multiple discrete choice questions for a range of premium categories in the style of contingent valuation (Kola & Latvala 2002; Lusk & Fox 2002). The categories were anchored by reference to the 'cheapest price available' which allowed for any differences of location and venue (Latvala & Kola 2003); that is, *Would you consider a lamb product with the options you've chosen to be good value and affordable if it were: [stop at the first No] "same as the cheapest price"; up to 10% more, 11-15% more; 16-20% more and then "how much more..."*. Some respondents may have been induced to continue saying yes despite income constraints (Jin *et al.* 2006). The WTP valuation for a hypothetical product is expected to be overstated (List & Gallet 2001; Murphy *et al.* 2005). Statements about shopping behaviour were rated on a five point Likert-type scale and were intended to moderate the interpretation of WTP responses.

The survey was tested on 10 respondents to check for ambiguous meanings or discomfort answering direct questions; after thirty surveys at the first site it was decided to drop one question about how often respondents might buy the product that contributed little to the aim of the survey. The test highlighted any alternative interpretations of questions that should be considered during analysis (Carson & Groves 2007).

### **3.4 Data analysis**

Non-parametric techniques have been used for two reasons; the variables are categorical and intercept sampling is not random in that all members of the population had equal chance of being represented, violating normal distribution assumptions for inferential statistics (Kalafatis *et al.* 1999; Cooksey 2007). Response bias in interviews can be estimated by comparing the results to actual market share of a similar offering, in this case, organically certified lamb (Diamond & Hausman 1994; Carson *et al.* 2001).

Likert type scales are treated as ordinal rather than interval variables, although some researchers assume equal intervals along the intensity scale (Nardi 2003), others argue that subjective answers cannot be validly measured mathematically (Argyrous 2005).

Cluster analysis was used to group and describe consumer preferences and to reduce data for cross tabulations with other variables (Cooksey 2007). SPSS was used to perform cluster analysis, firstly using hierarchical clustering Ward's method on binary data variables. The agglomeration schedule was perused to establish the appropriate number of clusters (Argyrous 2005; Kaye-Blake *et al.* 2007). ANOVA was used to describe the group means and translate these means into a verbal description of clusters (Argyrous 2005). Kaye-Blake *et al.* (2007) pointed out that cluster analysis does not provide a goodness of fit measure and results are the product of decisions about the distance setting, algorithm and outliers; however, it is a common method used for segmentation (Yam-Thang 1998; Walley *et al.* 2000; Evans *et al.* 2006; Wilson-Jeanselme & Reynolds 2006). Therefore, the number of cases in each cluster was 'reconciled' against the frequency data to decide upon the cluster solution that best reflected the cases.

Associations between descriptive cluster and variables did not seek to test formal hypothesis, instead associations were used to identify factors that affect the feasibility of marketing the hypothetical CGH branded lamb product. Associations reveal underlying concerns stating a

CGH preference, expectations of a label claim, information sources about food and farming, preferred point of purchase, WTP and purchasing behaviours.

Measures of association used most often in cross tabulations were Gamma and Cramer's V. Gamma was used where both variables are at least ordinal, as it is not sensitive to which variable is dependent (symmetric) and gives the strength and direction of the association (Argyrous 2005). This measure can produce a value indicating a perfect association (-1 or +1) when the relationship is not consistent, therefore cross tabulated data were inspected to verify the Gamma value (Argyrous 2005). Cramer's V statistic was used to indicate associations where at least one variable is nominal in contingency tables comparing more than four categories (Cooksey 2007). It is naturally non-directional and the size of the contingency table can increase the statistic; percentages help to interpret the relationship (Cooksey 2007). For Gamma and Cramer's V the association between variables was considered weak where the test statistic was less than 0.3, moderate where the statistic was 0.5, and strong where the statistic was greater than 0.7 (Cooksey 2007). However, the differences between categories in each contingency table were considered in interpreting these statistical tests (Cooksey 2007). Chi-square measures only whether a relationship exists and not the strength nor direction, also it is less useful where cells have frequencies less than five which can occur in small samples and variables with several categories or values (Argyrous 2005).

### **3.5 Results**

To achieve a sample of 251 interviews, 339 refusals were recorded, however an estimated 60% of refusals were a rejected approach rather than a refusal once the reason for the approach had been explained. This may have been partly due to recent street campaigns by green charities in both regional centres visited which made seeking council approvals more arduous and may have negatively affected willingness to engage with people carrying clip boards. Most common reasons given for refusals were no time/in a hurry or vegetarian/don't eat lamb. The refusal rate at farmers' markets was about a third of that at shopping centres, possibly due to the more relaxed Saturday morning atmosphere at the markets. Regional women were twice as reluctant to participate as the men or their urban counterparts.

The sample was split evenly between urban and regional locations, although 13 more surveys were completed in farmers' markets than shopping centres to compensate for 10 incomplete responses to question 14 at the first site (Table 9). Urban surveys were conducted in

metropolitan Melbourne and the regional surveys were undertaken in Albury and Bendigo, because of the proximity to producer case studies.

Table 9: Sampling design for consumer survey

	Farmers' markets (no. of interviewees)	Shopping centres (no. of interviewees)	Total
Urban	66	60	126
Regional	66	59	125
Total	132	119	251
% of total sample	53%	47%	100.0%

Sixty-one percent of the sample was female reflecting the percentage of women thought to be doing the household shopping (Chrysohoidis & Krystallis 2005). Slightly more of the males (4%) were interviewed at shopping centres, and 11% more of the females were interviewed at farmers' markets than at shopping centres. One quarter of the sample (n = 64) had children less than eighteen years of age.

The survey sample was compared to ABS Census population data, June 2005 for the State of Victoria (ABS 2005). The sample seems to be representative of mean household income which was \$55, 000 but under-represents some age groups, specifically younger and older shoppers (Table 10 and Table 11). Twice as many lower income respondents were sampled at shopping centres than at farmers' markets.

Table 10: Income structure of sample

Income	Percentage of sample
0 to \$29 999	19
\$30 – \$39 999	9
\$40 - \$59 999	20
Over \$60, 000	43
Declined to answer	9

Table 11: Age structure of sample

Age	Percentage of sample
18-25 yrs	10
26-35 yrs	19
36-45 yrs	20
46-55 yrs	24
56-65 yrs	18
Over 65 yrs	9

### 3.5.1 Preferred production standards

Respondents were asked which category best described their preference for pesticide use, environmental management and animal welfare, shown a visual aid (Table 7), and asked what issues were of concern. Responses were skewed towards the highest standards, possibly due to the SDB. However, multiple measures support the interpretation of data. The majority of consumers interviewed (63% to 78%) selected the highest on-farm standards (Figure 4). Almost half of the respondents gave at least one reason for their preference for pesticide use, 31% stated at least one environmental issue of concern and 40% stated a humane issue.

Gender was the only demographic variable associated with the preference clusters (V .269, .001). Fifty-two per cent of women were represented in the ‘free & high’ cluster compared to 39% of men. Layered cross tabulation between preference clusters, gender, age and income found a moderate association between 46-55 year old women with income of \$60,000 or more and preference for higher standards (V .518, .031).

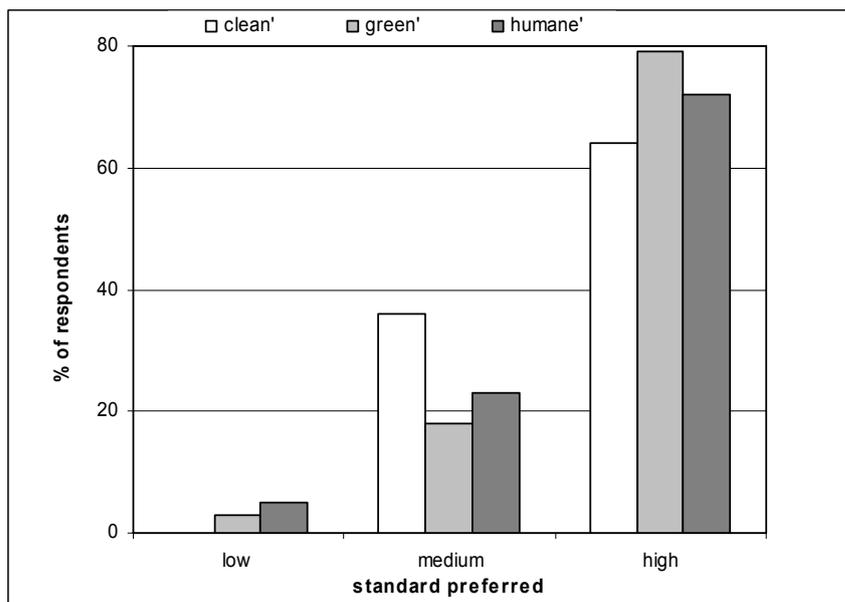


Figure 4: Preferred production standards

A description of the samples combined preferences for production standards is presented in Table 12. The terms ‘free’ and ‘safe’ refer to consumer preference for pesticide use (Table 7). The terms low, medium and high refer to the level of standard preferred (Table 7), high referring to all criteria being met, medium to criteria equivalent to the code of practice and low to criteria for survival and production only. The membership of the clusters labelled ‘free & high’, ‘safe & high’ and ‘low animal welfare & medium environment’ each reflects the frequencies in the raw data. The heterogeneity of responses is masked somewhat by the cluster solution. Cluster analysis with eight clusters revealed that the membership of the cluster labelled ‘medium animal welfare and high environmental standards’ includes: free & medium (n = 7), safe & medium (n = 16), free, medium animal welfare and high environmental standards (n = 20), safe, medium animal welfare and high environmental standards (n = 14). However, the combined description adequately represents the sub-samples. The dendrogram of the five cluster analysis is attached in Appendix 2.

Table 12: Description of clusters of combined preferences for production standards

	free & high (n = 118)	safe & high (n = 42)	medium AW & high Env (n = 57)	high AW & medium Env (n = 20)	low AW & medium Env (n = 14)
Pesticide free or used within safe limits	Free	Safe	Both	Both	Both
Animal welfare (AW)	Survival requirements, code of practice and five freedoms	Survival requirements, code of practice and five freedoms	Survival requirements and code of practice	Survival requirements, code of practice and five freedoms	Survival requirements
Environmental management (Env)	Inter- generational production capacity	legal obligations and biodiversity conservation	Inter- generational production capacity, legal obligations and biodiversity conservation	Inter- generational production capacity, legal obligations	Inter- generational production capacity, legal obligations

### 3.5.1.1 Pesticide use

Most consumers (64%) preferred their lamb produced ‘pesticide free’ and 36% selected ‘pesticides used within safe limits’. In total, 120 respondents (48%) gave at least one reason for their preference.

Those preferring pesticide free gave reasons that related to human consumption (28%) and environmental impacts (5%). Specific reasons given relating to human consumption included impact on health, long-term cumulative effects of chemicals, unknown risk of pesticides, avoiding consumption of chemicals, prefer 'natural' food. Specific reasons given relating to environmental impacts included accumulative or negative effects, belief that sustainable agriculture uses less pesticide.

Respondents preferring pesticides used within safe limits gave reasons relating to production (14%) and trust (4%). Specific reasons given relating to production included control of parasites and disease for food safety, animal welfare management, efficiency and costs, and acceptance that use is necessary. Specific reasons given relating to trust included explicit trust in pesticide safety and regulatory authorities, and the stipulation that the chemicals used should be 'safe'.

### **3.5.1.2 Environmental management**

Most consumers surveyed (79%) preferred lamb to be produced to the highest environmental standard, including criteria for sustaining production, legal obligations and conservation (Table 7).

Stated environmental issues of concern related to sustainability (8%), water resources (7%), soil conservation (12%) and native species (8%). Consumers preferring the highest standard for on-farm environmental practices were no more likely to raise issues than those with different preferences. No associations were found between those who raised an issue and demographic variables or location. Seven respondents (across all preference categories) made comments in support of farmer autonomy and currently good land stewardship.

Specific reasons given relating to sustainability included greenhouse gas emissions, pesticide dip sites and use of marginal land. Specific reasons given relating to water resources included drought, groundwater depletion, run-off and pollution, grazing and stream bank stability. Specific reasons given relating to soil conservation included overgrazing, erosion, hard-hooves, compaction, salinity and degradation. Specific reasons given relating to native species included habitat and biodiversity, clearing, grazing in alpine national parks and culling kangaroos.

### 3.5.1.3 Humane production

Seventy-two per cent of consumers preferred their lamb to be produced according to the highest animal welfare standards (Table 7). Almost half of the respondents mentioned one or more issues when asked *Do you have any particular animal welfare issues that relate to lamb production?* The main issues raised included mulesing (11%), live export (12%), cruelty or mistreatment (11%), feedlots (7%) and road transport (7%). Seven respondents explicitly stated their support for mulesing or opposition to animal rights' activists. Fourteen of the seventeen respondents mentioning feedlots preferred livestock to be able to express natural behaviours. Specific comments about feedlots referred most often to space, with one or two respondents mentioning stress, novel diets and their opposition to factory farming. Less than 2% of the sample raised the following issues: tail docking, yarding and slaughter, drought, routine use of antibiotics and hormones, fox predation, monitoring for disease.

Fifty-two respondents (21%) used words indicating that they oppose the suffering of animals for their consumption; such as stressful, fear, inhumane, mistreatment, ethical, or 'better way'. Respondents who expressed their opposition to suffering did not exclusively prefer the highest animal welfare standard ( $V=.197; .008$ ), indicating that their general concern may not translate to an understanding of animal welfare management.

### 3.5.2 Consumer interest in CGH

Consumers were asked to rate their level of interest using a five point scale in five general areas of lamb production (Table 13), prior to stating their preference for production standards. Areas of interest were very general and, as mentioned earlier, this measure served as a validity check for more specific preference variables.

Approximately 80% of the total sample was interested in chemical use and animal welfare, and 84% in the impact on the environment. Only 64% were interested in production methods and 65% in food miles.

Table 13: Number of responses to issues of interest (n = 251)

	Not at all	Not very	Unsure	Quite	Extremely
<i>How interested are you in chemicals used on farms?</i>	4%	9%	7%	43%	37%
<i>...the welfare of sheep and lambs?</i>	3%	7%	10%	44%	36%
<i>...the effect of farming on the environment?</i>	2%	6%	8%	38%	46%
<i>...how lamb is produced?</i>	2%	13%	21%	42%	22%

... how far your food has travelled?	8%	13%	14%	38%	27%
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### 3.5.2.1 Comparison between interest and preferences

Contingency tables and the Gamma statistic were used as a measure of the tendency for the same cases to fall in higher order categories for two variables (Cooksey 2007). There was a moderate tendency (Table 14) for cases interested in chemical use on farm to prefer pesticide free production (Gamma -.495, .000, standard error .084). A negative value for pesticide use is a consequence of the order of the variable categories in the contingency table; that is, pesticide free before pesticides used within safe limits. Perusal of the contingency tables shows that cases selecting pesticide free production rated their interest as *quite* (58% within this scale point) or *extremely* (81% within this scale point). Of the cases preferring pesticides to be used within safe limits 42% rated their interest in chemical use as *quite* and only 19% were *extremely* interested.

Table 14: Tendency for the same cases to be interested in the issues and prefer higher production standards

	Interest in chemical use	... in welfare	... in environment	... in production	... in food miles
Pesticide use	-.495, .000 standard error .084	-.490, .000 standard error .085	-.211, .050 standard error .105	-.104, .307 standard error .101	-.183, .058 standard error .095
Welfare standards	.387, .000 standard error .099	.433, .000 standard error .092	.196, .074 standard error .106	.100, .343 standard error .104	.226, .028 standard error .099
Environmental standards	.425, .000 standard error .104	.371, .001 standard error .103	.249, .036 standard error .111	.070, .538 standard error .114	.284, .012 standard error .107

Moderate tendencies (Table 14) were found between interest and production preferences for animal welfare (Gamma .433, .000 standard error .092). Perusal of the contingency tables showed that respondents preferring the highest animal welfare production standards (all criteria) were interested in CGH issues and represented 85% of the extremely interested cases and 70% of the quite interested cases.

There was a weak tendency (Table 14) for cases interested in the environmental impact of farming and preference for the highest standard for environmental management (Gamma .249, .036 standard error .111); and no association between environmental standards and production (Gamma .070, .538 standard error .114). Compared to the welfare attribute, 6% more respondents preferred all criteria to be met for the environmental standard and more respondents were unsure about their interest in the effect of farming on the environment.

There was a weak association between interest in food miles and higher welfare (Gamma .226, .028 standard error .099) and environmental standards (Gamma .284, .012 standard error .107).

Preference clusters were cross-tabulated with variables of interest, discerned in the review of literature such as information search effort, accessibility and willingness to pay. Results are presented in the following sections.

### 3.5.3 Information search

Overall, newspapers (60%) and television (46%) were the most frequent sources of information about food and farming (Table 15). Twenty-five per cent more rural respondents than urban said that television was a source of information about food (V .236, .000), and 50% more said that farmers were a source of information (V .267, .000). Radio was more likely to be a source of information for respondents at urban shopping centres (V .249, .007). Sixteen per cent of the sample used the internet as a source of information and these respondents were mainly in the 26-35 age category (V .290, .001). A quarter of respondents surveyed at farmers' markets and slightly fewer at shopping centres said that farmers were a source of information. Sixty-five per cent of the sample attended the farmers' markets to buy fresh fruit and vegetables, then gourmet produce and meat (17%) and baked goods.

A variable was created to classify responses for sources of information about food and farming into mainstream print, television and radio versus beyond the mainstream including internet, food labels and farmers. Fifty-six per cent of the sample looked beyond the mainstream for information, these information seekers were more likely to use their purchases to 'vote' for production methods (V .223, .014). No associations were found for location.

Table 15: Sources of Information

Source	Total No.	% of sample
Newspaper	150	60%
Magazines	41	16%
Television	115	46%
Radio	54	21%
Internet	41	16%
Food labels	82	33%
Farmers	58	23%
Beyond mainstream	140	56%

The ‘information seeking’ variable was cross tabulated with the preference clusters described above (Figure 5). The top three sources of information for the ‘free and high’ preference cluster were newspapers (63%), television (42%) and labels (37%). However, 64% of the cluster also looked beyond the mainstream for information.

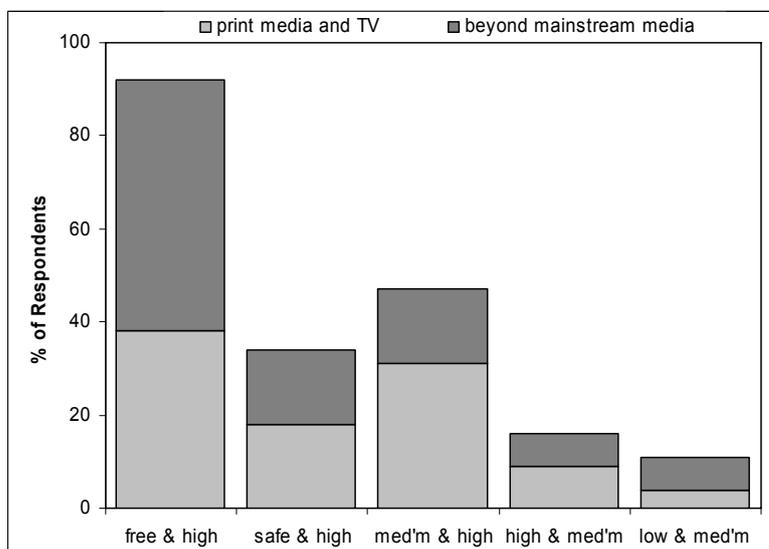


Figure 5: Sources of information about food and farming by preference clusters

### 3.5.4 Preferred point of purchase

Most respondents would prefer to purchase a CGH lamb product from retail butchers (65%), supermarkets (43%) and farmers’ markets (39%) (Table 16). The most frequent reasons for shopping at farmers’ markets was freshness (n =30) and quality (n = 6), and support for local produce and producers (n =20). Less frequently mentioned reasons were concern about farm practices (n = 8), value (n = 8), diversity of produce (n = 5). Interaction with producers was specifically mentioned once. Farm-to-door delivery, health food retailers and online ordering were seldom preferred options for accessing such a product.

There were weak associations between preferred standards and preferred outlets such as farmers’ markets (V .195, .048) and health food retailers (V .225, .013). The ‘free & high’ cluster (described in Table 12) selected farmers’ markets and health food retailers more often than other groups.

Table 16: Preferred outlet for purchase of a branded CGH lamb product

Preference cluster	Supermarket (n = 109)	Retail butcher (n = 162)	Farmers’ market (n = 98)	Farm-to-door (n = 30)	Health food retailer (n = 24)	Online (n = 8)
free & high	47%	49%	59%	57%	79%	75%
safe & high	17%	16%	13%	20%	0%	0%

medium & high	23%	21%	17%	13%	17%	25%
high & medium	8%	9%	6%	3%	4%	0%
low & medium	6%	5%	4%	7%	0%	0%

### 3.5.5 Purchasing behaviours

Most respondents agreed with four of the statements about purchasing behaviour (Table 17). Flavour and eating quality were the main considerations. Almost as many respondents did not always shop for the cheapest price, with this variable weakly associated with type of survey site ( $V .228, .011$ ). More respondents strongly disagreed with this statement at farmers' markets (76%) compared to shopping centres (24%); conversely more respondents agreed at shopping centres (65%) than at farmers' markets (35%).

Table 17: Frequency of responses to purchasing behaviour statements (n = 251)

Agree with the statements	Agreed	Disagreed	Unsure
I always shop for the cheapest price	14%	81%	5%
Buying 'healthier' options is affordable	77%	13%	10%
I use purchasing choices to 'vote' for farming methods	66%	23%	11%
When I purchase food value for money is balanced against the way food is produced	71%	19%	10%
Flavour and eating quality are the main considerations	85%	13%	2%

Respondents at farmers' markets were more likely to agree that healthier options were affordable ( $V .268, .001$ ) and that they balanced value for money against production methods ( $V .250, .008$ ). There was no such association between survey site and responses to the statement that purchases are used to 'vote' for farming methods. Gender was weakly associated with voting behaviour ( $V .199, .041$ ), with more females agreeing (Figure 6). Whilst fewer respondents agreed with this statement than other statements (Table 17), respondents preferring 'free & high' production standards were more likely to agree that they used purchases to vote for production methods ( $V .243, .000$ ) (Figure 7). A greater percentage of the 'free & high' cluster (18%) than other cluster groups disagreed that they balanced voting with value for money (Figure 8). The cluster labeled 'medium animal welfare and high environmental standards' was more likely to strongly agree that they always shopped for the cheapest price, whilst the 'free & high' cluster were more likely to strongly disagree ( $V .210, .000$ ) (Figure 9).

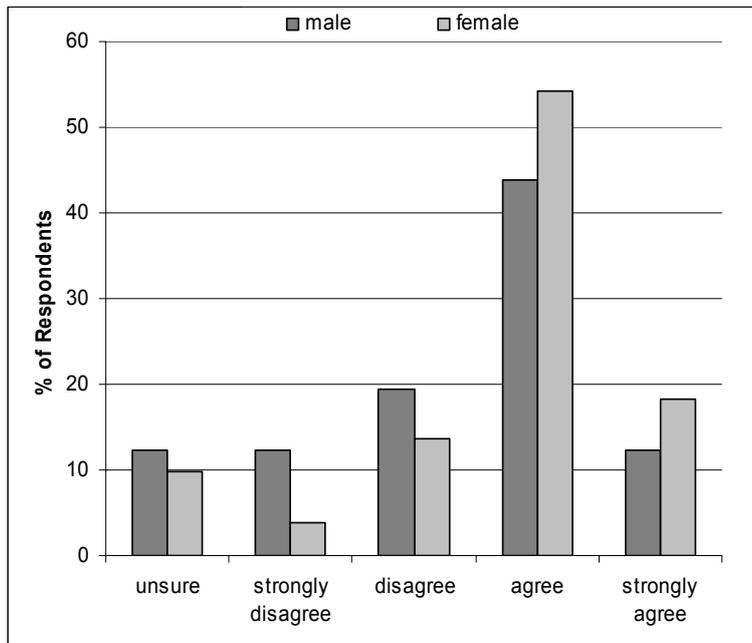


Figure 6: Purchases are used to vote for production methods by gender

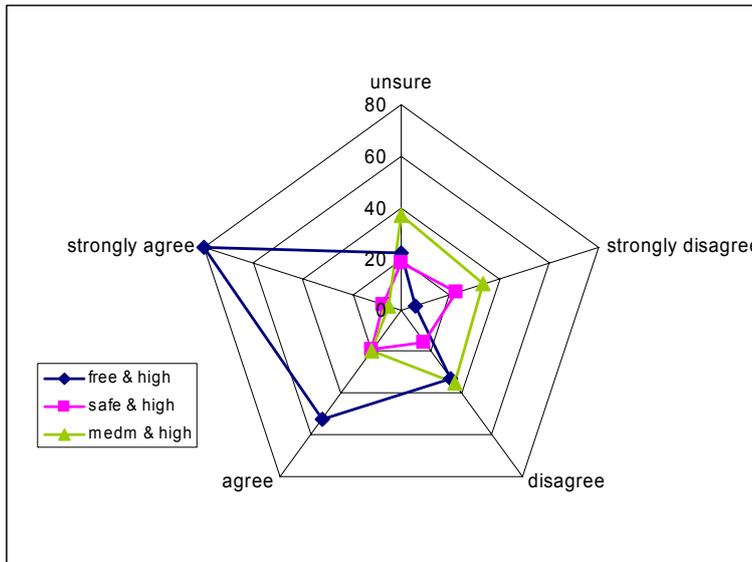


Figure 7: Purchases are used to vote for production methods by preference cluster  
Preference clusters described in Table 12.

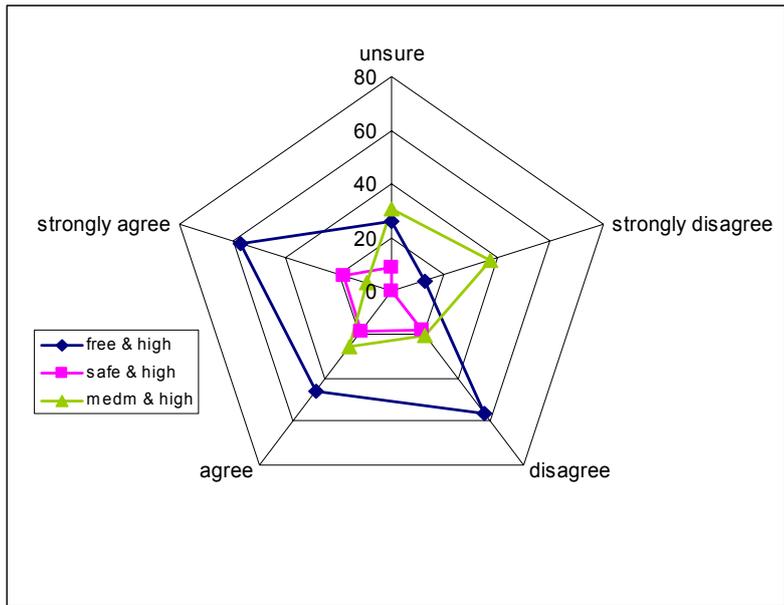


Figure 8: Balance value with voting for production method by preference cluster  
Preference cluster described in Table 12.

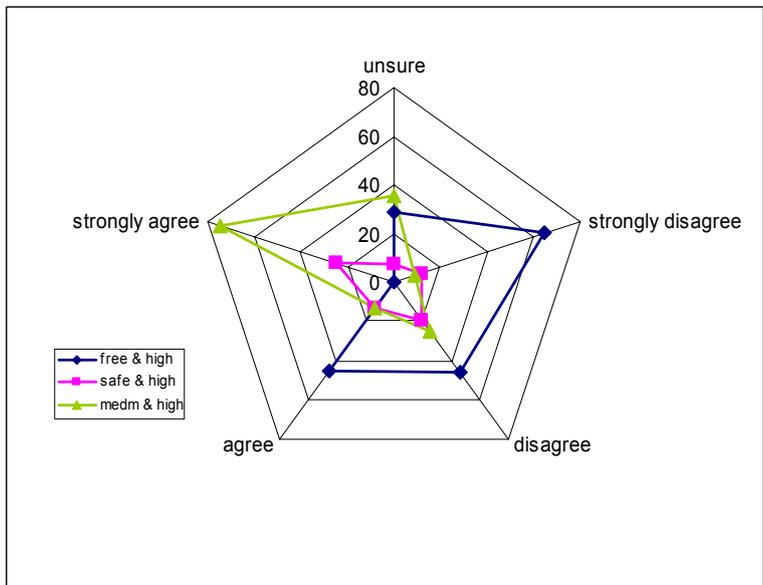


Figure 9: Shopping for the cheapest price by preference cluster  
Preference cluster described in Table 12.

### 3.5.6 Willingness to pay for the preferred standards

Willingness to pay would probably have been exaggerated in response to a hypothetical product and in the absence of budgetary constraints (Carson *et al.* 2001; Auger & Devinney 2007). Eighty-eight percent of respondents were willing to pay a premium up to 10% for a branded lamb product with their preferred attributes (Figure 10). Fifty-eight per cent went on to 11-15% premium and only 20% stated they would pay a premium above 20%.

Generally, the premium that respondents stated they were willing to pay increased with higher standards all three attributes that is, for pesticide use (Gamma  $-.344$ ,  $.000$ , standard error  $.085$ ), for animal welfare (Gamma  $.466$ ,  $.000$ , standard error  $.082$ ), and for environmental management (Gamma  $.530$ ,  $.000$ , standard error  $.085$ ). Figure 11 shows that the *pesticide free* preference increased as a proportion as the premium increased, and conversely those preferring safe use of pesticides were less inclined to pay higher premiums. The same trend can be seen in Figure 12 and Figure 13 where willing to pay higher premiums increases with higher standards and decreases with lesser standards for environmental management and animal welfare. These trends were as readily seen using preference clusters, therefore raw scores were used in cross tabulations.

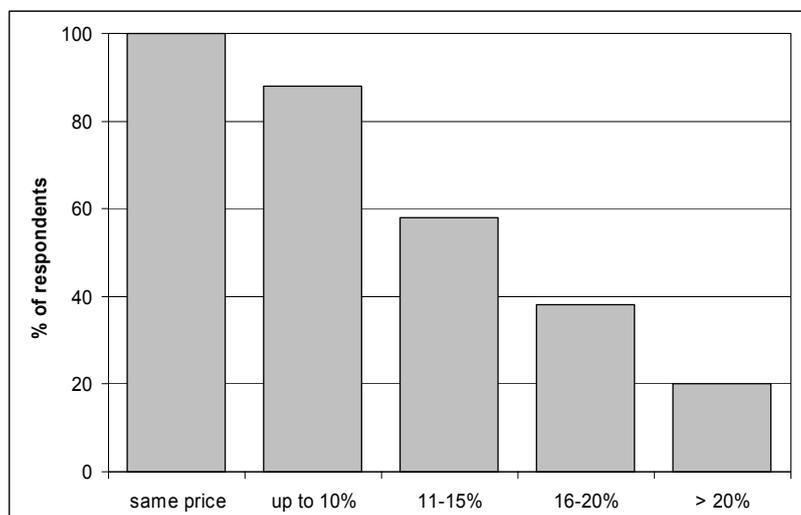


Figure 10: Percentage of sample in each *WTP a premium* category

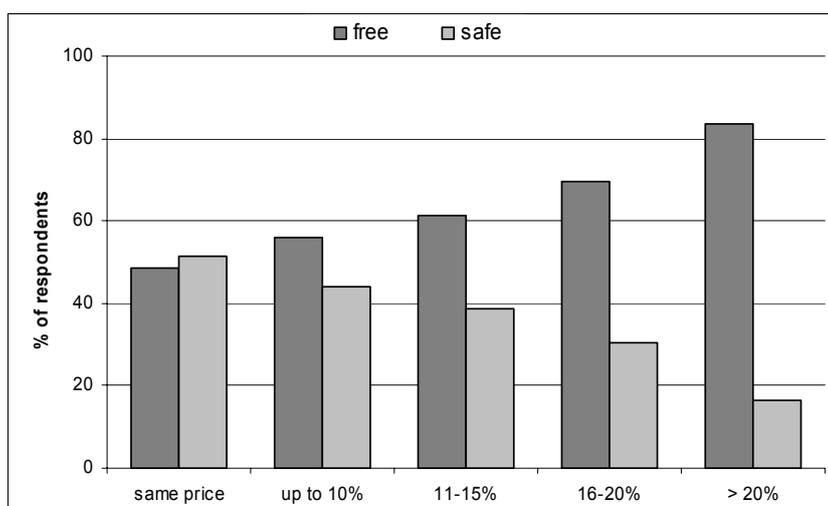


Figure 11: Proportion of each *WTP a premium* category represented by each pesticide use standard. Standards described in Table 7.

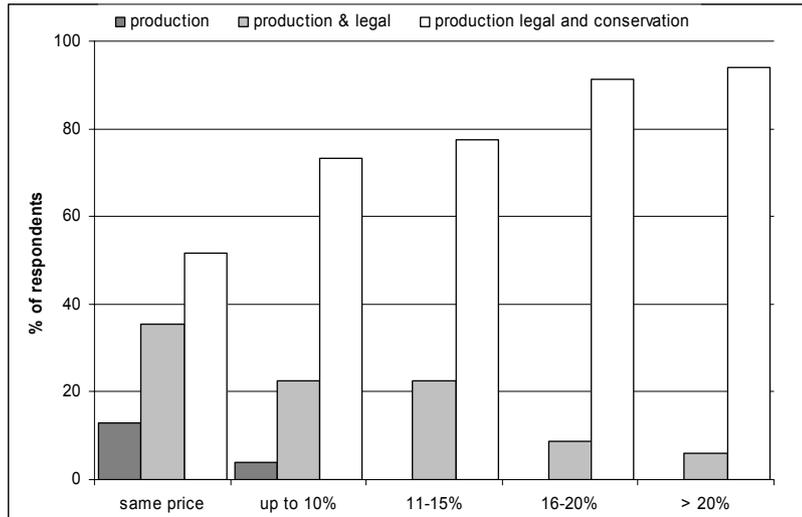


Figure 12: Proportion of each *WTP a premium* category represented by each environmental standard. Standards described in Table 7.

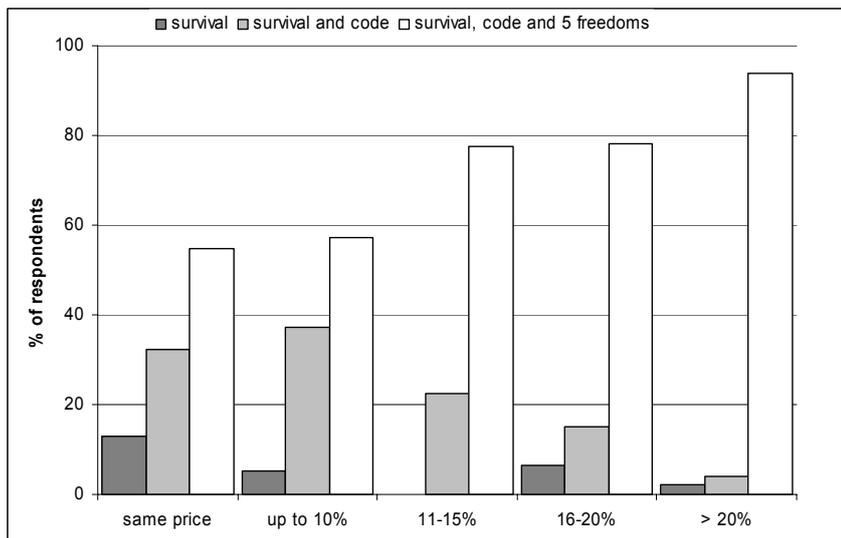


Figure 13: Proportion of each *WTP a premium* category represented by each animal welfare standard. Standards described in Table 7.

### 3.5.7 Expectations of a CGH label

Respondents were asked *which category best describes what you would expect of a lamb product labelled clean, green and humane?*, and were forced to select one of the three standards with the researcher confirming their expectations for the *pesticide free or used within safe limits*.

Approximately 60% of respondents expected a label claiming to be ‘clean, green and humane’ to be pesticide free (61%), and meet all other criteria for environmental management and animal welfare (63%). There were 23 cases not included in analysis of this variable: 10 responses (4%) for the pesticide use attribute were not confirmed by the interviewer, and 13

cases were recorded as various combinations of levels of the attribute, which was not consistent with the question asked.

There was a strong tendency for respondents to be consistent between preferences and label expectations for the ‘clean’ attribute (Gamma .855, .000, standard error .043), although responses shifted in both directions. For instance, 28% of respondents preferring ‘safe’ pesticide use expected higher standards of a product labelled ‘clean’ and conversely, 17% of those preferring pesticide free expected ‘clean’ to mean pesticides used within safe limits (Figure 14). Similarly, a greater proportion of respondents (39%) increased the standard expected for a ‘green’ label claim than decreased (24%) the expected standard (Figure 15). Only a moderate concordant tendency was observed between preferred and expected environmental standards (Gamma, .511, .000. standard error .114). Because the expected standards for ‘green’ and ‘humane’ claims (Figure 16) were tied, the shift is very similar for both attributes (Gamma, .485, .000. standard error.104). For instance, 33% expected a higher standard and 20% of responses moved from higher preferred standard to a lower standard.

Overall, respondents who preferred lower CGH standards expected a label claim to have higher standards, and conversely but proportionally less, those preferring high standards lowered their expectations of a label claim.

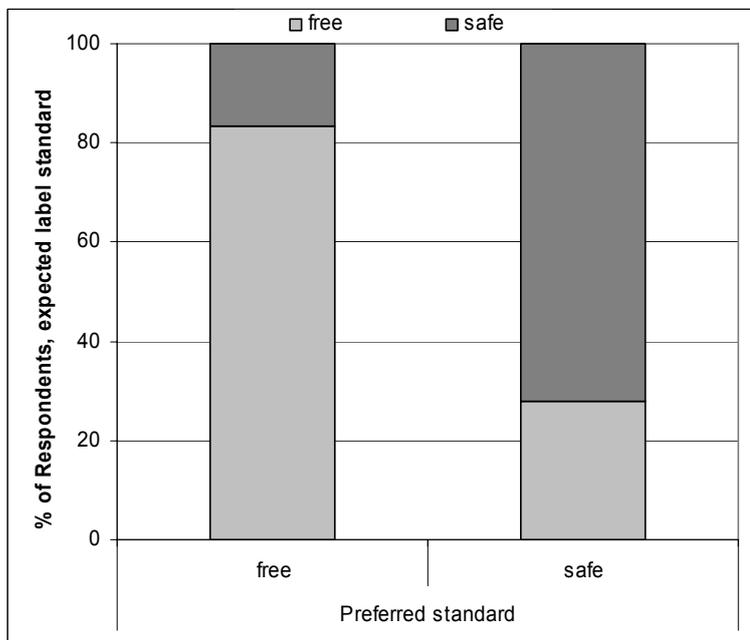


Figure 14: Percentage of expected CGH label standard by preferred pesticide use standard

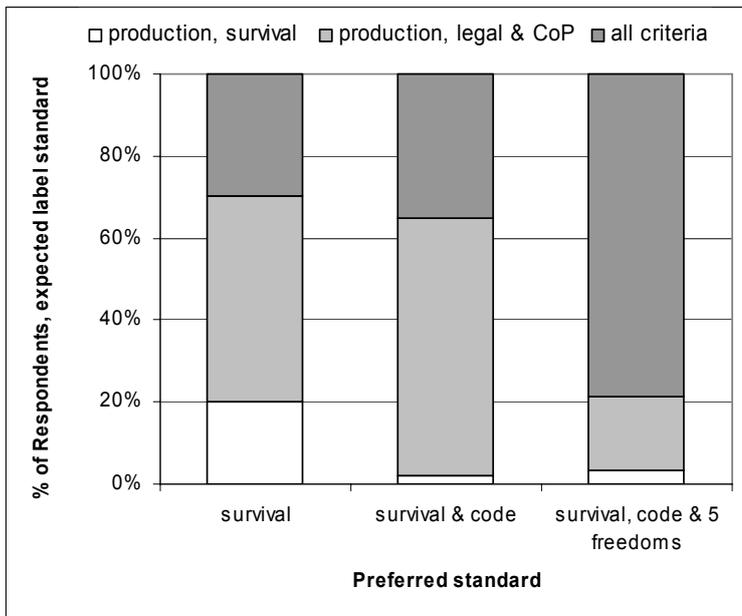


Figure 15: Percentage of expected CGH label standard by preferred environmental standard Standards described in Table 7.

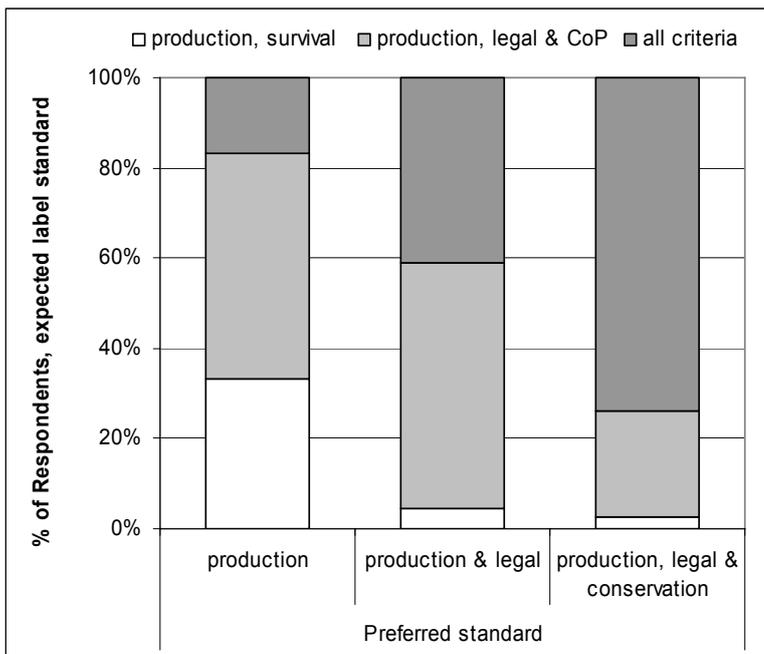


Figure 16: Percentage of expected CGH label standard by preferred animal welfare standard Standards described in Table 7.

### 3.6 Discussion

Evidence that satisfactorily answers the following research question is discussed, *What criteria would consumers expect to define the production of CGH attributes?* Evidence from the consumer survey relating to shopping behaviour and information search contributes to answering the broader research question,

*Given the constraints for new product entry in the mainstream, is producer-driven marketing a feasible alternative for Australian family-operated farms to market a CGH branded lamb product?*

Therefore, the discussion is from the perspective of providing CGH consumers with confidence in the product claims and with as little compromise as possible to purchase the product. Information flow and search are critical to making claims transparent and increasing consumer trust. Accessibility and WTP are critical to the degree of compromise that consumers are willing to experience in order to acquire the product benefits.

### **3.6.1 CGH defined by consumer preferences**

The majority of consumers in this study preferred that all green criteria were met (79%), all humane criteria (72%) and ‘pesticide free’ criteria (63%). These results are positively skewed. Internal checks suggest that SDB had less influence on results than the hypothetical bias. Consumers expressed their preferences and expectations of a hypothetical product. Actual purchasing behaviour will be influenced by a range of search and experience attributes, as well as consumer ‘involvement’ in the credence attributes (Carson *et al.* 2001; Lusk & Norwood 2006).

Internal checks suggest the SDB was limited. As suggested by Auger and Devinney (2007) multiple measures of preferences were used in the survey as an internal check for over-estimation of stated-preferences. There were no associations between consumer interest, preferences and expectations and the interviewer variable that weren’t explained by the sample (e.g. ratio of men to women), suggesting interviewer neutrality in eliciting the responses (Carson *et al.* 2001; Lusk & Norwood 2006). No associations were found between preferred production standards or interest and sites. Socially acceptable responses to farm production standards would be expected to be more pro-farming in rural areas due to differences in cultural norms (Ridley 2004; Duffy *et al.* 2005). The lack of association with survey site or sub-samples may be explained by the pervasiveness of these issues across the community (Diamantopoulos *et al.* 2003). Results may still have been affected by what is dubbed the ‘warm glow’ bias where consumers feel good about giving an altruistic preference (Carson *et al.* 2001). Lusk & Norwood (2006) embrace the SDB by asking respondents to select which product description they believe would have greater sales as a measure of public perception of the social desirability of a product. However, this is not helpful for estimating the level of demand.

Comparison of preferences to results from a national study by Cox *et al.* (2002) show markedly different results. Only 19% of Australian consumers were bothered by the way lamb was reared (Cox *et al.* 2002) compared to 78% of respondents in this study who preferred that all humane criteria were met. A specific description of animal welfare criteria was used in this study rather than the general statement used by Cox *et al.* (2002). Preferences for chemical use in lamb production were elicited in this study, whereas in the national *QA Review* consumers rated their concern about residues; half as many (32%) worried about residues in the *QA Review*, trusting industry and government controls to assure meat safety (Cox *et al.* 2002). However, a similar proportion of consumers (28% of this sample) stated that they preferred ‘pesticide free’ because of the known or unknown health affects of pesticides. Cox *et al.* (2002) found 33% of consumers agreed that lamb was an environmentally friendly meat. Most respondents in this study preferred the highest ‘humane’ standard. The differences observed between these results can be explained by the specific product description given to consumers which meant that they were stating their preferences based on their comprehension of the ethics (Kjarnes *et al.* 2007).

The specific criteria listed for the selection of a standard compensated for consumers’ lack of knowledge about the environmental impacts of farming (Hines 1987). Dembkowski (1998) suggested, from a meta-analysis of past research, a moderate link between knowledge of specific product environmental credentials and environmentally conscious purchases, and that knowledge has more influence on purchases where there is little cost to or change required by the consumer.

The implications for actual purchase of CGH branded lamb is that the consumers will need information to evaluate the product and that the product benefits will need to compensate for the information search effort and other search costs (Meyer 2001).

### **3.6.1.1 Comparison of preferences and interest**

Stated preferences for production standards were generally supported by associations with interest variables. The differences between interest and preferences may have related to consumers’ generally poor knowledge about food production methods (Cox *et al.* 2002), exacerbated by the lack of dialogue between producers and consumers in long mainstream supply chains (Appleby *et al.* 2003; Duffy *et al.* 2005). There was no association between preferences for environmental standards and interest in production. Consumers who preferred

the highest environmental standards were just as unsure as other groups about their interest in environmental impact on farming and interest in production methods.

Stated preferences in this survey indicate that sufficient consumer interest exists to consider marketing a product differentiated on the basis of CGH attributes. Before risking large scale investments or radical changes to production systems, it is recommended that utility values are calculated and that a choice experiment estimates the degree of substitution within the product category by simulating the purchase decision between CGH branded lamb and generic lamb (Caswell 1998). Alternatively, a trial marketing effort on the part of small-to-medium sized producers is an incremental step incurring less risk.

The levels of interest recorded are supported by previous research (Table 18), allowing for some cultural differences where awareness of issues may be given more public attention (Kalafatis *et al.* 1999). The differences in the way these results were ascertained should be pointed out. Duffy *et al.* (2005) rated interest in specific issues, chemical use, animal welfare and environmental impact. This method was adopted for this survey so most closely supports the findings here. La Trobe (2001) used a dichotomous question for concern about production methods and an open question to clarify concerns, with similar results to reasons given here for preferred standards (3.5.1). Lea (2005), Conner *et al.* (2007) and Kjarnes *et al.* (2007) rated importance using a phrase or statement. Conner *et al.* (2007) used a five point Likert-type scale with the following phrases to rate importance, ‘environmentally friendly’, hormone/antibiotic free and humane treatment for animal products. Lea (2005) used a five point Likert-type scale with the statement *Australians believe that it is important that agriculture and the food industry are environmentally sustainable.*

Table 18: Interest in issues compared to previous research

	Chemical use	Impact on environment	Animal welfare	Production
Current study (n = 251)	80.9%	84%	79.7%	64.1%
Current study, reasons for preferred standards (n = 251)	28% (health risk)	8%-12%	7%-12%	
Duffy <i>et al.</i> (2005) (n = 846)	77.5%		86.7%	
La Trobe (2001) (n =146)	22% (health risk)	11%	20%	87%
Conner <i>et al.</i> (2007) (n = 988)	87%	93%	92%	
Kjarnes <i>et al.</i> (2007)			69% -	

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		Netherlands
		73% - UK
		87% - Italy
Lea (2005) (n = 415)	90%	

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### 3.6.2 Information flow and consumer confidence in claims

Empirical findings indicate that more consumers expected label claims to meet the highest standards regardless of their personal preferences. Fewer consumers who preferred higher standards lowered their expectations to substantiate a label claim. Although the shift between preferred and expected standards was not specifically investigated in this study a few comments indicated two possible reasons for lowering the standard expected: that on-farm practicalities would constrain the standards that could be achieved; and a general cynicism about on-farm standards or product claims. Tadjewski (2006) may provide an explanation for the cynicism from those expecting lower standards; that is, finding products that meet their high standards is difficult, and these consumers become cynical and apathetic as a result of previous disappointments. Mistrust of product claims has been reported in the literature, particularly after the proliferation of product claims that could be described as ‘green-wash’ (Prakash 2002; Peattie & Crane 2005). Australian consumers show a degree of cynicism about label claims. A national survey found 63% of respondents were ‘somewhat confident’ in environmental claims made about products, and 27% were ‘not at all confident’ in claims (McNamara & Pahl 2004). The flow of information increases consumers knowledge of the product and has been shown to increase confidence in claims made about product attributes (Verbeke 2000a).

The response may have been different if an accreditation logo was attached to the hypothetical brand. In longer supply chains, consumer confidence in product claims can be increased through endorsement by a recognisable and trusted logo, or through a known accreditation program (McNamara & Pahl 2004; Pederson & Neergard 2006).

### 3.6.3 Information search effort

The sources of information that minimise search effort for potential consumers of CGH branded lamb (the free & high cluster) were predominantly newspapers and television. Paterson *et al.* (2001) also found that Australian consumers sought information about food safety and nutrition predominantly from television (news, current affairs, lifestyle programs and advertising) and newspapers, with labels as a reference point after friends and family.

Fifty-six per cent of the total sample looked beyond the mainstream for information about food and farming, compared to 43% in previous research in the UK (Duffy *et al.* 2005). Sixty per cent of potential CGH consumers searched beyond the mainstream for information. Shrum *et al.* (1995) found that ‘green’ consumers look for more detailed information than can generally be found on television advertising. ‘Green’ consumers continue to actively seek information and will swap brands if they perceive more benefits, requiring the supplier to work hard on communication to maintain customer loyalty (Shrum *et al.* 1995). However, information flow should be incremental and accessible at various levels of complexity to avoid overwhelming consumers (Ariely 2000; Tadajewski 2006).

Latvala and Kola (2003) proposed electronic media as a means of providing reliable information for credence characteristics but it appears to have limited appeal for the sample in this study. Internet use tended to be limited to 26-35 year olds. The disinterest in the internet as a source of information among older consumers may be explained by computer literacy rates and their experience of personal retail service prior to proliferation of supermarkets in the 1970s (Lawson *et al.* 2008).

The level of interest in clean, green and humane lamb production may be a precursor to a high level of consumer involvement in searching for product information (Mittal 1989). Consumer information search increases where there is a perceived increase in importance of product benefits (utility) or brand risk (opportunity cost of inferior product) (Vermeir & Verbeke 2006). In the case of CGH lamb, the perceived risk of chemical residues to personal or family health, and matching product attributes to personal values are likely to motivate consumer search effort.

Previous research has suggested that dialogue with the producer builds trust in the product qualities (Gilg & Battershill 1998; Gordon 2000; Hingley & Lindgreen 2002). There was little evidence to support the notion that consumers at farmers’ markets were seeking direct dialogue with producers about how their food is grown. In a previous survey at Melbourne farmers’ markets less than 5% of visitors reported ‘meeting the farmer’ as a reason for attending; similar to this survey, freshness was the primary reason for attending (Coster & Kennon 2005).

### 3.6.4 Accessibility

The consumers surveyed thought it would be convenient to access CGH lamb from retail butchers, supermarkets and farmers' markets in that order. Those respondents preferring pesticide free were more likely to search beyond the mainstream distribution channels, at farmers' markets and health food shops. These consumers trade-off convenience for the perceived product benefits (Follows & Jobber 2000).

Results indicate there is little call for online facilities for the purchase of CGH lamb, and only slightly more interest in farm-to-door deliveries. Consumers may want to visually inspect meat before purchasing for colour, texture and fattiness (Steenkamp 1997). The convenience of these methods of purchase may be utilised after trust in the brand promise is established. The findings are supported by Datamonitor data quoted in Canavan *et al.* (2007) for the point of purchase for European speciality food and drink where supermarkets (60%) and retail butchers (44%) were in the top four consumer choices, farmers' market (9%) and online (4%) were in the bottom four.

### 3.6.5 Willingness to pay

Most respondents said they would pay a premium of up to 10% for CGH branded lamb and the premium increased with preferred standard. Most of those stating they would pay a premium of 15% also preferred that all CGH production criteria were met (*free and high* cluster). Previous WTP estimates don't bundle these attributes. US and Canadian consumers are willing to pay similar premiums to consumers in this study for food safety and humane attributes (Dickinson & Bailey 2002; Dickinson *et al.* 2003). Australian consumers were willing to pay 10% more for meat production that is environmentally friendly (McNamara & Pahl 2004). However, price sensitivity was increased among consumers that expected 'green' product attributes should be the norm (McNamara & Pahl 2004).

The *free and high* group were more likely to agree that they used purchases to vote for production methods, and disagree that they shopped for the cheapest price. The total percentage of respondents that agreed that they voted with purchases (66%) confirms previous findings. The Eco-Range Australian Consumer Survey found that 62% of consumers believe their purchasing choices can make a difference to the environment (McNamara & Pahl 2004). This increases to 79% for the one in five surveyed who currently purchase organic meat.

Whilst there was no direct association between WTP variables and gender, more females than males agreed that they used purchases to ‘vote’ for production methods. Other research found that women shoppers consider price secondarily to healthier choices and appear to be willing to pay more for food assurances and label information than men (Paterson *et al.* 2001; McCann-Hiltz *et al.* 2004). Stern *et al.* (1993) found that women had stronger beliefs about the consequences of environmental conditions for themselves and others. Jin *et al.* (2008) found that younger, high-income females were more likely to pay a premium for branded fresh produce.

### **3.6.6 Summary**

The criteria used as prompts in the survey were established from a review of the literature. The results established which criteria consumers expected to define the production of CGH attributes. The majority of consumers expected that all the criteria outlined in Table 7 for ‘green’ and ‘humane’ and ‘pesticide free’ criteria for ‘clean’ would be met to produce CGH lamb. Whilst preferences were likely to be over-stated due to bias there would appear to be sufficient interest to investigate further the marketing of lamb with CGH attributes. Previous research confirmed consumer interest in these attributes although previously the attributes were not evaluated as a bundle. The findings, supported by previous research, suggest a premium of 10-15% above the cheapest price would be acceptable to CGH consumers, who are likely to support the production standards through their purchasing choices.

The survey results contribute to the broader research question: *Given the constraints for new product entry in the mainstream, is producer-driven marketing a feasible alternative for Australian family-operated farms to market a CGH branded lamb product?* The feasibility of marketing CGH branded lamb can be negatively or positively impacted by the distribution channel. Retail butchers, supermarkets and farmers’ markets are preferred points of purchase. There are risks and barriers to supplying the mainstream outlets that entail time and attention to develop brand recognition and supply chains arrangements. The costs and uncertainty associated with these preferred channels are investigated in the third component of this study.

Consumers sought information from the mainstream media, television and newspapers. However, more than half searched beyond the mainstream for information about the products claims and benefits, possibly motivated by food safety concerns. Younger consumers, under 35 years of age, are more likely to use the websites than older consumers. There was little evidence that consumers sought face-to-face contact with the producers, but expected any label

claims to meet the highest standards. These findings impact on the feasibility of marketing a CGH branded lamb in relation to the costs of promotion and delivering information to potential consumers.

The extent to which consumers' expectations are already being met depends on the majority of producers' ability to achieve CGH practices on farm. Past farm practice and biophysical assessments suggest that achievement of best practice is variable across the sheep meat industry (2.4.2). In the next Chapter, selected lamb producers are asked to evaluate the achievability of specific CGH practices.

## 4 Grazier evaluation of CGH lamb production

### 4.1 Introduction

The consumer survey in the previous Chapter established the production standards that might be expected from a lamb product labelled ‘clean, green and humane’ (CGH). About two-thirds of respondents preferred the highest standards, and expected similarly high standards for substantiating label claims. The standards presented to consumers were translated into farm practices that contribute to ‘clean, green and humane’ product attributes for evaluation by lamb producers.

Extensive agricultural research has generated guidelines, codes of practice and recommended ‘best’ practice, which could meet the highest expected standard described by the consumer survey. A number of researchers have pointed out that constraints to practices are specific for practices under local conditions (Cary *et al.* 2002; Webb 2004; Knowler & Bradshaw 2007). This has implications for the generalisability of findings in all such studies, and is the rationale for focussing on specific locations for the evaluation of CGH lamb practices.

The reasons why producers respond in such a variable way to recommended best practice has been researched extensively. Socio-economic characteristics, as well as certain attributes of the practices can be influence implementation (Cary *et al.* 2002; Pannell *et al.* 2006). Rogers (1995) provides a framework for decision criteria, stating that innovations with the following attributes are more rapidly adopted: relative advantage (financial, social or environmental), compatibility (with values and previous experience), complexity (or rather relative simplicity), trialability (later adopters implementing an innovation based on the experience of others), and observability (the advantages are visible). Guerin and Guerin (1994: 565) supported these findings, concluding that “innovations ... will not be adopted if they are perceived to be unprofitable, risky, not easily integrated into existing farm practices, or too complex for the farmer to understand”. Australian researchers have repeatedly raised the biophysical conditions as a barrier to implementation with Cary *et al.* (2002: 15) adding “geographical applicability” and Reeve (2001) finding unfavourable weather patterns, low returns on investment, and impending retirement for the majority of producers as impediments to wide-scale changes to farm practices. Another Australian study found low returns in marginal areas as a barrier “to effective NRM [natural resource management] at the landholding level” along

with a lack of information to aid decision-making (Mitchell *et al.* 2007: 108). Prime lamb producers commonly self-reported barriers as time, cost, possibility of failure, and uncertainty about the results (ABARE 2002).

Selected producers participated in an evaluation of sixty on-farm practices to establish the extent to which the ‘clean, green and humane’ (CGH) criteria can be successfully implemented to address the research question: *To what extent can conventional producers in this study meet consumer expectations and substantiate the ethical claims of branded lamb?* The interest in this study is not to investigate new barriers to adoption, nor to investigate industry wide ‘clean and green’ claims. The purpose of the producer survey was to measure the extent to which selected cases might be able to achieve on-farm practices that meet the criteria defined in the consumer survey (Chapter 3) and thereby be able to substantiate CGH marketing claims. In the process of the survey, producers’ specified the constraints to implementation of CGH practices, relating to the conceptual framework (Figure 1) and their level of interest in emerging market demands. The implication is that results may be useful for decisions about product differentiation and marketing within producer marketing groups, to which participants belonged.

## **4.2 Methods**

### **4.2.1 Study design**

An embedded multiple-case study approach was used to investigate producers’ perceptions of ‘clean, green and humane’ practices in a real-life context, that is, constraints associated with production (Lindgreen 1999; Yin 2003). This approach has been used in previous research to compare the effectiveness of different food supply chain scenarios (van der Vorst & Beulens 2002; Buhr 2004) and to explore and build theories about agricultural marketing strategies (Hingley & Lindgreen 2002; Conner *et al.* 2007). The propositions induced from the results of this study aim to be externally valid for lamb producers operating under similar conditions but are not representative of, nor can be generalised to, the whole population of lamb producers (Sommer & Sommer 1997; Lindgreen 1999; Tashakkori & Teddlie 2003; Yin 2003; Maxwell 2005). Comparison to the literature is used to indicate whether findings are typical of the constraints to practices in a broader context and indicating the external validity of the propositions (Maxwell 2005).

Semi-structured questionnaires embedded within each case present several producers' unique perspectives (Yin 2003). A semi-structured interview approach enables comparison between cases (i.e. lamb marketing groups) and reduced the volume of textual data to be analysed (Miles & Huberman 1984; Maxwell 2005).

The relationship between the researcher and interviewees can influence responses and affect repeatability, therefore the approach taken during interviews was empathetic whilst remaining an objective observer (Sommer & Sommer 1997; Maxwell 2005). Participants pre-occupation with an extended period of drought and associated financial pressures probably framed the responses. After listening to the impact of drought on their situation, it was pointed out that their responses should be considered in the context of what was achievable under 'normal' circumstances. A summary of results and propositions was sent to participants for corroboration of the facts and to verify interpretations (Miles & Huberman 1984; Maxwell 2005).

In qualitative realism research, the researcher needs to be aware of their values and assumptions that could bring bias to the interpretation of data (Maxwell 2005; Sobh & Perry 2006). The presumptions in pre-data collection propositions were:

- that CGH practices were achievable under the right biophysical conditions (the wrong conditions being lower rainfall areas, and where intractable pests and weeds had a significant economic impact that required a reliance on pesticides); and
- that conventional producers were motivated by profit and relied on processors to translate consumer specifications.

Ethical considerations included the impact of prolonged and severe drought on producers, confidentiality and reciprocity. Cross-case analysis preserves confidentiality by avoiding direct reference to an individual (Yin 2003). Anonymity was important to give the respondent latitude to be honest without implications. Respondents' names and contact details were not recorded on the questionnaires and details were kept separately. After finalisation of the project, the contact details and codes will be destroyed and a summary of all results sent to the participating groups. The original questionnaires will be kept in a secure place for a maximum of seven years, to allow time for peer scrutiny of the results.

#### **4.2.2 Case selection criteria**

The units of analysis were individual producers who were members of lamb marketing groups (LMG) based in Victoria. LMG were identified through an internet search and letters of invitation sent to group leaders, through agency or private coordinators. The criteria for selecting the cases were: the groups were proactively marketing lamb which inferred that group members were likely to be aware of emerging market demands, although not currently implementing the CGH criteria; cases were within one State to reduce variations in the context in which they operate such as different legislation, codes of practice and practice guidelines; in different rainfall zones; and in proximity to each other to reduce travel time and costs. Three lamb marketing groups agreed to participate in the study. The three cases were: a) The Campaspe Lamb Marketing Group; b) The Rutherglen Lamb Marketing Group and c) The South-West Lamb Marketing Group. The LMG in this study were not intended to be representative of the lamb producer population nor the findings generalisable outside of similar biophysical and production circumstances. Westgren and Zering (1998: 419) argue that generalisability of case study findings is a “function of the restrictiveness of the context”.

In this case, the regulatory environment and the marketing context were deliberately similar across cases in order to focus on the on-farm constraints to the production of CGH lamb. Controlling characteristics that are not of under investigation, that is the criteria is the same across cases, reduce the likelihood that those specific characteristics influence outcomes (Yin 2003). Repetition of cases operating in similar context enables triangulation; verification through repeated responses, and holds one variable relatively constant when comparing other variables of interest (Yin 2003; Sobh & Perry 2006). The marketing context was similar for all cases, that is, conventionally grown lamb, not currently marketed as meeting CGH criteria, sold through mainstream distribution channels. In one case, the south-west LMG, a core of members co-operatively sold lambs to a mainstream processor which did not relate directly to the interview questions nor have a major influence on results.

Comparison of cases with different characteristics, in this instance, biophysical conditions and production systems, illuminates how these factors influence outcomes (Yin 2003; Sobh & Perry 2006). Biophysical conditions and production systems were similar for the two cases in central Victoria (Campaspe and Rutherglen), and differed from the case in the higher rainfall area in the south-west of Victoria. Similar responses regarding the achievability of practices were expected from the two central Victoria cases. However, it was expected that responses to practices will differ between regions due to the influence of local biophysical conditions

(Cary *et al.* 2001; Knowler & Bradshaw 2007) and between production systems due to the fit with existing farm practices and infrastructure (Pannell *et al.* 2006; Kaine *et al.* 2007).

Access to group members was negotiated with group leaders and a different approach taken in each case. Invitations to participants, project information and consent forms were addressed and mailed to members by Rutherglen group leaders with a follow up mail-out. A member contact list was supplied after meeting the Campaspe group leader. In both groups more than 90% of the groups' active members were interviewed. Access to the south-west group was limited by the board members to the board (which represented 80% of producers who were selling co-operatively), then a single mail-out to the larger LMG was negotiated which received a very limited response (n =7) that was a very small proportion of the total group membership of 50. It was decided not to make an additional visit (given budget and time) to conduct these further seven interviews which could not represent a consensus view of the whole LMG.

#### **4.2.3 Data collection**

A documented interview protocol was used to standardise the interview process across units of analysis and cases (Appendix 3) (Yin 2003). Thirty two face-to-face interviews at the participants' properties minimised the inconvenience to participants and allowed time for a rapport to develop, to observe the production conditions, and to conduct the questionnaire of approximately one hour. Face-to-face interviews involved more than just verbal communication to gauge the attitude towards questions and prompt further comments, gauge respondent understanding of the question and give a standard explanation when appropriate (Czaja & Blair 1996). Previous research has used mail surveys for producer assessment of on-farm practices (Vanclay & Hely 1997; Keogh *et al.* 2004) and have suffered a poor response rate, which was resolved in the case of Keogh *et al.* (2004) with follow up phone interviews. This questionnaire was too long for a telephone interview (Neuman 2003), and had already been trimmed from 80 practice questions to 60. Open questions about achieving the CGH criteria would have taken similar amount of time to properly cover the CGH criteria.

The questionnaire (Appendix 3) consisted of four parts:

- Part 1 - producer and farm characteristics;
- Part 2 & 3 - producers' interest in and view of market demand for CGH criteria; and
- Part 4 – producers' evaluation of on-farm practices.

A measure of ‘motivation to farm’ was adapted from Frost (2000). The main part of the questionnaire was the producers’ evaluation of on-farm practices that achieve the CGH criteria, identified earlier in section 2.4.4. Part 4 was split into farm management areas and then practices within each category that achieve the CGH criteria (Table 7). This was done to improve the flow during discussion of each management area. There are many individual criteria that may be achieved or negatively impacted by practices in different management areas, for example reducing chemical use relates to weed control, as well as animal health and chemical use risks or minimising soil erosion relates to practices under management of pasture composition and soil health.

Practices for inclusion were selected from government and industry guidelines and voluntary codes of practice for lamb produced in south-eastern Australia; the references are listed at the end of Appendix 3. The list of practices was comprehensive but not exhaustive. Six experts from different fields including biodiversity conservation and animal welfare provided feedback on the included practices. Most practices were preventative and the benefits difficult to observe unless the outcomes can be compared to not undertaking the practice (Guerin 1994). Six alternative or integrated pest management practices that aim to reduce pesticide use were a major departure from local traditional practices but represented a move towards meeting higher consumer expectations for ‘clean’ production (Ridley:2004).

Although a ‘not applicable’ option was available if respondents didn’t feel qualified to assess a practice, it is likely that some producers evaluated some practices without being at all familiar with implementation. Therefore, producer ratings express their attitudes and perception of the constraints to CGH lamb production.

#### **4.2.4 Data analysis**

The aim of data analysis was to observe repeated responses and patterns as evidence for propositions (Yin 2003). Criteria for reporting evidence for propositions were:

- approximately a third of producers rated an applicable practice *never* to *sometimes* achievable (excluding *not applicable* ratings) and comments indicate that a constraint exists; or
- that constraints were repeated across a range of ratings.

The relevance of constraints was considered in terms of evidence for the propositions or as evidence for rival explanations (Sommer & Sommer 1997; Bazeley 2004). Investigating rival

explanations for causal links may improve the internal validity of the study (Yin 2003; Bazeley 2004). 'Causal links' refer to repeated patterns, that is, constraints are repeatedly perceived to lead to the producers' inability to consistently achieve CGH practices (Tashakkori & Teddlie 2003; Yin 2003; Maxwell 2005). Causal relationships observed in social science data are contingent on the context, therefore direct causality is rarely established between variables or factors in social science (Sobh & Perry 2006). However, induced propositions from this study can be tested in similar context in future research (Tashakkori & Teddlie 2003).

Here a mixed methods approach was taken using interpretation and non-probability statistics to induce propositions and improve internal validity (Yin 2003; Bazeley 2004). Both SPSS and NVivo software were used to analysis the similarities and differences between individual producers and groups. SPSS software is commonly used for non-parametric data analysis (page 66). Previous researchers have used NVivo to analyse transcribed semi-structured interviews (Binder & Clegg 2007; Hujala *et al.* 2007). Integrated qualitative and quantitative data analysis facilitated the cross-checking of consistency in responses and interpretation (Maxwell 2003; Bazeley 2004; Bazeley 2007a). Counts, although small, are used where they aid understanding of the repeated patterns and associations found in the data (Sandelowski 2001; Bazeley 2004).

Analysis in SPSS explored associations between practice ratings and enterprise characteristics, producer characteristics and producers' market views, and differences between the cases (lamb marketing groups). Cross-tabulations in SPSS found associations between variables using non-probability statistics. Cramer's V statistic was used where at least one variable was nominal and Gamma for ordinal variables. Cramer's V ranges from 0 to 1 and is applicable where contingency tables are larger than 2 X 2 variables, it indicates the strength of an association but not the direction (Cooksey 2007). Gamma is a symmetric measure of tendency for cases to simultaneously select higher order categories for two variables, it indicates both the strength of the tendency and the direction (Cooksey 2007). For Gamma and Cramer's V the association between variables was considered weak where the test statistic was less than 0.3, moderate where the statistic was 0.5, and strong where the statistic was greater than 0.7 (Cooksey 2007). However, the differences between categories in each contingency table were considered in interpreting these statistical tests (Cooksey 2007).

Kruskal-Wallis H Test is a non-parametric version of ANOVA which is used to compare groups of different sizes where assumptions for ANOVA may be violated such as normality or homogeneity of variance (Argyrous 2005; Cooksey 2007). Tests comparing means, such as t-test or F-test, won't yield a valid result for nominal data because it isn't sensibly represented using means (Argyrous 2005). The Kruskal-Wallis H test indicates when there is a significant difference but does not indicate which group is different, therefore it is used in conjunction with cross tabulations (Cooksey 2007).

Producers' comments on the achievability of practices were coded using NVivo 7 software. A tree-structured hierarchy of categories (i.e. nodes) was created, with the first order nodes being farm management categories listed in Part 4 of the survey, for example pasture management, soil management, biodiversity. Sub-categories were based on impediments, achievements and recurring issues with specific practices. New variables were created in NVivo, designating presence or absence (0/1), that warranted investigation against ordinal or nominal data and then imported into SPSS (Bazeley 2004). SPSS runs considerably more quickly than NVivo for quantitative analysis and offers a wider array of statistical measures.

Conversely, an attribute table was created in NVivo using the nominal and ordinal variables exported from SPSS for 'matrix' analysis against the coded qualitative data (Bazeley 2004; Bazeley 2007a). Queries and matrices connect ratings and relevant comments, and identify which group these were relevant to. Memos were used to track connected themes and record interpretations to induce propositions (Miles & Huberman 1984; Lindgreen 1999; Bazeley 2004; Maxwell 2005).

## **4.3 Results**

### **4.3.1 Summary of case descriptions**

The following case summaries compare the three groups' motivation for farming, income, biophysical conditions and production systems, sources of market information, product assurances and views on the importance of clean, green and humane criteria to future market access.

Most respondents felt their primary or secondary motivation for farming was that *the farm is a means of obtaining income and security*. Nineteen gave their primary or secondary motivation as *being a farmer expresses who I am and is fulfilling*. Twelve said their motivation for

farming was that it is valuable work, and ten said they were motivated by the social recognition and sense of community.

A between-group comparison of income split between lamb and other agriculture showed that the Campaspe and Rutherglen groups were reliant on income from other agricultural activities, and that the South West group relied mainly on lamb production for their income (V.485, .028). The mean '*10 year average gross income from lamb*' was \$81, 000, skewed by the higher income from lamb in the South West. The number of lambs turned-off in 2005 followed the same trend with the South West highest, followed by Campaspe then Rutherglen (V .569, .013). The estimated farm income for the top 25% of lamb specialist in 2006-07 was \$87, 338 (MLA 2007). Most farms made up to thirty percent of their income off-farm, with only five having higher proportions of off-farm income. Total off-farm income has increased over the past 20 years to an average of \$40, 000 in 2005-06, as have the proportion of farms with off-farm income which has risen to 42% (Productivity Commission 2008).

The South West group had higher rainfall and more grass based pastures, with more undeveloped and developed (with introduced species) native pasture utilised than other groups (V.408, .046). Rutherglen and Campaspe used finishing strategies (V.480, .008) to cope with dry summers such as feedlots operating in containment or sacrifice paddocks, dry-land or irrigated lucerne pastures. Campaspe had more than 90% introduced pastures whilst other groups had far less (V.602, .032). Campaspe had more area remaining as native woodland than other groups (V.456, .052).

The sources of market information differed slightly between the groups. Campaspe respondents relied more on media reports as their primary sources of market information (V.455, .045). The South West group relied on their marketing group for market prices and specifications from the processors, whereas other groups didn't have specifications driven by the group (V.690, .000). The South West provides a declaration to the group buyer regarding carcass specifications, handling and quality.

### **4.3.2 Producer attitudes to future market expectations**

Responses to the importance of environmental management, chemical use and animal welfare in three years and 10 years were totalled for each respondent to indicate the importance placed on CGH production, and this score was used in the following analysis. There was no

significant difference between group average ratings for CGH; however, Rutherglen had the greatest variation in responses (Table 19).

Table 19: Average group ratings (out of 7) for CGH importance in 3 years and in 10 years.

	Average group rating for 3 years	Average group rating for 10 years	Believe the importance will increase over time (% of group)
Campaspe	4.89 (standard dev 0.73)	6 (standard dev 0.96)	100
Rutherglen	4.66 (standard dev 1.73)	5.76 (standard dev 1.32)	89
South West	4.4 (standard dev 0.49)	5.9 (standard dev 0.53)	83

Chemical management was generally rated higher in importance than environmentally friendly and animal welfare in both three and 10 years times (Figure 17). Representative comments about chemical use were:

- ... Consumers are increasingly concerned about chemical use and impacts on health.
- ... Consumers are demanding more information and better labelling.
- ... Meeting standards has a cost that may decide the limit in terms of willingness and ability to pay.
- ... Emergence of Asian markets with lower standards stabilise these demands in Australia

Environmental management was rated as less important than animal welfare in the short term, but ratings were the same for these two criteria in the longer term. Producers want to be seen as good environmental stewards and “*doing the right thing*”. There is less reservation about adoption of conservation practices if they are “*easy and cheap*”.

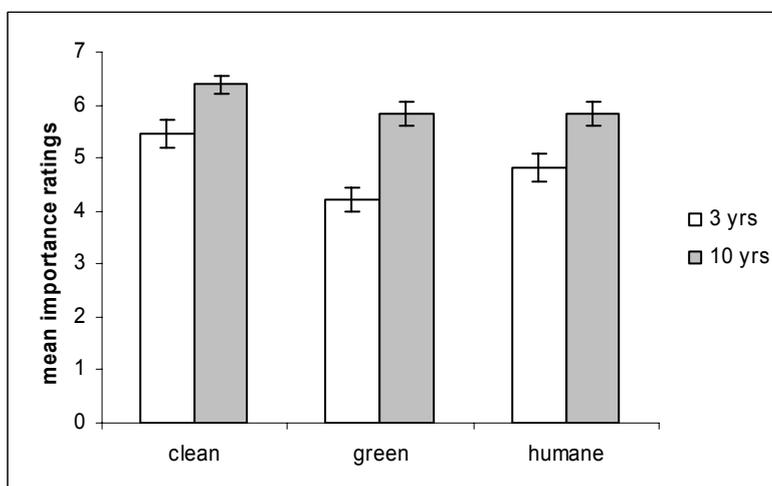


Figure 17: Comparison of mean ratings of importance of CGH attributes

The main reason why respondents from all groups thought CGH attributes are increasingly more important was lobby groups raising consumer awareness (n = 14). Responses indicate that producers feel embattled, particularly against the current anti-mulesing and live trade campaigns, for example representative comments were:

*...Pressure from radical groups gaining access to practices without practical considerations are using consumers as a lever for their own agendas; animals are being scrutinised at auctions.*

*...I'm not against the RSPCA but it's about balance. The radical lobby groups are gaining more attention, and I'm afraid governments listen to those voices because there is less rural representation.*

*...Lobbyists use the media and corporate public relations but producers bear the costs.*

*...Consumer education by pressure groups is creating a push for more accountability.*

Respondents viewed the growing importance of CGH attributes as a trend in Western countries where there is a disconnection between urban consumers and production of their food. Producers believed that the “*push for accountability*” in relation to farming practices would be lessened if city consumers weren't so disconnected from their country cousins. The media was seen by producers as complicit in presenting the lobbyists cause without contact with producers who are dealing with the impact of issues such as fly-strike.

Attitudes towards the importance of CGH product attributes to future market access had a weak influence on the ratings of the achievability of practices, with only a few weak to moderate associations. Those producers not expecting to continue farming after five years rated the importance of chemical use and residue management in three years time higher than other producers (Gamma -.414, .037).

#### **4.3.3 Interest in marketing 'clean, green and humane' lamb**

All South-west producers were interested in marketing a clean, green and humane product to satisfy buyers and processors who are seen as following consumer demands to maintain market access. This group of producers made a quality assurance declaration to the processors. One respondent commented that

*...regulators will keep step with market expectations, for example, the Bureau of Animal Welfare is re-writing codes of practice in Victoria.*

In the Campaspe group, ten producers were quite interested in marketing a CGH product, three extremely interested, one not sure and one not interested. The main reasons for the interest were that the respondents took pride in the quality of the product (n=6), in their farm management (n=4) and their ability to respond to consumer demands (n=5). Other reasons were: traceability and enforcement of regulations regarding chemical use and management (n=3); and that traceability provides an opportunity to attract a premium for product attributes, with some producers (n=3) emphatic that they wouldn't proceed without a premium.

Marketing such attributes was thought to:

*...Maintain an edge on the market; in 10 years producers could be left behind; need to be accountable and prove your actions.*

The Campaspe respondent who was not interested thought the effort required to administer a quality assurance scheme was not rewarded through a market premium.

All Rutherglen producers (n=9) were interested in marketing a clean, green and humane product. Comments indicate that producers are responsive to market demands for 'safe' food, for example:

*... It only takes one positive test to alarm markets*

*...Consumers have the right to know that food has been grown to current standards*

*...Consumers want it and lamb production systems are half way there - extensive pastures and hormone free*

Assurance schemes were thought to cost too much and didn't attract a premium in the current mainstream market. Assurance schemes are seen as bureaucratic paperwork rather than the translation of certain values into farm practices, as one producer stated

*... clean and green is a perception... that consumers have of product claims such as CGH.*

Five Rutherglen producers gave assurances other than the National Vendors Declaration; several commented that the demand wasn't sufficient and that no premium was realized for the efforts of complying with certification for EMS or Flockcare. Three producers had completed EMS courses but weren't certified, two of these producers were also Flockcare accredited. To be an eligible supplier for export to Saudi Arabia, two producers made a declaration to Castricums that the lamb was "paddock reared".

#### 4.3.4 Farm management priorities

Practices were aggregated by topics including pasture management, soil management, weed control, greenhouse gas reduction, chemical risk management, balancing the water needs of the ecosystem and agriculture, biodiversity management and animal welfare, in that order. Respondents ranked these management areas in order of the priority to the farm productivity and viability to reveal how respondents viewed the contribution of practices to the farm. The mode for each management area is given in the Table 20. There was no significant difference between groups or ‘CGH importance’ scores and the ranking of these categories.

Table 20: Mode ranking of management areas  
(1 denotes the highest priority)

Management Area	Pasture	Animal	Greenhouse	Biodiversity	ChemRisk	Soils	Weeds	Water
Priority (mode)	1	2	8	7	5	3	4	6

Most producers prioritised the production outputs, that is, the pasture management and animal welfare, above the management of the natural resources related to the farm productivity, such as soil, water, biodiversity and greenhouse gases. This corresponds with most respondents primary (n =10) or secondary (n = 13) motivation for farming, *the farm is a means of obtaining income and security* (Table 21). The remaining nine respondents felt this was the least motivational reason for farming.

Table 21: Motivation for farming

Level of motivation	Means of income & security	Self-expression & fulfilment	Valuable work	Prestige and family tradition
Most	10	14	3	5
Second most	13	5	9	5
Second least	5	9	5	13
Least	4	4	15	9

#### 4.3.5 Producer rating of practices

Mode scores for producers’ ratings of the achievability of clean, green and humane practices are presented at Appendix 4. Forty-three percent (26 of 61) of recommended best practices were rated by most respondents as *often* achievable (Table 22). Thirteen practices (21%) were rated as *always* achievable, five of these in the ‘humane’ category; five (8%) were rated as *sometimes*, two as *rarely* and eight (13%) as *never*. Respondents rated eleven practices (18%) as *not applicable*.

Table 22: Frequency of mode responses

Mode response	% of practices
Always	21
Often	43
Sometimes	8
Rarely	2
Never	13
Not applicable	18

The following sections categorise practices that contribute to specific ‘clean, green and humane’ criteria presented in the consumer survey and using producer evaluation of the practices contributing to each criteria to describe the achievability of each criteria.

For the purpose of this analysis, a practice is deemed to be constrained where most producers have rated it as never to sometimes achievable. Producers may have rated practices as often achievable rather than always in recognition of the biophysical and financial uncertainties in a farming environment.

#### 4.3.5.1 Pesticides used within safe limits

Most producers rated practices that contribute to the criterion *pesticides used within safe limits* as *often* or *always*; with the exception of, *check residues in feeds and fertilisers* (Appendix 4). Personal safety lapses were the main reason for not *always complying with recommended best practice for chemical users*. Reasons for personal safety lapses (n = 12) related to equipment design or inconvenience, for example the difficulty in handling heavy, slippery chemical containers with gloves, the lack of pouring spouts, safety equipment was uncomfortable or awkward or left in the shed (n = 7).

Producers signed a National Vendor’s Declaration (NVD) declaring that they have complied with the Livestock Production Assurance (LPA) program, the checklist of on-farm management to minimise the risk of chemical residues (MLA 2004). The unknown contamination status of farm inputs present risks to *compliance with the Livestock Production Assurance*. Comments were made that the location of *contaminated sites* was unknown (n = 3). Eleven respondents commented that they relied upon the suppliers to *check residue contents of fertilisers*. Some respondents enquired about the residue content with suppliers and found that the information was not available (n = 3). Few respondents (n = 5) relied upon the supplier to *check the residue content of feeds*. Four volunteered that they

checked the vendors declaration for feed, however it was also pointed out that producers “*can't be fussy during a drought*”.

#### 4.3.5.2 Pesticide free

The modal response to most practices that contribute to the criterion ***pesticide free*** production was never, with two practices rated as rarely and sometimes (Appendix 4). Comments suggest that producers in the study are not routinely introduced to practices that reduce chemical use and that there is little encouragement for conventional producers' to gain the required knowledge and technical skills. Comments indicated a lack of knowledge (n = 3) about avoiding resistance by not-drenching animals showing signs of having some natural immunity or resilience to worm burdens. Most producers rated using ***resistant animals as harbour for non-resistant worms*** (n = 16) as *rarely* or *never* achievable, with no significant differences between LMG ratings. Ewe breeders cannot chance ***selecting worm-resistant animals*** because of uncertainty about the potential loss of desirable meat carcass characteristics, whether all progeny inherited the trait, and whether breeders would be culling more animals than they retained for breeding (n = 2). Producers rely on breeders to select for this trait, and consequently the practice was rated as *rarely* or *never* achievable (n = 14).

Five producers commented that they had contradictory information about ***resting pastures for 10 weeks to interrupt worm lifecycles***, which was rated from never to often, quoting Department of Primary Industry and consultants, some saying the rest needs to be longer, some shorter depending upon the parasite species.

Without convincing evidence of efficacy, alternative pest control methods, such as ***biological controls*** are perceived to be a “*leap of faith*” (n = 2). Two producers “*weren't convinced*” that high tannin plants or pasture diversity assisted with natural immunity to internal parasites. In another instance, two producers had trialled Luci-trap and considered it a failure, however a third had counted flies in the traps over time and had observed less, deeming it worth further trialling.

The role of re-establishing native plantings ***as habitat for natural predators*** and pest control was commented on by some producers (n = 3), but was also motivated by providing shelter for lambing. As one producer pointed out, past clearing of the landscape has depleted the ratio of predators to pests, inferring that the balance was insufficient for pest control.

### 4.3.5.3 Reducing the reliance on pesticides

Producers in the survey commented about “*a lack*” of or “*vague*” information (n = 3) on effective implementation of integrated pest management (IPM). Comments about their own experience of *integrated pest control to avoid resistance* related to internal parasite resistance, such as alternating the types of drench (n = 3), using as little as possible (n = 4), only drenching new stock (n = 1); rather than a range of integrated practices such as resting pastures, rotations with different classes of animals, animal nutrition or immunity.

Producers are concerned about the risk of failure of lice and fly treatments, for animal welfare as well as economic reasons. Recent withdrawal of the registered use of diazinon treatments was a concern for producers. Comments (n = 5) indicate that producers often do not make the distinction between persistence and toxicity, and the various modes of action. Chemical formulations with *lower with-holding periods* (WHP) were thought to have lower efficacy:

... *Longer WHP are the only ones that work.*

... *Low WHP are not readily available and I question how long it works.*

... *Go for chemicals that work – so we use diazinon for lice.*

Comments indicate that Lucerne finishing systems may reduce the use of herbicides and drenches. Respondent comments and ratings indicate that worm burdens are less of a problem in lucerne. There was a significant difference between LMG ( $F=3.843$ ,  $df2, 27$ ,  $p=.034$ ) in ratings for *selecting resistant animals* with the Campaspe group rating significantly lower than the other groups. Lucerne finishing systems were more prevalent in Campaspe than other groups, suggesting that reduced worm burdens negate the need to select animals for their natural resistance to the impact of parasitic worms. Lucerne finishing systems were moderately associated with *rest pastures for 10 weeks to interrupt worm lifecycles* ( $V.512$ ,  $.050$ ). Most of the South West group were on grass finishing systems and rated this practice as never (n = 4) or rarely (n = 1). Resting through the cropping phase (approximately 3 year cycle) and resting lucerne for 4-6 weeks after seeding and subsequent leaf drop were considered by respondents to reduce the worm burden.

Lucerne and crop rotations provide the opportunity for mechanical rather than chemical weed control methods. *Using a combination of treatments to avoid herbicide resistance* was moderately associated with finishing system ( $V .423$ ,  $.030$ ). Lucerne finishing systems were associated more strongly with mechanical weed control methods such as tillage ( $V .609$ ,  $.035$ ),

grazing (V .548, .048) and by hand (V .701, .032) than with herbicide as the primary treatment (V .446, .029).

#### Weed control

Used in an integrated program, all non-chemical weed control practices in the survey reduce the need for herbicides and were thought to be achievable *often* or *always* by most respondents (n = 24). Most respondents (n = 27) relied on herbicide as the primary weed control treatment. However, more than half the respondents incorporated secondary methods such as grazing (n = 9), removing by hand (n = 7) and ploughing (n = 4). Mechanical removal (e.g. ploughing or other treatments drawn by tractor) was not used by 20 respondents, and was a primary method for two respondents and secondary method for the remaining eight.

***Designated machinery wash-down areas*** reduce the spread of weeds with machinery movements within and between farms. Comments suggest that weed spread by machinery movements within the farm boundary was under-estimated and that the focus was on weed invasion from outside the farm, for instance being self-sufficient for machinery, feed and new ewes was mentioned (n = 5); or weed invasion on machinery was also seen as the responsibility of contractors (n = 2). Returning to a permanent facility between paddocks was considered time consuming. Instead, one producer *knocks the dirt off tines before moving paddocks* to avoid contamination from loose soil.

Campaspe and Rutherglen respondents tended to have weeds under control. This is likely to relate to the rotational use of lucerne pastures and cropping, which implies a combination of herbicide, tillage and grazing during establishment, leaving few weeds to remove by hand. One producer, who took a holistic approach to pasture management, commented that lucerne “*shades out the weeds and competes strongly for soil moisture*”.

#### **4.3.5.4 Minimising soil erosion**

Practices that minimise soil erosion focused on maintaining groundcover and were rated by producers as *sometimes* to *often* achievable (Appendix 4). Water availability and the type of finishing system (Table 23) greatly influenced the achievement of practices that minimise soil erosion. Alternative finishing systems such as lucerne, irrigation and feed lots, contributed to soil conservation through the maintenance of groundcover, rotational grazing and mitigation of salinity.

Table 23: Finishing systems within the lamb marketing groups

Finishing system	Group location			Total
	Campaspe	Rutherglen	South West	
Lucerne	8	2	0	10
Grass (native and improved)	3	3	6	12
Feedlot or irrigated finishing	4	4	0	8

Comparison of ratings for each soil management practice (Appendix 5) shows that ratings for *maintaining groundcover* and *rotational grazing* were significantly different between LMGs. Producers in different rainfall zones rated the achievability of *maintaining ground cover* differently (H 7.924, df2, .019). For instance, 60% of the Campaspe group rated *maintaining groundcover* as *sometimes* to *never* achievable compared to 20% in other groups. The Campaspe group had more producers finishing on rain fed lucerne (n = 8) than Rutherglen (n = 3). This comment from a Campaspe producer is representative of those finishing on lucerne without irrigation:

*...The clover dies in summer leaving bare ground under lucerne; there is a lack of research and information to address this issue, winter oats helps.*

The South West group rely on coastal rainfall and introduced grasses and a range of summer crops; all respondents in this group rated *maintaining groundcover* practice as *always* achievable. Finishing systems such as irrigation and feed-lotting were moderately associated with the achievement of groundcover (V.480, .008). Rutherglen rated *maintaining groundcover* as *sometimes* to *always* and were more likely to finish on irrigation.

Representative comments (Appendix 6) from Campaspe and Rutherglen respondents who rated practices that maintain groundcover (after receiving average rainfall) as *sometimes* to *never* achievable are:

*...Summer pastures are browned off and there's not enough feed.*

*...Stubble is grazed in summer but it's hard to avoid bare ground late summer.*

A few respondents used 'sacrificial' or 'containment' paddocks to feedlot ewes to reduce grazing impacts over late summer/autumn and during drought. One producer who rated all pasture management practices as *always* achievable commented:

*...Sheep are kept in containment paddocks rather than baring the ground in late summer.*

Seventy-five per cent of producers rated *rotational grazing* as *sometimes* to *never* achievable (Appendix 4). However, there was a significant difference between LMGs (H 5.732,

df2, .057). Most of the South West respondents rated the practice as *sometimes* achievable compared to the median score of *often* for all cases (Appendix 5). Moving ewes with young lambs at foot during winter and early spring causes ‘mis-mothering’ and was generally avoided (Appendix 6). The practice was thought to be very dependent on rainfall and summer feed availability. Four producers who rated rotational grazing as *often* had alternative summer grazing such as irrigated pastures or containment paddocks. Producers finishing lambs on lucerne rated *rotational grazing* higher than those with grass based pasture (V .512, .049). Seventy per cent of producers with lucerne finishing systems rated the practice as *often* or *always* achievable compared to twenty-five per cent with grass. The length of grazing rotations was based on cropping phase and lucerne growth stages of flowering and leaf loss, rather than a whole property grazing strategy.

Two-thirds of the respondents (n = 21) rated ***maintaining deep-rooted perennial pastures to reduce salinity and acidity*** as achievable *often* or *always*. Lucerne (a deep-rooted perennial) is routinely planted as pasture in Campaspe and Rutherglen districts to reduce salinity; however as a legume it also has a role in inducing soil acidity.

Most respondents rated resting of pasture to maintain critical ***leaf area*** (n = 21) or periodically ***allow pastures to seed*** (n = 17) as *rarely* to *sometimes*. In drier areas, lack of summer rain or slow winter growth constrained the resting of pastures (Appendix 6). Irrigated pasture or stubble grazing provided alternatives over the drier months to enable resting of grass based pastures. Resting to maintain 5-15cm of leaf length was thought to involve “*under-stocking*” by one respondent on the western boundary of the Campaspe group, where there was no alternative grazing. He volunteered that he maintains high stocking rates as his farm income was largely reliant on lamb production and rated maintaining groundcover as *never* achievable, commenting that

...*Groundcover is only 50% after summer period without grazing; Lucerne pastures are under-sown with rye and clover but still struggle to maintain 60% cover.*

#### **4.3.5.5 Maintaining soil fertility**

Soil fertility management practices included in the survey enable the producer to identify deficiencies, and ensure that ameliorants added to the land are of an acceptable quality in conventional agriculture. Differences in group ratings for soil and pH testing (Appendix 7) can be attributed to the proportion of cropping and the perceived insignificance of the risks of not testing (Appendix 8).

The Campaspe and Rutherglen groups rated *testing soil 4-5 years* and *pH testing 2-3 years* as achievable less frequently than the South West group (Appendix 7). Ratings were moderately associated with lucerne finishing (V .628, .019). Comments indicate that the risk of not testing on the prescribed schedules was perceived as an insignificant risk to productivity (Appendix 8). Producers' perceived insignificance of soil acidity (constructed as a variable) was associated with low rating of pH testing (V .597, .030), and comments indicate that testing was coordinated with crop rotations or lucerne pasture establishment which are longer (6-10 years) than the recommended schedules (Appendix 8).

Most respondents (n = 19) confidently relied upon a “*trusted*” agronomists or suppliers to ensure the quality and content of fertilisers (V .708, .005), and half (n = 15) relied on advice for lime (V .756 .002) (Appendix 8). Most of the South West group relied solely on the supplier or agronomist for both. Four respondents thought it was easy to ask for the pH neutralising value, fineness, and origins for lime. Whereas, there was often no choice of superphosphate supply and conversations indicate that the risk of cadmium contamination was not widely understood.

#### **4.3.5.6 Efficient water use**

Four practices related to efficient water use were rated by producers (Appendix 9). Four of the six irrigators rated *operating efficient irrigation systems* as *always* achievable (V .603, .005). Irrigation systems varied in their efficiency, from flood irrigation (n = 2) to laser levelled paddocks (n = 1) together with recycling bays (n = 2), to centre pivot with minimal run-off (n = 1) (Appendix 10).

Most respondents did not believe managing willows was applicable to their farm. However, many of the properties had stream banks and the recorded distribution of weedy willow species extends across the north-east of Victoria and parts of the south-west (WONS 2008). Comments indicated that *willows* were perceived as a risk only if they were an invasive species (n = 4) and that they are thought to be attractive (n = 2). Conversations indicate that the significant water loss through evapo-transpiration from willow infested streams was not understood, nor were other impacts on aquatic eco-systems.

Few producers in the South West group grew crops and consequently rated appropriate crops as *not applicable* (Appendix 9). Most producers (n = 19) rated *designing deep dams with*

*small surface area to volume to reduce evaporation* as *often* achievable, limited by sandy sub-soils.

#### 4.3.5.7 Not polluting streams

The impact of agriculture on stream water quality can be minimised by controlling stock access, the run-off in surface water of soil, fertiliser and other agricultural inputs or waste. The ratings for practices contributing to not polluting streams were *rarely* to *often* (Appendix 4). The prevalence of a *not applicable* rating for practices to protect streams can be explained by the number of producers who had no streams on their properties, in particular, 50% of Campaspe respondents (Appendix 11).

About a third of the respondents rated *protecting stream bank stability and installing off-stream watering points* as *often* or *always* achievable; more so in the Rutherglen and South-West groups (Appendix 11). Catchment Management Authority incentives appear to be sufficient for fencing off stream banks. The cost of fencing and watering points, as well as the ongoing risk of flood damage, was a limitation mentioned by two central Victorian producers who rated the practice as *sometimes* achievable (Appendix 12). One respondent who rated *protecting stream banks* as ‘never’ stated that he “*might have to fence off creek in the future because of erosion on the banks, and funding is available, but I’m unsure of the advantages*”.

The risk of pollution and loss of fertilisers were secondary considerations for many producers when applying fertilisers. One third responded that *applying fertiliser when there’s 70% groundcover actively growing* was *rarely* or *never* achievable, with the majority of the Rutherglen group rating this practice below the overall median (Appendix 11). Producers preferred to apply fertiliser before the autumn break ( $V = .861, .000$ ), mainly to have the fertiliser available to plants at the first seasonal rainfall, and while the ground was still trafficable (Appendix 12).

*Applying low doses of nitrogen* was rated as *not applicable* where little cropping was done (Appendix 4). Comments were that there was no apparent benefit for the additional costs of fuel and time for a second application (Appendix 12). One producer commented that the risk of fertiliser run-off was low on flat topography. Maintaining *buffer zones of 20 metres alongside streams when spreading lime, fertiliser or using pesticides* rated highly overall, however, one producer observed that the area was “*too much to take out of production*” (Appendix 12).

In most cases, the disposal of wastes met with Environmental Protection Agency recommendations; the exception being the lack of facilities to dispose of used engine oil. Nine respondents volunteered that they had difficulty with disposal of waste (Appendix 12). There are regular local services for the *disposal of chemical drums and unused chemicals*; however, according to one producer, the collection of unused chemicals could do with more publicity to address the common lack of awareness of services. There were no organised, free services for *disposal of tyres and oil*. Most producers in the Campaspe group rated this practice less achievable than the overall median (Appendix 11). Local council waste management facility charges were thought to be exorbitant. Consequently, producers improvised by recycling oil on bailer chains, on golf course greens or through the local mechanic, and tyres were used to hold down the plastic covering silage pits or around electricity poles to keep stock away from chemical treatments for termites.

#### 4.3.5.8 Native bush land and wildlife conservation

Practices contributing to the conservation of native species were rated *often* or *always* by most producers, with the exception of wetland conservation which was rated *not applicable* by fourteen respondents (Appendix 4). The *not applicable* responses were from producers with only scattered natives or no native woodland remnants nor wetlands remaining on the property.

Most properties had little native woodland remaining and many (50%) were replanting, primarily for stock shelter (Table 24). All the districts had a long farming history with most respondents (n = 25) inheriting the farm. The average remnant native vegetation cover per property was 4% (range 0-15%) and the average area replanted per property was 1.3% (range 0-10%).

Table 24: Percentage native woodland cover by groups

	0	1-5%	6-10%	>11%
Campaspe	1	9	4	1
Rutherglen	1	7	1	
South West	4	2		
Overall	6	18	5	1

The conservation of wildlife and habitat that remained was considered to be achievable by most producers (Appendix 4). Campaspe respondents had more woodland on their properties than the other two groups and rated natural regeneration as achievable more often than the other groups (Appendix 13). Comments indicate that this group is actively conserving

remnants; half of the group were fencing off remnants to control the impact of grazing (Appendix 14). Rutherglen and South West respondents had larger areas of replanted vegetation (Chi 24.184, df 8, .002). Constraints to the conservation of remnants included time and money to fence, and control of animal populations perceived to be a pest by producers (Appendix 14). Publicly funded incentives were thought to be “*sufficient*” by some and “*only*” 25% of the actual cost in another case. Those who rated ***allowing natural regeneration*** as less achievable commented that:

...*Prefer to plant tube stock than regenerate*

...*Open woodlands have been sown with salt bush*

...*Fencing corridors and under story would be fox harbour.*

The control of pest animals (which respondents defined as including kangaroos) was perceived as a problem in ungrazed or fenced off vegetation, whether it was a planted corridor, timber (blue gum) plantation or remnant woodland (Appendix 14). Commercial blue gum plantations, state forests and ungrazed land were considered uncontrolled harbour for kangaroos and pests such as rabbits and foxes and therefore a source of frustration (n = 5). The bureaucratic process for ***permits to cull and clear*** were thought to be onerous (n = 2). The example given was that clearing permits have an obligation to replant an arbitrary number of replacement trees. In one district, the comment was made that “*no-one gets permits and only about 20 animals are left*”.

Wetlands were a resource that was utilised rather than conserved. Five respondents from all groups commented that ***wetlands*** are strategically grazed during drier parts of the year; two producers stated that wetlands were recently drained to develop pastures (Appendix 14). One district within the Campaspe group was the Greta Swamp, until drained early last century and retains moisture and feed in the dry summers. The significant difference between groups for wetland conservation related to the number of *not applicable* responses in Campaspe and the South West (Appendix 13).

#### **4.3.5.9 Reducing greenhouse gases**

Some producers commented that they could not do anything about reducing agricultural greenhouse gas emissions, and this was reflected in their management priorities. Most respondents (n = 21) ranked greenhouse gas reduction as the lowest priority for their farms productivity and viability, with almost all other respondents (n = 8) ranking it as second lowest. However, respondents were not aware of on-farm practices that would contribute to

the reduction. After rating the practices many realised they could achieve practices that contribute to greenhouse gas reduction. Most producers rated practices that reduce greenhouse gases as achievable (Appendix 4), with the exception of direct drilling into stubble which required significant investment in specialised machinery. This was not perceived as justifiable for producers with smaller areas of cropping.

Both *minimum tillage* and *alternatives to burning stubble* are more relevant to mixed farming (Campaspe and Rutherglen). The Campaspe group rated finding alternatives to burning stubble more achievable with 66% rating *sometimes* or above; the Rutherglen group rated it less achievable with 66% *sometimes* or below (Appendix 15). Burning stubble was reported to have advantages such as control of insect pests, weeds and diseases such as rust; or for contractors wanting to save time (Appendix 16). Alternatives to burning stubble included grazing stubble or direct drilling the next crop into the stubble of the previous crop which often requires specialised machinery that can sow through stubble and root matter from a previous crop.

A greater proportion of the Campaspe respondents (75%) had reservations about achieving minimum tillage than the Rutherglen group (50%) (Appendix 15). Comments that indicated producers could not till through dense root mats or heavy soils came from those with clay soils (V.566, .010) (Appendix 16). Representative comments specifically from producers on clay loam who rated minimum tillage as *often* were:

... *Heavy stubble can't be tilled with conventional combine as it hooks into harrows; new machinery costs \$40-50 000*

... *Effect of stubble on the next crop yield*

...*Soil is so heavy that machinery can't get through roots and soil.*

Comments indicated that justifying the investment in new tillage machinery was a major barrier to using this practice to reduce greenhouse gases (Appendix 16). Minimum tillage was rated as more achievable where income from other agricultural activities (e.g. cropping) was higher (V 1.000, .007). Where the investment in new machinery has been made, an *"improvement in the soil structure is noticeable"*.

Producers were asked to rate *applying low doses of nitrogen* in the context of evaluating practices to reduce greenhouse gas emissions. There was no significant difference between group ratings; although the South West group were inclined to use clover to fix nitrogen. The

practice was more relevant in the mixed farming area, where the additional time for two applications was a constraint, and the benefit (reduced waste) was not obvious (Appendix 16).

Finishing systems may contribute to the abatement of greenhouse gas emissions by reducing methane through minimising the number of *grazing days required for each animal to reach market weight*. The Campaspe and Rutherglen groups used supplementary feeding with grain (n = 8) usually in paddocks and sometimes feedlots/containment paddocks (n = 2). Crops such as chicory, rape, turnip, plantain, brassica, millet supplemented pastures in the South West group helped to reduce the number of grazing days. Lucerne pastures were reported to help finish lambs during the drier seasons due to a shorter plant growing season which takes advantage of the rainfall patterns. *Finding alternatives to burning stubble* was moderately associated with finishing systems (V .523, .012). Comments and ratings indicate that irrigators were rarely inclined to wait for stock to graze the stubble, whereas most respondents finishing lambs on lucerne (eight out of 10) rated this practice as *often* or *always* achievable, depending on the season.

#### **4.3.5.10 Livestock - feed, water and disease treatment**

Seven respondents volunteered that animal welfare in general is intrinsically linked with productivity, the quality of the produce and returns. Representative comments include:

... *Sheep achieve best when well looked after*

... *Animal welfare is something we do anyway; 98% of farmers care for their stock.*

Most respondents rated the provision of feed and clean water as *often* and *always* (Appendix 4). Respondents rated *pasture diversity and length to improve animal nutrition and reduce parasite infections* in the context of evaluating animal welfare practices, rating this practice as sometimes (n = 11) or often (n = 14). This approach to controlling disease through increased immunity appears not to have wide acceptance. Worm burdens were thought to be low in districts where lucerne is relied upon, possibly because it is grazed higher and away from hatched larvae and eggs. Nineteen respondents had no wetlands and answered *not applicable* to *removing stock from wetlands in wet months to avoid parasites*.

#### **4.3.5.11 Shelter, stress, fear and pain**

With few exceptions, respondents rated practices in this section as *often* or *always* achievable (Appendix 4). The value of *plantings as shelter* was commented on by five respondents. The South West group rated provision of shelter less achievable than the other groups

(V .461, .042) and correspondingly had the least amount of remnant vegetation and plantings remaining on the properties.

To avoid injury in races and transport four respondents volunteered that they used gentle dogs and muzzles when necessary. Most trucks are up to standard to avoid damage to carcasses, under an accredited carriers program. In all three cases the distance to abattoir was not significant, 1 to 2.5 hours transport time.

Four respondents commented that they had tried various methods for tail docking and castration and had settled with rubber rings as the best option.

The survey respondents were largely producers of meat rather than wool. It is the wrinkling skin and 'stained' wool of Merino breeds that attract blowflies. Nine producers had sheep mulesed, and eight volunteered that they did not mules sheep. Comments indicate that mulesing is done in the animals' best interest, to avoid flystrike, and that producers' are aware that contractors should be accredited to perform the recommended method. Only one producer commented that they were successfully using a newly available anaesthetic spray. Three mentioned that it's difficult to get contractors who are accredited for the 'V method' of mulesing. V method of mulesing refers to the currently accepted best practice for remove the wrinkled skin around the breach of merino sheep to reduce flystrike. Representative comments were:

*...There is no proof that V mulesing is less painful or stressful than any other method.*

*... Mulesing minimises stain and dags that shearers won't touch.*

*... Mulesing is done before the bush fly season to avoid fly strike on the wound and mismothering.*

*... Mulesing in paddocks ... [to avoid mismothering] ...is too slow because the contractor has to move portable yards; mistreatment affects productivity.*

#### **4.4 Discussion**

In the context of the cases studied, the investigation determined the extent to which CGH attributes could be produced, and identified the constraints to answer the research question: *To what extent can conventional producers in this study meet consumer expectations and substantiate the ethical claims of branded lamb?*

Producers' evaluation of practices was not primarily an assessment of current farm practice but their views on the achievability of CGH practices and the perceived constraints to those practices. The format of the evaluation involved producers' ratings of practices on a scale of never, rarely, sometimes, often and always achievable. Therefore, the discussion covers the proximity of the theoretical achievability of CGH production to consumers' expectations rather than the proximity of actual lamb production to consumers' expectations.

Constraints were reported for two-thirds of the clean and green practices evaluated. Statements are proposed to explain constraints to CGH practices and evidence given from the above results. The reported achievability of recommended 'best practices' is typical of the variation found across pastoralists in Australia (Walker 2007). Sub-headings under each attribute, that is clean, green and humane in the following sections, present evidence for these propositions, which are also summarised in the appendices:

- A. Minimising chemical use and residues were constrained by the perceived risk of failure of alternative practices to control pest outbreaks, a lack of knowledge or support to trial the practices, and systemic issues beyond the farm-gate (Appendix 17).
- B. Green lamb production is constrained by unfavourable biophysical conditions, the return on investment, non-convergence of conservation and production goals, and under-estimation of risks (Appendix 18).
- C. The extent to which animals are treated humanely is largely a function of the stockman's awareness and understanding of animal behaviour and ability to read the behavioural and physiological signs of pain and distress (Appendix 19) (Hemsworth & Coleman 1998).

With hindsight, the evidence for the propositions would have been stronger if the pilot interviews were spread across groups (not within one group), and then the protocol was adjusted to probe for verification of constraints from other respondents once it was raised the first time. Also, it would have been useful to conduct a pilot with local State government agency experts to identify practices that were seldom applicable in each region and then remove those from the interview protocol to save interview time with producers.

The findings support previous research that major constraints to adoption of new practices in Australia are financial constraints and insufficient proof of efficacy (Connell *et al.* 2000; Robertson & Wimalasuriya 2004). The relevance of overseas research into farmers' response to CGH practices may be limited as a comparison to the findings in this study due to

differences in biophysical and institutional conditions. For instance, farmers' responses to reduced tillage in European countries may be influenced by the subsidies offered to adopt (Lahmar 2008). In general, constraints identified in Europe included the constraints identified here, such as climate, the impact on production costs of adoption, the coordination of practices with existing farming systems, cultural barriers, lack of knowledge and technical support (Lahmar 2008). Similar constraints were identified in a review of recent research into farmers' intentions to adopt soil and water conservation practices in America and Africa, such as rainfall, technical support, knowledge and skills, and "awareness of environmental threats" (Knowler & Bradshaw 2007: 42). Investigating barriers to firms' adoption of eco-labelling Pedersen and Neergaard (2006: 26) summarised barriers as "limited investment resources, high costs of implementing environmental management, lack of information and know-how, difficulties in quantifying the benefits and organisational inertia". Cullen *et al.* (2008) found that farmers tend to learn from each other because another farmer has the practical and therefore credible experience of agro-ecological practices. Ohlmer *et al.* (1998) also found that farmers gathered information, identified problems and checked their decisions through their personal contact with other farmers.

Knowler and Bradshaw's (2007) analysis showed that causal relationships between individual variables and adoption were not converging with increasing numbers of investigation; that is, relationships are not universal but influenced by the socio-economic and biophysical context. Pannell *et al.* (2000) found that the factors that affect farm decisions are so complex that they are unlikely to be fully modelled because these decisions are made in specific enterprise context and characteristics.

#### **4.4.1 'Clean' lamb production**

Producers rated the importance of chemical management higher than environmental management or animal welfare in both three and 10 years with comments indicating a positive response to consumer concerns about health. Midwest American farmers perceived the threats of chemical use were highest for human health and water quality (Napier *et al.* 2000).

Producers' reported that producing 'safe' lamb was achievable; 'safe' meaning that pesticides are used within maximum residue limits set for human consumption by the registration authority. The few reported failures to comply with safety recommendations related to chemical-user safety rather than consumer health (Appendix 17). Compliance with 'safe' chemical management through the Livestock Production Assurance, now given through the

NVD, provides access to markets and traces the responsibility for chemical residues to producers rather than buyers within the supply chain.

Producers in this study rated practices contributing to ‘pesticide free’ production as less achievable than practices which have a commercial imperative; that is, compliance with the NVD for market access. For conventional farmers, minimising pesticide use is an incremental but significant step towards meeting changing market expectations for ‘pesticide free’ lamb.

Constraints reported by producers to minimising chemical use and residues can be explained by the producers’ perceived risk of failure of alternative practices to control pest outbreaks, a lack of knowledge or technical support to trial the practices, and institutional issues beyond the farm-gate (Appendix 17). The reported constraints to implementing new practices that minimise pesticide use are not unique to this study and are discussed below.

#### **4.4.1.1 Risk, knowledge and technical support**

Producers in each group relied on pesticides for convenient and effective control of pests and diseases and to avoid economic risk (Appendix 17). For example, producers considered biological controls as a ‘leap of faith’, and bemoaned deregistration of some pesticides. Previous research shows that producers apply pesticides to reduce risks such as loss of yield (Pannell 1991). Brodt *et al.* (2006: 90) found that “production maximizers” would use fertilizer and pesticides that were effective as opposed to “environmental stewards” who were prepared to take the risk on the “softest” chemicals. Wilson & Tisdell (2001: 458) argue that “yields and returns become dependent” upon pesticide use posing an economic barrier to change.

Pannell and Zilberman (2001) found that farmers need evidence about the efficacy, costs, benefits, risks and coordination with the rest of the farming system to evaluate the relevance of practices to their enterprises. Farmers’ perceptions of the riskiness of practices can be positively affected by observing the benefits of a change (Robertson & Wimalasuriya 2004). Farmers have confidence in biological pest control practices that have been adapted to fit with existing farming systems in local conditions by other farmers (Cullen *et al.* 2008).

The information available for pesticide reducing practices was often considered vague or contradictory. A review of recent research on farmers’ intentions to adopt low-input agricultural practices that technical support, management knowledge and skills influenced

adoption in half of the studies reviewed (Knowler & Bradshaw 2007). Significant technical knowledge and support is required to reduce the risk of failure in implementing new pest control strategies (Cary *et al.* 2001; Pannell *et al.* 2006). Implementation of integrated pest control practices needs to be specified for variations in climate, production systems and parasite and host species' lifecycles, rather than a general recommendation (Gurr 2006). Napier (2000) found that government technical support influenced the adoption of conservation practices in the Midwest of the United States, along with farmers perception of the risks of chemical use.

Technical support through government agencies is scarce (ASEC 2001; Mitchell *et al.* 2007), and engaging private consultants would add to the cost of making such changes. Agricultural extension tends to preserve conventional practices (Ewing 2003) and not promote 'alternative' practices that challenge the local norms (Roberts 1997; Ridley 2004). This is not specific to agriculture, people are generally more comfortable with incremental change rather than radical redesign (Hill 2005).

#### **4.4.1.2 Farm inputs and equipments**

Livestock breeders have a role to play in supporting attempts to reduce pesticide use by selecting for worm resistance and bare breech (less soiled wool and fly treatments). The demand for these traits is increasing with public pressure to cease mulesing and reduce chemical use, generating a significant investment in genetic indices (MLA 2008b).

There are potential threats to the 'safe' status through the risk of chemical residue contamination of inputs such as fertiliser and feed. Producers were not habitually checking the residue status of inputs. Often, when they did check, suppliers lacked full information about product status, or there were limited options for feed supplies during drought, forcing producers to take the risk. The risk of residue contamination of meat increases during drought because animals graze bare ground. The risk of cadmium contamination could spoil the low ambient levels in Australian soils that are an advantage in global markets (Hudson 1995).

A constraint to reducing herbicide use was the prevention of weed spread and new infestations within the farm boundary, particularly during stock and machinery movements. Controlling the spread of severe, noxious or unpalatable weeds could compensate for the cost of portable wash-down systems.

### **4.4.1.3 Summary**

In summary, conventional lamb producers in the cases observed are complying with the industry assurance programs for ‘safe’ meat. The uncertainty and lack of knowledge about alternative pest control methods means that conventional producers are likely to incur additional costs to attain skills and technical support to produce lamb that can claim to be pesticide free or at least to minimise the use of pesticides. Production costs might also increase to produce lamb that can substantiate a ‘green’ claim.

### **4.4.2 ‘Green’ lamb production**

Producers in this study believed that environmental management would become increasingly important for market access over time, but that it was currently not as important as chemical residue management and animal welfare issues. Producers were more likely to give environmental assurances if it was necessary to maintain market access, satisfy market demands and gain a premium. Previous research supports these findings. Eighty-two per cent of surveyed graziers were willing to voluntarily implement an environmental assurance scheme if there was evidence of the economic benefits, details about the level of administrative burden and restrictive regulations, and “substantial consumer demand for environmentally-friendly products” (Pahl 2003: 17).

Constraints reported by producers to ‘green’ criteria for the production of lamb can be explained by unfavourable biophysical conditions, non-convergence of conservation and production goals, perceived return on investment, and under-estimation of risks (Appendix 18). The following sub-sections provide evidence for these explanations and then discuss the significance of these findings.

#### **4.4.2.1 Biophysical limitations**

Responses from producers in Campaspe and Rutherglen regions indicate that rainfall is frequently insufficient to maintain the recommended minimum ground cover of 70%, which is critical to soil conservation and carbon sequestration (NLWRA 2001a). To compensate for limited feed availability producers tended to invest in adaptive feeding systems rather than reduce stocking rates. Where low rainfall constrained production, a common strategy is to prioritise the immediate financial security of a farm above soil conservation (Cary *et al.* 2001; Robertson & Wimalasuriya 2004). Financial security enables landholders to wait for the not immediately observable and uncertain, longer-term outcomes of some environmental practices (Pannell *et al.* 2006).

Net primary productivity (biomass) and stock carrying capacity of the Campaspe and Rutherglen districts are rated as medium, in comparison to the medium to high productivity of the south-west area (SoE 2006). The South-west group reported maintaining 70% groundcover at all times. Knowler and Bradshaw's (2007) review of recent research showed that most studies found a positive significant relationship between rainfall and farmers' intention to adopt soil and water conservation practices.

#### **4.4.2.2 Convergence of conservation and production practices**

Grazing management and investment in infrastructure were the main areas where 'green' production practices were considered achievable when there was little negative impact on production. Many producers reported that they had already invested in infrastructure and machinery recommended by agricultural experts to maintain a productive resource base and long-term financial viability of the farm, for example, minimum tillage, testing soils and maintaining groundcover (Acid Soil Action 2001; McFarland *et al.* 2003). Overall, producers were inclined to prioritise the allocation of capital to meet immediate competing needs. Specifically, the investment in machinery or infrastructure was prioritised to align with the main source of on-farm income to maximise the return. For example, the purchase of direct drill machinery could be justified by the higher usage in a mixed farming enterprise than solely lamb production. Previous research supports this finding. Cary *et al.* (2001) found that the purchase of machinery needed to be justified by creating significant farm income. Napier (2000) also found associations between adoption of practices and the proportion of farm income and acreage related to those practices and where a return could be expected in the short term (5 years).

In economic terms, farmers are under the pressure of declining terms of trade (input costs versus price received) and have less profit margin to employ labour and invest in machinery (Williams, 1990). Vizard (2006) found that farms that perform well financially have low production costs, prioritising expenditure on improvements that drive productivity, for instance direct drill machinery or irrigation. Negative perceptions of long term financial security affected the decision to invest in new practices more so than current financial position (Cary *et al.* 2001).

Research conducted in similar climatic conditions to the cases studied here found that the participating landholders defined sustainable land management firstly through improvements

to profit and secondly to environmental issues such as water quality, salinity, erosion and pests (Cocklin *et al.* 2003). An Australian study found that 50% of land managers reported economic risk as a barrier to investing in environmental sustainability (ACG 2001). Such rationalisation of farm investment does not consider the long-term, unmonitored, less observable benefits of maintaining ecological processes that are the basis of agricultural productivity (Robertson & Wimalasuriya 2004). Practices tend to be adopted more rapidly where there was an observed and immediate benefit such as conservation tillage on erodible soils and integrated pest management in higher rainfall zones where pest pressure was also higher (Fuglie & Kascak 2001).

Results indicated that average gross income over 10 years could be a predictor for the achievement of practices only where it involved large or long term expenditure. Barlow *et al.* (2003) used “net cash flow results averaged over a 10 year period” for economic analysis of set stocking and rotational grazing in Western Victoria. Cary *et al.* (2001) found that negative perceptions of long term financial security affected the decision to invest in new practices more so than “objectively measured indicators of current financial position”. Gross farm income was found to be a significant variable in predicting adoption of soil and water conservation practices in America and Africa (Knowler & Bradshaw 2007).

#### **4.4.2.3 Non-convergence of biodiversity conservation and production goals**

The survey constructs did not directly measure producers’ attitudes towards biodiversity management, but were reasonable proxies. Production priorities were ranked higher than biodiversity (4.3.4). Most producers considered biodiversity management practices to be achievable, however about a third of producers’ reported continued grazing in remnant native woodlands and wetlands, and in some cases sowing of such areas with pasture or fodder species (4.3.5.8). Previous work indicates that only farmers with strong conservation goals invest in the environment without financial incentives (Reeve 2001; Pannell *et al.* 2006; Vizard 2006). Brodt *et al.* (2006: 90) found that “production maximizers” were not prepared to take land out of production for the sake of increasing biodiversity.

Time and money were reported constraints to excluding stock from creeks and remnants. Approximately one third of respondents in this study were in the process of excluding stock from creeks and the small remnant areas that remained on properties (p. 112 & 111). Producers may be reluctant to invest in water quality practices where they do not perceive that other users will reciprocate. Benefits that result from managing water quality accrue to

downstream users who may not contribute themselves (Pannell *et al.* 2006) and farmers expect compensation for this off-farm benefit (Reeve 2001).

Producers did not always comply with regulations for culling and waste disposal when government services were inconvenient, expensive or non-existent. Previously, through a Victorian government project titled “Environmental Management Systems for Lamb and Sheep Meat Production”, producers’ self-reported that weak management areas were pollution, waste and water management and biodiversity management (Linden & Huhn 2005a).

Previous research found that producers viewed conservation practices as having low compatibility with existing farming systems, and that the loss of biodiversity is not widely recognised as a threat to farming (ACG 2001). Reeve (2001) concluded that the level of environmental concern among farmers had increased only slightly in the previous decade. Self-reported industry derived reports indicate that 40-50% of producers control grazing in riparian areas and wetlands (Walker 2007). The lack of integration of conservation and production ideals is not unique to Australia. A survey of Austrian farmers found lower “nature values” on properties where production was a stronger motivator than farming in “concordance with the biodiversity of their landscape” (Schmitzberger *et al.* 2005: 274).

#### **4.4.2.4 Unrecognised risks to environment**

Responses indicate that producers in the study under-estimated the potential impacts of declining soil fertility, increasing pH levels, soil contamination, and weed incursions. For instance, respondents with lucerne pasture perceived little risk in testing soils less regularly than recommended, and had in many cases adjusted the timing of testing to coincide with the cropping phase. The perception of no risk may be a result of deep-rooted lucerne pasture avoiding the acid surface soils.

Natural resource degradation processes often occur at rates that are difficult to observe without monitoring, therefore farmers can easily under-estimate the risks to agricultural productivity and environmental damage (McTainsh & Boughton 1994). Without early recognition of a problem, the opportunity to intervene with preventive measures may be lost (Ehrlich & Becker 1972). For example, checking the cadmium content in phosphate fertilisers would ensure that low ambient levels are maintained. Previous researchers have concluded that landholders do not recognise the risks of soil degradation on their own properties (Cary *et al.* 2001). A national survey of farmers found that 55% do not report soil decline as a threat

(ACG 2001). Conversely, “awareness of environmental threats” was found to be positively correlated to farmers’ intentions to adopt soil and water conservation practices (Knowler & Bradshaw 2007: 39).

#### **4.4.2.5 Summary**

In summary, the LMG producers’ evaluation of ‘green’ practices indicated several critical failure points. For the observed cases to make a claim of ‘green’ lamb production, critical failure points would need to be addressed, or at least declared as a weakness that was being addressed, to maintain consumer trust in the brand promise. For example, in the cases observed in this study the following would need to be substantiated:

- Maintenance of groundcover for soil and water conservation, weed control, animal welfare, and as a carbon sink.
- Checking the quality of soil ameliorants to avoid negative impacts on food safety and long term productivity.
- Ongoing investment in irrigation efficiency.
- Identification of the weed potential and environmental impact of willow species present.
- Buffer zones alongside waterways are used when applying chemicals to pasture or crops.
- Control stock access to waterways.
- Manage native habitat primarily for biodiversity values, with occasional strategic grazing for fuel reduction.
- Reduce greenhouse gas emissions through tillage machinery innovations, alternatives to stubble burning and/or carbon sink off-sets.
- Identify and compare the costs and benefits of two low dose nitrogen applications according to individual properties.

The constraints mentioned by producers have been noted in previous research, and include: biophysical limitations particularly low rainfall and consequent lack of groundcover; convergence of conservation and production practices determine the allocation of financial resources and effort; non-convergence of biodiversity conservation and production practices deters investment without external financial incentives or a strong conservation ethics; and unrecognised risks to the environment allows resource degradation to go unnoticed. Overall, the producers evaluated most ‘green’ practices as achievable. The level of investment required

to achieve the practices and substantiate a claim depends upon the current assets of the farm that is, skills, natural resources and infrastructure.

#### **4.4.3 'Humane' lamb production**

Producers rated most humane practices as achievable *often* or *always*, and ranked animal health and welfare in the top three management priorities. This is a positive view of an industry that is currently challenged by lobbyists on the grounds of inhumane practices such as mulesing and live export of livestock. However, 'humane' treatment is sometimes compromised for farm income security and costs associated with humane practices. For instance, many producers were forthright about the fact that they mulesed sheep on the grounds that it is more humane to do so than allow flystrike to occur and that any replacement technology for the 'V method' will need to be cost-effective (Pannell *et al.* 2006).

In the cases studied, certain circumstances would need to be avoided in order to substantiate a 'humane' claim, such as animals grazing bare-ground during drought, feed-lot production systems, lack of shelter, livestock sold for live export or mulesed without pain relief. Several producers stated that productivity (lamb growth rates and lambing percentages) can be adversely affected by poor welfare (Grandin 2003). Defining animal welfare in terms of economic efficiency was prevalent among conventional farmers across Europe (Veissier *et al.* 2008). Hubbard *et al.* (2007) found conventional UK farmers linked welfare to the value of the animal and public concerns and, in turn, market access. Farmers felt public concerns were driven more by media campaigns than an understanding of farming practices (Cary *et al.* 2004), which is mirrored in the findings here. Te Velde *et al.* (2002) found that conventional farmers' perceptions of animal welfare were very similar, sharing values and norms from a production paradigm that concentrated on efficiency and fast growth. Organic farmers in Sweden were found to hold two distinct views of welfare associated with their motivation for farming (Lund *et al.* 2004). Those who saw farming as a lifestyle thought the expression of natural behaviours was important as opposed to farmers who viewed organic production as a means of gaining a premium, and the latter group viewed surgical procedures more favourably. Enculturation and lack of understanding of animal responses may explain the positive evaluation of practices by producers' in this study (Hemsworth 2007).

Stockmanship has been shown to be critical with the stockperson's personality, attitude and behaviour impacting on animal welfare (Wood *et al.* 1998; Waiblinger *et al.* 2006; FAWC 2007a; Veissier *et al.* 2008). The stockperson's or producer's attitudes will impact on the

labour devoted to individual animal care in an extensive system, for instance during pregnancy, lambing and lactation, and vigilance for diseases, parasites and predators (Goddard *et al.* 2006). Hemsworth & Coleman (1998) argue that inappropriate interactions should be corrected using facts to modify beliefs, as well as demonstrating better techniques. Hovi and Padel (2000) are of the view that it is not easy for farmers to discuss their attitudes towards animals that may be accepted cultural norms.

Animal welfare hinges on subjective assessments based upon an individual's perceptions of an animal's distress in varying circumstances (Hemsworth & Coleman 1998). Fitzpatrick *et al.* (2006: 56) point out that sheep are "relatively stoical creatures" which may have been an evolutionary advantage in terms of not drawing predators attention to weakness. As a result, humans may find it difficult to gauge the level of pain just on a sheep's behaviour. However, stock handlers' behaviour and performance can be assessed against a benchmarked standard that aims to circumvent aversive states (Grandin 2003). Waiblinger *et al.* (2006) suggest a different research approach to assess positive or at least neutral livestock reactions to human contact.

The pressure for industry to change practices is more likely to occur through lobbyists and media campaigns than legislation. Legislation avoids prescription because it is difficult to cover every circumstance or to monitor animal treatment, particularly in relation to reducing fear and pain (Fitzpatrick *et al.* 2006; Bureau of Animal Welfare 2007). Also, it is difficult to apply objective measures of welfare under various circumstances that could occur on-farm (Fraser 1987; Hemsworth & Coleman 1998; Mellor *et al.* 2000). Therefore, State governments prevention of animal cruelty legislation and supporting industry codes of practice set a minimum standard for the provision of food, water and shelter (Victorian Government 1986; Bureau of Animal Welfare 2007). Topical and emerging issues relating to pain relief during on-farm surgical procedures and reducing the stress of handling may be the basis for differentiating a lamb product that appeals to involved consumers.

#### **4.4.4 Implications of finishing systems for CGH lamb**

The evaluation of practices found that finishing systems (agronomic, irrigation or feeding technologies) used in the cases studied have benefits for 'clean, green and humane' attributes and can simultaneously compromise another CGH attribute. Examples of this compromise that were utilised in the cases observed were lucerne based pastures, containment paddocks and lamb feed-lotting.

Lucerne crops provide a feed source in lower rainfall areas and control water table recharge and salinity (Cary *et al.* 2001). However, producers reported that it is difficult to maintain groundcover as the growth habit of lucerne competes for light with ryegrass and clover that are regularly sown to increase groundcover. Producers reported reduced worm burdens and drenching when animals graze lucerne plants and are grazing away from the soil. Lucerne benefits 'clean' and 'humane' production to the detriment of 'green' production.

Containment paddocks are a drought strategy whereby selected paddocks are 'sacrificed' to protect the ground-cover on destocked proportions of the farms. Livestock are fed grain in containment paddocks, and stocking densities can be intensive. Lamb feed-lotting is a more permanent finishing system which was regularly used by at least two producers in this study. The profitability of feed-lotting is largely dependent on grain or feed prices. Intensive systems are said to avoid the hazards of predation and exposure to climate that occur in extensive pasture-based systems (Edwards & Casabianca 1997).

Whilst intensive systems have benefits for soil conservation, there are unresolved disadvantages for animal welfare and food safety such as increased stress due to confined space, a lack of diverse surroundings that enable natural behaviours (Edwards & Casabianca 1997) and the ability of animals to maintain a minimum distance between themselves and other animals (Fox 1996), decreased animal health due to the proximity of animals, a build up of noxious gas, and the dryness of manure and consequent impact of pathogen-laden dust on respiratory and eye diseases (Fox 1996; Dowling & Crossley 2003). Other concerns are waste management and the level of pathogens in relation to food safety (Fox 1996; Dowling & Crossley 2003). Research and guidelines aim to address some issues, however, an animals' ability to express natural behaviours can not be resolved in containment lots as they are featureless, compacted bare dirt (Bureau of Animal Welfare 2007).

#### **4.4.5 Conclusion**

In seeking to answer the research question, the survey found that the extent to which conventional producers could meet consumer expectations and substantiate the ethical claims of branded lamb was largely dependent upon extant skills, infrastructure and machinery and the producers' willingness and ability to adopt new practices. Assuming producer willingness, the major constraints to achieving CGH practices are the biophysical conditions at a specific location and the cost of implementation considering the extant skills, infrastructure and

machinery available to the enterprise. Where biophysical conditions are favourable, the profitability of producing CGH lamb would still depend upon the initial expenses involved in adapting existing farm resources. This finding would apply to all enterprises.

Many of the reported constraints to CGH lamb production may be resolved through a willingness to invest in skills, technical support, infrastructure and machinery. There are, of course, constraints where producers have limited influence or no control such as climatic conditions, government services and supplied inputs. Adaptations to climatic conditions such as finishing systems can compromise marketing claims that meet all three CGH attributes.

Whether it is worth making changes to meet consumer expectations is contingent upon existing enterprise assets (human, natural, infrastructure and capital), as this determines the costs involved in changing production and the return on this investment. The next Chapter investigates the distribution options that might secure an adequate return on investment. Chapter 6 then discusses the significance of production constraints, distribution options and consumer responses for the production and marketing of CGH branded lamb.

Limitations of the evaluation of practices in this study were that the evaluation task was operating on two levels: theoretical and actual achievability of practices. It is unclear exactly when producers were answering based on their own experience of trialling or implementation of a practice and when they expressed their opinion of the practice pre-trial. This type of evaluation should first establish producers' experience of the practice. Further research could establish producers' utility for implementing practices, for example, *would this practice be worthwhile if it gained a premium of 10%*, focussing on the critical practices to the substantiation of clean, green and humane claims. Identifying the critical practices might involve a similar producer evaluation as was conducted here.

## **5 Evaluation of producer-driven marketing/meat distribution systems**

### **5.1 Introduction**

Meat brands differentiated on the basis of credence attributes are rare in the mainstream distribution channels where meat is predominantly generic. The main reasons are that the supermarkets are unlikely to initiate credence assured meat programs in the medium term due to insufficient consumer demand (Cary *et al.* 2004; Bhaskaran *et al.* 2006), supermarkets are largely uninterested in small volume niche products (Bhaskaran *et al.* 2006), and private brands struggle to gain a premium or the volumes (both demand and supply) required in the mainstream (Plunkett & Kingwell 2001). There is a lead-time for brands to build consumer recognition and loyalty that generates the sales volumes, and to coordinate adequate supply typical for mainstream brands (Gattorna 2006). Volume of supply and economies of scale in production and processing that can sustain lower margins in the mainstream can eventually be attained through horizontal alliances or producer co-operatives (Plunkett & Kingwell 2001). In the interim, alternative means of distribution can be an ‘incubator’ to test and market a new brand (Coster & Kennon 2005; FDIS 2001).

For producers who aspire to small scale business goals, for instance to improve farm-gate prices or increase revenue to, in turn, support a family farm lifestyle, then direct marketing and alternative food networks (AFN) are reported to improve farm incomes in comparison to supplying mainstream markets (Lawson *et al.* 2008; Coster, 2005 #459). There is evidence that consumers are purchasing direct to support local farmers and production methods, such as pesticide free or humane (Pretty 2000; Coster & Kennon 2005). Consumers are increasingly interested in how food is produced and in information that reassures them that the food is safe (Gilg & Battershill 1998; La Trobe 2001; Lyson & Guptill 2004; Coster & Kennon 2005; Keeling Bond *et al.* 2006). Face-to-face contact and dialogue appear to be important to consumer trust in the product claims made by direct marketers (Gilg and Battershill 1998, Hingley & Lindgreen 2002; Venn *et al.* 2006).

Supplying a differentiated and branded product requires a shift in orientation from meeting mainstream buyer specifications to focusing on consistently meeting consumer expectations (Camarri 2002). The Beef Improvement Association advises that to differentiate and brand a

beef product requires understanding what the consumer wants (from portion sizes to credence values), and adds the importance of being transparent and maintaining a means of consumer feedback (Camarri 2002). Buhr (2004) found that to differentiate a product and build a customer base, the needs of customers should be understood, production systems changed to meet those needs, ways found to access the segment and advertising used to establish the brand. The components of this study have thus far established consumer preferences and expectations of CGH branded lamb, and evaluated the constraints to changing the production systems to meet those needs. This component of the study is focussed on consumer access to CGH branded lamb through alternative distribution channels and whether it is financial viable to do so. The research question is: *Given the constraints for new product entry in the mainstream, is producer-driven marketing a feasible alternative for Australian family-operated farms to market a CGH branded lamb product?*

Producers of a CGH branded lamb would bear net costs unless there was adequate revenue in the mainstream or alternative channels to cover the cost of production and marketing of credence attributes (Malcolm *et al.* 2005). Producers who cannot compete with economies of scale and cost efficiency required in the mainstream may overcome this “cost handicap” by supplying a niche market and using supply chain strategies to control costs (Buhr 2004: 273). Other considerations before making a strategic change to an enterprise would be the resources available such as the skills, labour and production capacity and the uncertainties or risks involved. Previous research used a cost, benefits and uncertainties framework to evaluate direct marketing in the European context (Verhaegen & van Huylenbroeck 2001). A similar framework is discussed in the literature review (2.11) and applied below to six cases of producer-driven marketing in Victoria, Australia.

Meat producers who have already differentiated and marketed their own product can provide insights of relevance to the production and marketing of CGH branded lamb. The following investigation is not restricted to one type of supply chain or a particular meat. A number of concepts used in the literature to describe distribution channels that are alternatives to conventional channels are too narrowly defined for this purpose (2.10). The description used for cases in this study is producer-driven marketing. Producer-driven marketing is defined here as cases where producers market their own produce and encompasses all supply chains that are developed and managed by producers (1.2).

### **5.1.1 Study purpose, research question and propositions**

The purpose of the study is to investigate the feasibility of producer-driven marketing of differentiated meat, starting from the single family farm. The context is the structure of the Australian market for meat in which the decision is made to switch to alternative distribution, discussed in section 2.7 (Westgren & Zering 1998). The broad research question is:

*Given the constraints for new product entry in the mainstream, is producer-driven marketing a feasible alternative for Australian family-operated farms to market a CGH branded lamb product?*

Enterprise characteristics that contribute to the ongoing viability of the businesses were investigated, with the aim of identifying specific factors relevant to the marketing of branded meat that may also apply to CGH branded lamb. The literature informed the following dimensions of interest as a guide for the interview questions and analysis which were:

- product qualities and attributes that customers are seeking through these channels;
- the skills, experience and personal attributes required by producers managing marketing;
- the formal and informal mechanisms that maintain consumer trust in a brand promise;
- the volume of sales that might be achieved; and
- the likely impact of value adding and producer-driven marketing on farm profit margins.

## **5.2 Methods**

### **5.2.1 Study design**

The phenomenon of producer-driven marketing is relatively novel in Australian agribusiness with no previous research into the profitability and long term viability of such an approach in the Australian context. A case study approach enables in-depth investigation of the dimensions of interest stated above in the context of actual enterprise processes and everyday events (Yin 2003). Multiple case studies across a variety of meat types and distribution systems and outlets (Table 25) were used to identify common processes, patterns and exceptions across the cases independent of the enterprise characteristics (Yin 2003).

Table 25: Distribution channels for case studies

	Home delivery	Restaurant	Farmers' market	Retail butcher	Supermarkets	Food service
Lamb 1			X	X		
Lamb 2	X	X		X		
Beef 1			X	X	X	
Beef 2			X	X		
Pork 1			X			
Pork 2				X	X	X

### 5.2.2 Case selection

The units of analysis were the producer-driven enterprises. The criteria for case selection were: meat producers who had decided to market their own meat produce, within proximity of other field surveys to control costs and time, and to work within a similar market and biophysical context. Cases were not limited to lamb as such instances are rare and geographically spread across several States. All cases were marketing product with similar characteristics; meat is perishable, requires similar post-production handling along the supply chain and represents a similar market position. The production of CGH attributes was not of interest in this component of the study having been the focus of Chapters 3 & 4. No cases were found where the producers were claiming to be producing the bundle of attributes of interest; that is 'clean, green and humane' production. However, all the selected cases made at least one credence claim: two producers were claiming to produce pork using 'free range' husbandry; four producers were claiming 'clean and green' credentials; three cases were claiming 'stress free' animal handling; and two producers claimed health benefits associated with grass-fed rather than grain-fed beef (Table 26). Of interest to an investigation of the feasibility of producer-driven marketing of CGH lamb was consumer confidence in their claims, and their experience of developing alternative supply chains.

Table 26: Credence claims of the cases studied

	Free range	'clean and green'	'stress free' handling	Grass-fed health benefits
Lamb 1		X		
Lamb 2		X	X	
Beef 1		X	X	X
Beef 2		X	X	X
Pork 1	X			
Pork 2	X			

Cases were identified through various means: two were found through internet searching for meat product, one was recommended and three were approached at farmers' markets in Melbourne. Enterprises participating in the study were small to medium sized farms.

### **5.2.2.1 Description of the product, enterprise supply chain and operation**

#### Lamb 1

Kartanji Park Premium Lamb (KPPL) is a family owned and run, vertically integrated enterprise based in Sale, Victoria. The KPPL brand is promoted on the basis of eating quality and freshness (that is, no cryovac packaging that induces anaerobic aging and a peculiar flavour). Eating quality is the result of the breed, the feed and animal handling practices described as “minimum interference” and “low stress”. KPPL is either pure Wiltshire Horn or crossed over Suffolk ewes. Lambs are finished at KPPL for four to six weeks on native grasses or introduced grasses and clover, to produce a better flavour than solely grain-fed lamb. The couple coordinates the processing and distribution, and maintains 270 acres of farmland. The local abattoir slaughters the lamb and hangs it for four days, then delivers back to the boning room, where it is hung another two days before boning and packaging on a Friday for the weekend markets. Two full-time butchers are employed, a casual butcher to help with retail shop sales, as well as an apprentice in the boning room. KPPL is sold from refrigerated trailers at 11 farmers' markets per month around Gippsland and metropolitan Melbourne. Orders are taken online and at markets. Part-time sales people are employed to cover the markets along with the family, as the face of the farmer-direct brand. The owners plan to continue to grow the business.

#### Lamb 2

Rutherglen Premium Lamb (RPL) is a partnership between two family-owned and run farms, where the main proponents had complementary marketing and financial skills. The plans for the future of the brand were not jointly shared and were moderated by family commitments in once instance, and comparative returns from the sale of irrigation water. Lambs are produced on three properties around Rutherglen and Wangaratta owned by the two RPL proprietors and occasionally from a trusted supplier. The brand is differentiated as a regional product (i.e. “one of the cleanest and most unspoiled areas of the world”) with consistent eating quality. Younger ‘milk-fed lamb’ (not weaned), aged 2.5 - 3 months and 8-12 kg carcass weight, is targeted at the restaurant trade and the larger lambs, 25kg carcass weight, are packed for home delivery. RPL supplies 700 lambs per year, an average of 13 lambs are killed and processed each week. Six lambs per week to two regular restaurants and the remainder to 200 home

delivery clients. It is also retailed through a specialty butcher shop in Wangaratta. Orders are taken by phone and on the website. The producer transports the animals to the local abattoirs. Carcasses hang there for three days and are then delivered to butchers. Innovative cuts such as diced shoulder, scotch fillet, topside steaks, butterfly steaks are cryovac packed and delivered in a carton. There is a full lamb in each pack which can be cut in any one of four styles. A courier service delivers the packs to Sydney and Melbourne where they are distributed in smaller refrigerated vehicles to homes and restaurants across the metropolitan and country areas within a week of slaughter.

### Beef 1

Mt Bellevue Welsh Black Beef (MBWBB) is both a personal partnership, with dependent children, and business partnership between the beef breeder and a direct marketer of meat. As well as plans for future growth of the beef brand, the property includes a Welsh Black stud, a vineyard, bed and breakfast, and merchandise under the Mt Bellevue label such as jams, shampoos, wines and hides. The brand is differentiated on price (“butchers’ shop prices”), traceability and minimal chemicals, “naturally reared, grass-fed and stress-free”, and the eating characteristics described as the “classic taste of old-fashioned beef – tender, marbled and flavoursome.” Immediately after slaughter at the local abattoirs, the carcasses are branded and stored separately. Carcasses are released to a butcher in Wangaratta for processing and packaging prior to each weeks farmers’ markets. The butcher is licensed as a PrimeSafe supervisor which enables the partners to assist with cryovac packaging, and preparing secondary cuts for value added products. Value adding includes frozen meals prepared by a locally renowned chef, naturally flavoured pies and sausages. Mt Bellevue has a PrimeSafe registered refrigerated trailer to collect and distribute meat at farmers’ markets at one rural and three metropolitan farmers’ markets. They usually have a team of three including the partners at the markets to keep pace with the queue, and a chef to demonstrate and advise on cooking.

### Beef 2

Strathbogie Beef (SB) is a family owned and run enterprise which had stopped supplying direct to customers and continue to sell the brand to a local butcher. They stopped marketing direct to consumers for a culmination of reasons which were the impact of drought on pastures and reduced stocking rates, reconsideration of the margins gained, and reassessing the impact on family life with two children under the age of five after a 12 month trial. They are farming because of the family lifestyle but found they were “exhausted, which was not

fair on the children”. Coordination and selling at farmers’ market impinged on family time and incurred the cost of additional part-time farm labour (it was “robbing Peter to pay Paul”). The marketing margin was less than their benchmark of a teachers’ salary. However, there remains a future prospect of integrating the beef brand with a bakery.

SB was described as “100% natural grass fed, dry-aged beef”, selectively bred for taste, tenderness and good human health. The website describes the nutritional benefits of grass-fed beef; that is the higher nutritional values than feed-lot cattle, free of hormones, feed additives or animal by-products, and with minimal use of antibiotics and pesticides. They found it necessary to undertake a minimal drenching program because they border a state forest and some macropod parasites transmit to bovines. They also promote the ‘environmental care’ on the property including extensive tree plantings and carbon credits. There was minimal handling of the herd and minimal stress prior to loading for transport to the abattoirs, which affects tenderness and flavour. Chilled carcasses were then transported to the butcher in Benalla who processed and packed the meat into cryovac bags to be collected in the refrigerated trailer (which was only licensed to carry cryovaced meat). Packs were then labelled and distributed. Online orders were delivered at two metropolitan farmers’ markets and were given priority over supermarket orders. Local supermarkets carried value added secondary cuts and small goods, which is 45% of the beef carcass.

### Pork 1

The Gypsy Pig (GP) is a partnership marketing business based in Darnum, Victoria. One couple, with dependent child, supply rare breed pork and the other couple has expertise in marketing. The pork is differentiated on the basis that it is free range and has eating quality characteristics that they believe are substantially lost in commercial breeds grown intensively, such as higher fat content that give the meat flavour and moistness. The business started in a partnership with another rare breed supplier in a jointly owned specialty butchers shop but chose to reduce the work load involved in running the shop to accommodate family commitments.

The Gypsy Pig now solely supplies two metropolitan and one semi-rural farmers’ market. The supply chain is coordinated by the producer. The animals are ear-tagged for traceability and the carcasses are easily distinguished by colour and proportions. Animals for fresh meat products are slaughtered just prior to each market at a local abattoir who handles small private lines. Carcasses are delivered to a specialty butchers shop to be broken down and packaged in cryovac bags. The benefits of cryovac are preservation and no freezer burn if the customer

decides to freeze the product. They do not sell frozen product. Smoked products such as bacon and ham, are processed at PrimeSafe approved facilities. By law, labels must have contact details, ingredients, either date packed or use by date.

## Pork 2

Otway Pork (OP) started as a partnership between a medium sized pig producer and a marketing consortium that had already developed a similar model for a chicken brand (Lilydale Free Range). Production has expanded to two free range breeder farms, one of 1500 sows and one of 1000 sows and contracted 'grow out' facilities. The brand is differentiated on the basis of consistent eating quality and 'bred free range' which enhances eating experience characteristics such as moisture, tenderness and flavour. The Royal Society for the Protection of Animals (RSPCA) accredits the free range breeding where piglets are born and raised with sows outdoors until 3-4 weeks of age. Each weekly batch of 400 pigs is then weaned and sorted by sex into straw lined shelters until 9 weeks of age. Then, males are taken to a contract 'grow out' facility in northern Victoria, destined for curing by a national company. The 200 females are 'grown out' to 19 weeks of age in the sheds for the brand. Pigs weighing 85 kg are slaughtered for the retail butcher trade, and the rest grow to 105 kg live weight for selected Coles' supermarkets (meat managers in Coles have autonomy to source meat based on local customer requirements, which is largely discovered through trial and error) and a food service supplier, who distributes select cuts to hotels and restaurants. In free range breeding operations seasonal infertility during high summer temperatures affect the supply. There's a very narrow band across southern Victoria, Tasmania and the south-west of West Australia and as north as Scone in New South Wales with right temperature and rainfall for free-range breeding. At this stage, both production facilities are in the same climatic zone.

Two full-time marketing staff members solicit orders from retailers and deal with customer enquiries. A meat manager coordinates the slaughter, selection of carcasses to fill order fat and weight specifications, packaging at the boning rooms and distribution by a sub-contractor. The boning room is owned by an affiliated company. At the boning room the meat is boned, sliced, packed, priced, weighed, dated and sorted for orders to 55 Coles' stores around Melbourne. Selected orders are taken in pallet lots for distribution to Coles' stores. The alternative is to cross-dock whereby the meat is delivered to Coles distribution centre for consolidation into pallet lots and distribution, but this is double handling and risks the quality of the product. A marketing officer is employed to check supermarket shelf displays for product and packaging integrity, and restocking from the refrigerated mother-packs.

### **5.2.3 Data collection and validity threats**

An interview protocol was developed to standardise the questions across cases (Appendix 20). The interview remained flexible and took one to several hours (Yin 2003). The protocol covered the dimensions of interest and enquired about the impact on farm profitability of value adding and marketing post farm-gate, the costs and revenues post farm-gate. The protocol was adjusted after the first interview with little rewording for clarity (Buhr 2004). Interviews were tape-recorded and transcribed. Transcripts of the interviews were sent to the informants for corroboration, checking the reliability of the interpretation. A few minor factual corrections were then made prior to analysis.

To improve the reliability and validity of the data, multiple sources of evidence were collected including interviews with processors, buyers or partners; policies and claims made on websites and promotional material; media articles; and personal observations at the premises (Westgren & Zering 1998; Lindgreen 1999; Yin 2003). Additional sources of evidence collaborate the data collected during case interviews. Full case notes are not appended, however, the chain of evidence has been maintained through an NVivo Version 7 database (Yin 2003).

### **5.2.4 Data analysis**

Cross-case analysis was undertaken using NVivo software. Each transcript was coded using a hierarchy of 'nodes' which are markers of text in this type of software (Bazeley 2007b). The proliferation of nodes was organised into themed sets to gather evidence for propositions (Yin 2003; Bazeley 2004). Queries and matrices were used to find relationships between nodes and/or sets. Interpretations were recorded in memos; these were also coded to match newly developed concepts with original data (Bazeley 2004). When the issues and relationships were clear, models were created in NVivo and exported for presentation of the findings. Frequency of cases was used to support interpretations of the strength of evidence for a repeated experience or event (Sandelowski 2001).

## **5.3 Results**

### **5.3.1 Motivation for producer-driven marketing**

Dissatisfaction with the low prices offered to meat producers supplying the mainstream was the primary incentive to explore alternative marketing options (Table 27). Most cases had previous experience of supplying mainstream supermarkets and reported that buyers want to

maximise their margins and, as suppliers of perishable food, they could not be price setters. Abattoirs are also competing to supply the supermarkets and pass on the pressure to maintain low prices. It was thought that penalties imposed by the abattoirs for carcasses outside weight specification were misused.

Improved profitability and support for a farm lifestyle (1.3) were primary motivators for direct marketing among the cases interviewed (Table 27). For family enterprises the additional revenue supported the farm lifestyle. Two cases reported their dissatisfaction with price variation as a result of the number of stock yarded at regional sales each week or seasonal price slumps due to importation of cheap intensively grown pork from Canada, when Australian pig production is affected by summer infertility. To avoid pilfering experienced when supplying retail butchers, one case decided to direct sell to consumers.

Ethical motivations mentioned included paying a fair price to other producers of lamb supplying the brand, supporting the local economy by employing people in a retail butcher, supplying ‘clean’ and nutritious food, and free range production. Three producers raised unconventional breeds, either for improved flavour or to conserve a rare breed.

Table 27: Motivations among cases for producer-driven marketing of product

	Price setter	Avoid yield loss	Smooth price variability	Support family lifestyle	Business or ethical values	Conserve, develop the breed
Lamb 1	X			X	X	X
Lamb 2	X			X		
Beef 1	X		X	X	X	
Beef 2		X		X		X
Pork 1	X			X	X	X
Pork 2	X		X			

### 5.3.2 Implementation of producer-driven marketing

Long-term viability was the definition of success in all cases observed. However, in most cases, business goals were a means to support the family farm lifestyle. Key factors necessary to achieve long-term viability of these relatively new enterprises included managing supply chain relationships and risks, brand management and promotion, human resource limitations on family farms and profitability.

### **5.3.2.1 Desirable characteristics within supply chains**

The following section describes the desirable aspects of supply chain relationships, the reported risks and management strategies. Figure 18 depicts the characteristics within the supply chains observed in the case studies of direct marketers.

In three cases, the supply chain included additional producers to supply the brand, once a growing sales volume was limited by the production capacity on a single farm. Product quality control involved inspection of external suppliers' properties and animals.

Good relationships with the processing butchers were reported in terms of a team effort to value-add through innovative cuts, presentation, processing of small goods, and coordinate deliveries from the abattoirs and where necessary coordination of couriers for home delivery. Retail butchers benefited by dealing direct with producers by receiving consistent quality, no good and services tax on the carcass or agents' fees, and cross promotion with the brand. The butcher was often the sole retail outlet for the brand. There is usually agreement that the producer distributes the brand in a different geographical market to the butcher shop to avoid competition in the same market. The relationship was jeopardised where there had been substitution under the brand label with generic meat.

Good relationships with abattoirs doing private kills were reported in terms of engendering trust by stamping the carcass with the brand immediately after processing, offering advice and feedback on carcass quality, and supporting stress minimisation strategies by reducing the time spent in holding yards.

With one exception, the cases had developed multiple supply chains which were a combination of retailers (butcher, gourmet shops, supermarket or restaurant) and selling direct to consumers (farmers' markets or home delivery). Retail presence was reported to be a benefit in that it increases exposure, increases promotion through the gourmet food movement, is an outlet for value added products and secondary cuts, and supplies the local market to build the client base and brand reputation.

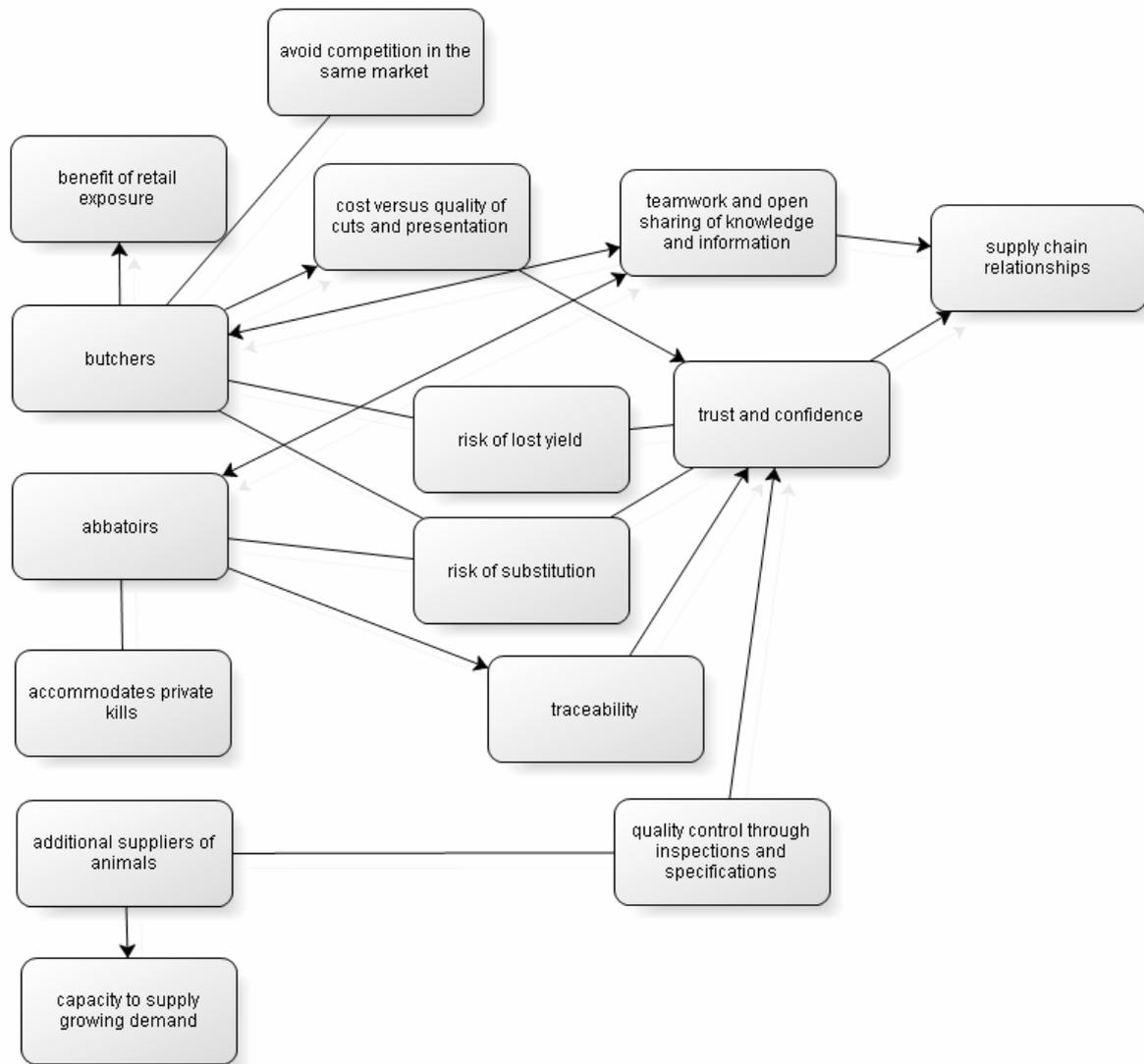


Figure 18: Risks and desirable characteristics of supply chains observed in the case studies

### 5.3.2.2 Response to supply chain risks

In the process of developing supply chains, five entrepreneurs had changed abattoirs and butchers or both, and in one case, both more than once. Reported reasons included poor standards of cutting and presentation, loss of yield, and claims for a share of the brand. Lost yield can be discovered by weighing and reconstruction of the beast compared to the slaughter sheet.

Substitution was reported as the biggest risk to brand reputation when supplying retailers. A written contract for one brand includes sampling and DNA testing and mystery shoppers (spies) to check the cuts being sold under the brand name; a breach would invoke

misrepresentation under the Trades Practices Act. The risk of substitution is very difficult to prove and can cause damage to the brand where the substituted product does meet the expectations of the consumer. Similarly, traceability from the abattoirs is essential to providing a consistent quality to consumers.

Entrepreneurs managed the risk of brand damage with strategies such as vertical integration to maintain control of the product through the whole supply chain, “*doing everything right*” in regards to food safety, and diversification of supply chains to be able to supply product through the mainstream in the event of brand damage.

Distribution of branded perishable goods presents unique challenges for maintaining product integrity. Home delivery customers need to be at home at the arranged delivery time, or the courier must re-try the next day. For transport and distribution through farmers’ markets, refrigerated trailers must be registered with the PrimeSafe standard in Victoria. Entrepreneurs report constantly checking refrigeration temperatures and difficulty maintaining the required temperature on busy days when the doors are opening often.

### **5.3.2.3 Producing the brand claims**

In all cases, products were differentiated from mainstream commodities primarily on the basis of eating quality, that is, flavour and tenderness in the case of beef and lamb, and flavour, tenderness and moistness for pork. In three cases, eating quality was linked to production practices such as free range pork, grass-fed beef, minimising stress, and linked to breed in three cases. Regional reputations evoked gourmet quality, and ‘clean and green’ values in three cases. Beef and pork products were promoted as being hormone free and minimal use of antibiotics and drenching. Value added distinctions were made by the branded lamb enterprises, such as innovative cuts, freshness (not cryovaccated), or preservative and gluten free products.

All cases reported that the consumers’ experience of the premium eating quality created return business. Producers have to know what affects eating quality and commit to consistently high standards of husbandry, processing and butchering. Reported quality control points to produce flavour and tenderness were minimising the stress caused by handling, isolation and transport prior to slaughter, in five cases, and length of hanging time in another. Carcase characteristics and animal temperament (which impact on the pH and avoids dark cutting meat which is inedible) contribute to eating quality. Carcases were sometimes visually assessed by

producers at the abattoirs to understand the impact of on-farm management decisions. Grass fed animals were thought to produce better flavour, as was free-range husbandry for pork. Traditional or rare breeds were produced in three cases (one lamb, beef and pork) to differentiate on the basis of flavour and tenderness. Packaging extends shelf life but can affect eating quality, for instance, cryovac packaging for transport is practical; however, if not frozen within a about week gases build up which anaerobically "stew the meat", changing the texture and flavour.

#### **5.3.2.4 Gaining consumer trust in the brand claims**

Producers selling direct to consumers reported that their customers asked questions about production. Producers selling via home delivery or retailers experienced fewer enquiries about farm practices. Producers reported that consumers want to be assured that the food is safe and possibly more concerned in the metropolitan markets about animal welfare. Most common questions asked were about farm practices that affect flavour and human health such as chemical or drench use.

NVivo matrix queries revealed what producers did to gain consumer trust in product claims. This included providing consistently good eating quality, face-to-face dialogue, extending an open invitation to visit the farm, and in two cases accreditation schemes were implemented, one self-assessed and the other third party verified.

Dialogue with the producer supplanted the need for third party assurances when meat was sold direct to consumers. Consumers question the producer about their practices. *“Questions can be confronting when you're busy handling transactions, but you need to be able to look somebody in the eye, smile and explain what you do. You have to know what you're talking about to be credible when selling face-to-face”*. Commonly, they want to know what makes the meat 'special' or different to that in the supermarket or they'll ask about the claims specifically made by the brand. For example, asking how free range pigs are housed, and many are surprised to find that not all pigs are raised free range. Five producers mentioned consumers' lack of knowledge about farm practices, some referring to the disconnection with 'country cousins'.

Direct marketers own the animal through the whole supply chain, negating the need for compliance with the Livestock Assurance Program and National Vendors Declaration (NVD). An NVD is an instrument for traceability and liability in a long supply chain, such as through

livestock agents and wholesaling abattoirs (MLA 2004). However, producers are highly motivated to comply with food safety regulations to protect the brand image. Dealing directly with the consumer, it is in their “*own best interest to maintain the highest standards to avoid liability*”.

The two cases that were more distanced from their customers relied more on consumers’ perceptions and third party endorsements, such as Flockcare accreditation, Environmental Management Systems (EMS, not accredited) and RSPCA accreditation for free range breeding of pork. The enterprise that had completed an EMS course and continued to keep records, stated that accreditation was too expensive for no perceived return and unnecessary for market access at present. This brand stated that marketing was “*about perceptions*”. This case considered an EMS to be “*business as usual*” because they saw continuous improvement as “*common sense*” and are able to set their own objectives.

The RSPCA accreditation and logo was explicitly used to differentiate the product and appeal to a growing market segment. The RSPCA accreditation was a pilot standard for the pork industry. The production process was developed in conjunction with RSPCA, with the breeding operation audited every eight weeks by the same RSPCA officer. This has enabled an understanding of the issues and continuous improvement rather than preventing the movement of animals through the business. The proprietor believes they could access the supermarkets stating ‘free range’ without the accreditation. In fact, one supermarket buyer was negative about the accreditation initially because they believed the RSPCA is better known for the welfare of pets rather than livestock. However, the accreditation differentiates the product in a unique way which is recognisable by consumers. Advertising in the supermarkets says “bred free range” so consumers are purchasing possibly with the perception of the animals living outdoors all of their lives. The definition and use of the term ‘free range’ is controversial within the pork industry due to instances such as the one just described.

Four entrepreneurs had considered organic accreditation while three mentioned the number of “*conflicting*” standards as a barrier and that this was “*confusing*” and would “*weaken the label*” in regards to consumer perceptions of what organic production actually meant.

A number of practical barriers were also reported including:

- more land required to quarantine non-organic animals bought in from the sales yards or other properties;

- organic producers need to be located nearby an abattoirs that is accredited to be cost-effective;
- can not readily source organic feed and bedding;
- the organic standard does not allow the application of nose rings to prevent digging up the groundcover and that are necessary for soil conservation;
- impeded ability to control internal and external parasite outbreaks quickly enough to protect their investment or to prevent animal distress (n = 4).

The perception of one producer was that conversion to “*organic was easy at the soil level but difficult from the animals’ intestines through*”.

### **5.3.2.5 Promotion**

Different types of promotional activities had various implications for growth in sales, particularly as a result of the producers’ capacity to supply and maintenance of consumer trust in the brand promise (Figure 19).

All marketers had promotional fliers or brochures to accompany sold products and websites describing the product in varying detail with regard to production, claims made, product list and how to order or purchase. Websites were inclined to present images of the farm and family. One enterprise was of the view that promotional material should deliberately avoid raising methods and avoid showing live animals because of their inevitable slaughter. This view is supported by marketing research (Schroder & McEachern 2004; Kubberod *et al.* 2008).

Online ordering facilities were established in three cases whilst others decided they might not be able to satisfy the lumpy demand that can arise through web based ordering. *“Before launching a website you need to be well established, with systems organised and products tested in a local environment. Word of mouth is about the right pace for a small operation. Slow progression enables you to handle the learning curve, investment and volume.”*

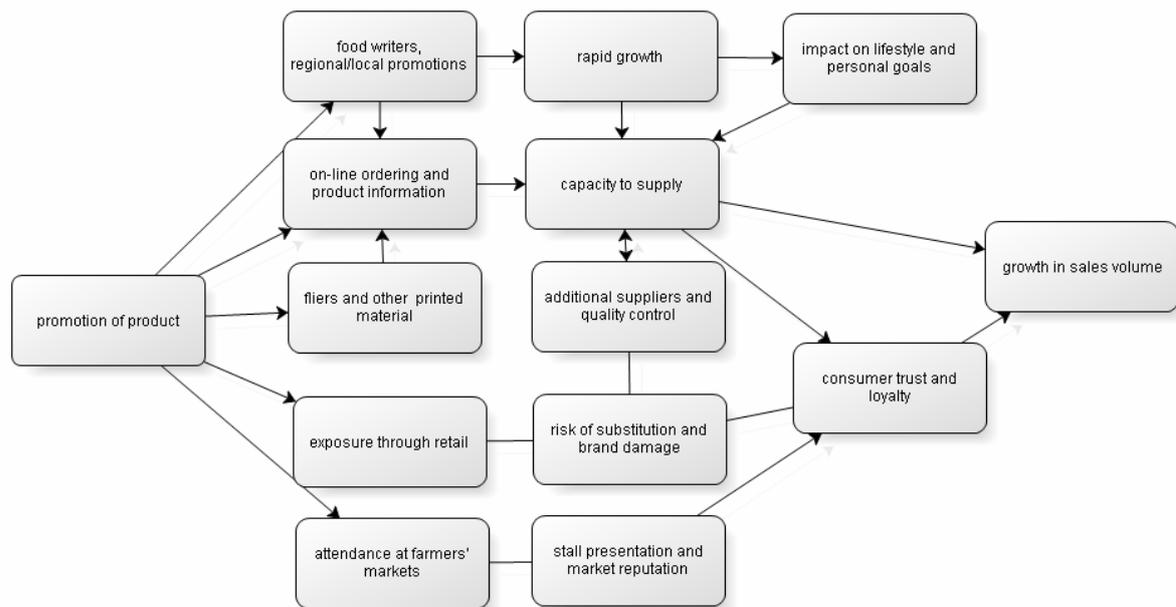


Figure 19: Implications of promotional activities on growth in sales volume

Wide media promotion can lead to rapid increase in demand and the struggle or inability to supply the volume. Four of the enterprises were featured in the Epicurean section of *The Age* metropolitan newspaper and two experienced an immediate increase in orders, which could not be met in one case and in another they sourced animals from a 'trusted' producer. The two producers experiencing a spike in orders had been promoted previously so *The Age* article built on their reputation, indicating that the spike may not happen the first time consumers hear about a product.

Cross-promotions between brands and regions were prevalent in the north-central region of Victoria. Being seen as “*an ambassador for the region's produce*” tended to bring further promotional opportunities through media interviews. Two entrepreneurs cross-promoted their brands through farm stays, and one of these merchandised under the brand label with a range of jams, shampoos, wines and hides.

Time spent on sales and promotion is proportional to the size of the turn-over. Smaller enterprises might spend a few hours a week taking orders and 2.5 days preparing for and attending each market, whereas medium sized enterprises employed sales staff to contact all outlets and solicit orders each week. Making regular contact with clients was seen as a good way of gaining orders as well as identifying quality, service or delivery issues.

A repeated theme across cases was that attendance at farmers' markets had to be reliable and consistent to encourage and retain the customer base. Attracting customers at farmers' markets was dependent upon the presentation of the market stall and staff and, at metropolitan markets, creating the perception that "*the country is coming to town*". Innovative products and cooking demonstrations are devices to capture attention, particularly among younger people lacking the skills to prepare meat well. Sales at markets tended to be many small orders. One case reported that few consumers had freezer space for a side of lamb, along with other meats and frozen goods. This observation may be a limitation to sales of a boxed whole lamb.

The reputation of the farmers' market is intrinsically bound with the brand image. A few producers took an active interest in the organisation and policies of the markets they attend, to maintain quality and authenticity, as well as the application of rules regarding competition and collusion. One producer wanted greater access to all metro markets so supported greater competition, however, another believed that competition could make the supply to markets unviable and unsustainable. Authenticity concerns were that the sellers are indeed the producers not just re-sellers, and that claims of organic or 'environmentally friendly' can be substantiated in some way.

### **5.3.2.6 Growth in sales volume and limitations**

The greatest increase in sales volume was reported by two cases that were vertically integrated, and had invested in infrastructure, promotion and wide distribution of the branded product. One case had realised a thirty-fold increase in volume over two years through consistent attendance at the largest metropolitan farmers' markets with the largest visitor numbers. Being a consistent reliable presence at as many markets as possible was a key strategy for this brand. Another case had realised a forty-fold increase in volume in 6.5 years through metropolitan retailers, constrained for two years due to the development of appropriate packaging for mainstream supermarkets. RSPCA 'free range' accreditation and consistent eating quality were this brand's promise, however there was an existing successful business model that this case was emulating. Using free range egg sales as a benchmark product with the same demographic profile as free range pork, then the owner estimated that sales could potentially increase a further five times. Without the same investment in expansion, smaller increases in volume of three- to eight-fold were experienced by other cases.

Five enterprises mentioned that there was unmet demand for volume and four enterprises had plans to either increase supply or exploit a new service niche. For example, one case observed that there was unmet demand for home deliveries after business hours and linked with suppliers of other fresh perishable products. In some cases distributing through a limited number of outlets enables better control over the growth in volume to match their capacity to supply.

Capacity to supply animals is a major limiting factor to growth. A repeated theme across cases was that supply had to be reliable and consistent to encourage and retain return business. Two smaller holdings who distribute pork and lamb through farmers' markets are concerned with supply of additional reliable sources of product that meet their brands' specifications. Larger properties producing beef were limited by the time it took to produce marketable sized animals. Strategies to overcome limits to supply included negotiated arrangements with neighbouring producers to breed particular genetics and grow to brand specifications. Other reported limitations to growth were lack of consumer awareness of brand, very limited supermarket shelf space, time and energy of a small team and the reduction in margins to employ staff or suppliers which potentially meant reduced quality control and the risk of substitution.

### **5.3.2.7 Human resources limitation and strategies to achieve goals**

Producer-driven marketing provided the flexibility to integrate family needs with making additional income (Figure 20). However, three cases were time and energy poor due to a combination of factors including managing multiple integrated enterprises, vertical integration, attendance at farmers' markets, and dependent children. Couples with older, independent children would presumably have more time and energy to devote to the enterprise. Managing multiple integrated enterprises such as farm stays, supply of cross-promotional products or attendance at farmers' markets ultimately resulted in some families experiencing high levels of stress. Farmers' markets are more resource intense than supplying restaurants or retailers, due to the preparation and presentation of the stall and the high level of involvement with customers. In some cases, added pressure resulted where rapid growth occurred beyond the enterprise's capacity to supply, and where there was unclear delineation of responsibilities for farm production, marketing, financial management and supply chain coordination.

Supply chains consisted of a team with complementary skills extending beyond the producers, to include contracted butchers, accountants and marketers, as well as business partners or

board members. As one entrepreneur said, “one person can’t do it all”. A commitment to product quality, determination to resolve problems and an ability to inspire others to continue were reported to be critical to achieving enterprise goals. In most cases, the entrepreneurs had extensive skills and experience in at least one area of the business, for instance meat production, marketing, or business management. Three cases had past experience in butchering and three cases had previously marketed differentiated meat products.

To relieve the pressure on human resources, four cases had purposely limited supply to one farm’s capacity. As an enterprise becomes larger or multi-faceted, a shift of the entrepreneurs’ involvement is required to oversee, coordinate and manage employed staff rather than undertake a hands-on role. However, this would reduce profits to previous levels unless sales revenue is increased to cover the additional cost.

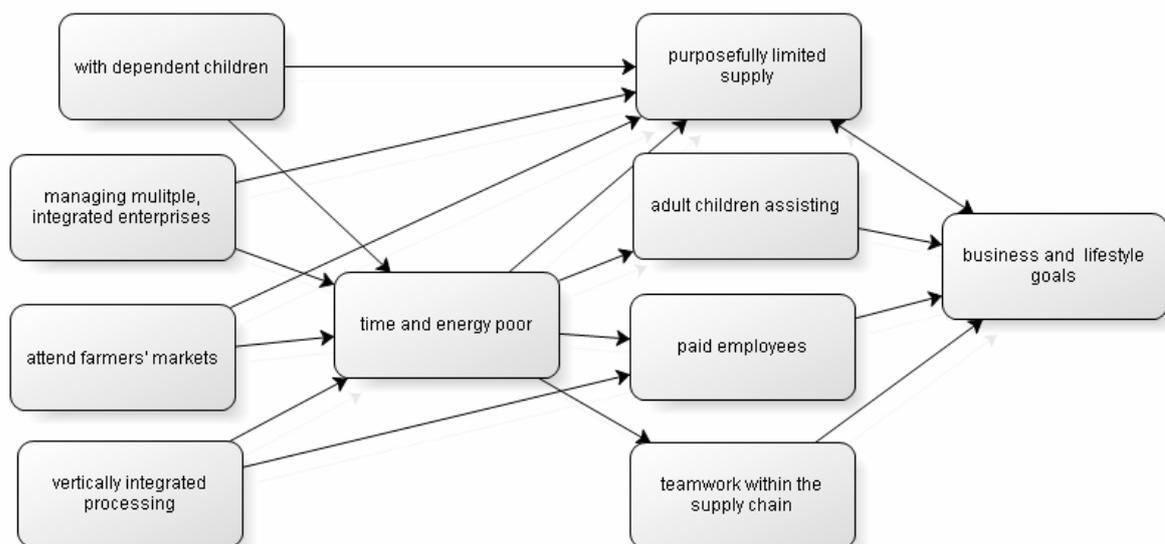


Figure 20: Human resource limitations and strategies

### 5.3.2.8 Costs and benefits of supplying mainstream retailers

Producer-marketers developed more than one supply chain to gain promotional opportunities and access to mainstream retail, restaurants or specialty butcher shops. The mainstream offered producers with high volume outlets for perishable, value added secondary cuts that are less popular than primary cuts. Smaller volume retailers can be undercut because of the lower prices negotiated to gain entry into supermarkets. This occurs because the smaller volume retailers may pay higher wholesale prices to cover the distribution costs, and therefore can not compete with supermarket prices.

Supplying supermarkets is attractive as an outlet for value added secondary cuts, however, negotiating entry into large supermarket chains was reported to be more challenging than small local supermarkets due to the volume required. Supplying supermarkets also presented challenges for managing cash flow as payment of invoices can be up to 60 days from receipt of goods. In the absence of on-site butchers to ensure meat quality and brand integrity on the supermarket shelf, one producer-marketer employed a marketing officer to check shelf space presentation (e.g. not squeezed), re-stocked bays, check use by dates and packaging. Refrigerated mother-packs were developed to extend the storage of individual meat packs kept at each supermarket to restock the shelves.

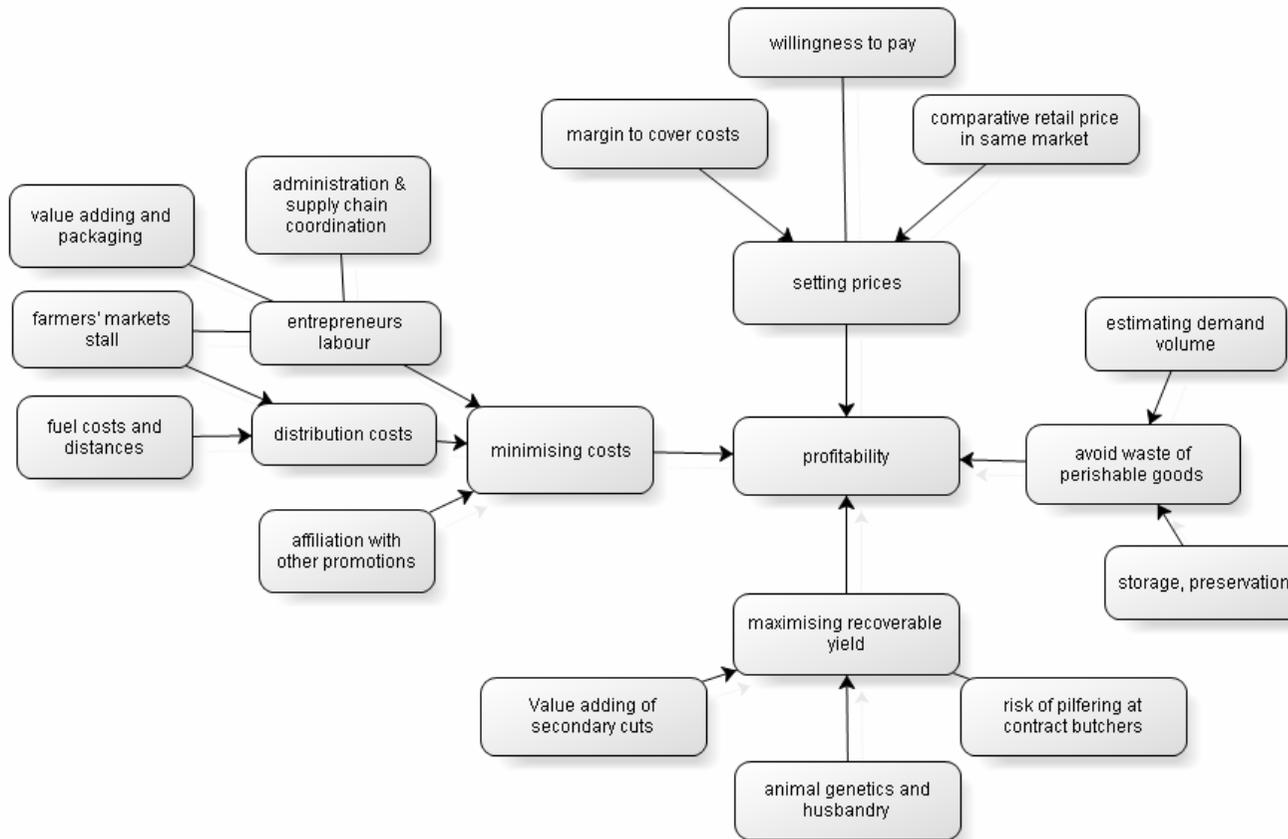
On supermarket shelves consumers are offered a choice between branded and generic products. However, there is limited capacity to promote the branded product attributes. Information that differentiates the meat is limited by the label space unless the supplier pays for an 'end of aisle' promotional stand or other advertising. A branded product competes with the supermarkets' house brands, which are often promoted through catalogues.

### **5.3.2.9 Profitability**

The benchmarks used for profitability of the PDM enterprises ranged from crude to sophisticated measures including cost of feed compared to returns, comparative price per kilogram to mainstream supply, comparison to full-time salary, supermarket gross income per beast and internal rate of return. Entrepreneurs, sometimes with expert advice, deemed the measures appropriate for the size of the business and their goals. Maximising recoverable yield, setting prices, estimating sales volume and minimising costs were reported as key facets of profitability (Figure 21). Each factor is discussed in the following paragraphs.

Return per animal depends on recoverable yield which is determined by the carcass, yield loss, animal genetics and husbandry. Yield loss through pilfering was experienced in two cases, discovered by reconstructing the weights of packaged meat compared to the abattoir kill sheet, and resulted in finding a new butcher to break down the carcass. Recoverable yield (also called saleable meat) varies according to species and breed and is increased by value adding to secondary cuts and trimmed meat.

Figure 21: Factors found to be contributing to profitability among the cases interviewed



It can be 65% to 75% of a beef carcass and is higher for lamb because there are more cuts with bone in (e.g. chops and legs). The value added products reported were all differentiated in some way, for example, low fat kabana, all natural flavours and herbs, smoked or free of preservative and gluten. Secondary beef cuts were value added into convenience meals. However, the value adding requires the additional time and skills in the boning room, butchers or contracted kitchen. Value adding extends to finding markets for all animal products. Animal skins represent 10-15% of the sale price. Unique qualities such as long haired skins or small skins present both a challenge and an opportunity. They may not meet the specifications of the tanneries and therefore an alternative outlet needs to be found to avoid the loss. Focusing on the unique quality is one way of marketing these skins.

Retail prices were generally benchmarked in the same market location that the product was being offered. For example, prices at local supermarkets and butchers in the same suburbs as the farmers' markets were a benchmark, producer-marketers then decided if the quality or values offered could sustain a premium above those local prices. This is a combination of what the consumers were used to paying and the premium they were willing to pay. In one instance, prices were cheaper than local prices justified on the basis of fewer overheads, e.g. no shop rent. This pricing strategy was successful in that all prime cuts were usually sold prior to the markets. In another case, the producer needed to increase the margin and did so incrementally. In their experience *“few people mention the price, even the less well-heeled, because they are buying flavour and other values”*.

Setting a wholesale price for meat sold to butchers and restaurants involved establishing a profitable margin to cover the costs of production, processing, marketing and unrecoverable yield. Retail butchers save sales tax or agents' fees that would be paid by going through a third party at the sales yards. Wholesale price to a supermarket was likely to be based on the generic price at the time, with a premium possibly negotiated. One marketer's experience was that the premium was eroded when the generic retail price increased 53% whilst they were unable to negotiate an equivalent increase for their brand, with only a 9% increase. However, this *“loss”* was considered to be worth the brand exposure and made their 'free range' pork a comparably priced choice. Restaurants tend to want wholesale price or a discount and only want certain cuts.

Estimating supply volume impacts on profitability by avoiding wastage of perishable product. Where the branding is fresh, not cryovaccated or frozen, unsold product was a particular problem that was mitigated to some extent by taking orders to supply home delivery, butchers and restaurants. Similarly, on-line orders and providing payment details (e.g. credit card) closes the sale with customers willing to collect the order from the markets. Those distributing through farmers' markets took orders as well as selling over the counter. Three producers kept records of cuts and amounts sold at each market. Cheaper cuts tend to be more popular in rural markets and convenience prime cuts tend to sell more in metropolitan markets. No-one could observe a seasonal pattern in the amount sold or the amount sold from week to week. However, there was a slight drop in attendance at farmers' markets on weekends that coincided with a large popular event such as sports finals.

Producer-marketers minimised costs by being affiliated with other promotional activities. Farmers' markets were advertised and promoted by the organisers, attracting crowds of up to 3000 in the metropolitan locations with a variety of specialty foods and entertainment, and at aesthetic sites adjacent to trendy shopping areas. Therefore, attending farmers' markets was seen as cost-effective brand exposure. Marketers were conscious of fuel costs, distances to larger markets and visitor numbers at the more developed metropolitan farmers' markets. Cross promotion and media opportunities were taken to increase brand exposure at minimal cost. In one case, a very articulate owner took every opportunity to be the regional 'ambassador' for gourmet food and wine, and cleverly included their brand in interviews. The slow-food movement and wine trail in north-central Victoria focused media attention on producers of differentiated product in that region. The coordination of events and promotion was sometimes subsidised by government agencies through the employment of a regional development officer. Consequently, enterprises also benefited through regional promotions where possible.

Household labour was often used to minimise the external labour costs that may be incurred in distribution and sales, processing and value adding. Under a PrimeSafe licensed supervisor, producers could work in preparation areas to weigh, pack and label, and process value added goods.

### **5.3.3 Marketing outcomes**

Producer-driven marketing was reported to improve farm-gate prices and achieve an adequate marketing margin in most cases. In two cases, selling at farmers' markets rather than

supplying supermarkets was considered a higher return for time spent. However, two cases provided opposing views and considered the time spent selling at farmers' markets to detract from production aspects of the enterprises, and chose to distribute the brand via restaurants, home delivery and retail butchers. The one medium-sized enterprise supplying mainstream supermarkets, butchers and food services companies believed producers should distribute CGH branded lamb through specialty butchers to maintain a premium and leave the retailing to specialists. Whilst producers were able to capture varying proportions of the post-farm marketing margin, this was off-set by additional processing, distribution and promotion costs, which are discussed later.

### **5.3.3.1 Farm income**

Table 28 compares estimated costs and returns for the two cases that direct marketed lamb through farmers' markets (case 1) and home delivery (case 2). The profitability of distribution through the farmers' markets increases with the volume of lamb sold. The integration of production, boning room and distribution to farmers' markets (case 1) saves more than 30% on the butchering and packaging compared to case 2, who had innovative cuts and a high standard of presentation. Case 1 sells a conservative estimate of 15 lambs per week and case 2 sells 13 per week.

It is estimated that the returns through alternative channels are up to 90% higher than the mainstream farm gate prices (about \$3.50/kg for 25kg) at the time of survey. For lower weights (18-24 kg) lamb prices in 2006 ranged between \$2.50 and \$1.40 (Weeks & McRae 2008).

For the remaining cases, figures were not volunteered to enable the calculation of gross profit. The reluctance of producers to divulge details of farm income is noted elsewhere (Govindasamy *et al.* 1999; Brie 2005). However, responses indicated that cases achieved reasonable marketing margins. The mainstream supplier reported a wholesale marketing margin of 33% and the direct marketing cases reported figures that indicate a farm to retail margin of 30% or at least significant increases to farm gate prices.

Table 28: Comparison of estimated farm-gate price/kg of lamb distributed through farmers' market (case 1) and home delivery (case 2).

	Lamb Case 1	Lamb Case 2
Return	\$218 per 20kg lamb*	\$195 per box (average 18kg) to Melbourne
Processing costs	\$ 38.40	\$57.50
Distribution costs	\$ 10.00**	\$15.00
Stall wages	\$ 32.00***	
Total marketing costs	\$ 80.40 per lamb	\$70.00 per box
Gross profit	\$137.60	\$125.00
Farm gate return per kg	\$ 6.88	\$ 6.94

\* calculated using 80% yield of saleable meat from 25kg carcass -yield % from Campaspe Carcase competition, 2006.

\*\*calculated using \$50 fuel from Sale, Victoria to metropolitan Melbourne return, plus \$50 vehicle costs and \$50 for stall fees and licenses for minimum of 15 animals per market.

\*\*\*4 people per week at 8 hrs each times \$15 per hour = \$480; for estimated minimum of 15 animals per market then wages are \$32 per animal which will decrease with volume, for example for 20 animals would reduce wages to \$24 per animal.

Figures provided by Otway Pork indicate that farm-gate prices averaged \$2.50/kg in 2007, which represented a 25% return. The marketing margin is 33% above the farm-gate price and included 2% royalty to the RSPCA, administrative overheads, processing and distribution, plus net profit of approximately 10% per pig. Gypsy Pigs are sold to the marketing business at a break even cost (covering the cost of raising the animal) to support the marketing business at this stage. The marketing business is averaging a 30% margin over cost price.

Figures provided by Mt Bellevue Welsh Black Beef indicate the gross return averaged \$6.18/kg. Based on the figures quoted gross income per beast was \$2600-2800, carcass weights were between 250-300kg, and processing, packaging and distribution costs were estimated to be \$1000 per beast. In 2005-06 the average price paid in the mainstream channels was \$3.50/kg, indicating that this enterprise achieved a farm-gate return that was 76% higher than the mainstream.

Marketing through Strathbogie Beef appeared to make the farm partnership (father and son) more profitable. SB always paid the farm at the top of the bracket of the mainstream prices. They set the price to be "honest" to the farm, i.e. "the most we could pay ourselves based on

*the top weekly price for that weight*". The farm partnership was saving the usual agent's fees, transport and killing costs, which were incurred by the SB brand (son and wife). However, the marketing margin subsumed these costs as well as paying the farm top prices.

#### **5.4 Discussion**

Producers were motivated to make a strategic change to the marketing of their products mainly to improve profit. In five cases, the profitable farm-based business was a means of continuing to support other lifestyle and family goals. Previous research also found that the farm profit was not an end in itself but served to provide security for the family lifestyle (Pannell *et al.* 2006). Lifestyle goals have previously been found to motivate family business start-ups in other industries (Andersson *et al.* 2002). Family businesses have impacts on family life that need to be managed or that may influence later decisions to again change the marketing channels, as was the case for Strathbogie Beef. Brie (2005: 54) found that many vendors at farmers' markets were in "transition from full-time employment in the city to farming in a rural area" ... moving from ... "employment to productive retirement". The motivations for PDM observed in this study were more complex. Two cases in this study could be said to be making the transition to a rural lifestyle, although not retiring. In most cases, extending the family farm business to incorporate marketing their product was a means of providing additional income.

Cases where the marketing of product was a means to meet personal goals, the business growth was less than in the two enterprises that were focused foremost on business growth. Overall, producer-driven marketing was profitable after a lead-time to build the brand reputation and client base. Govindasamy *et al.* (1999) found that direct retailing was an effective way to increase farm revenue, and that significant factors were proximity to urban locations and value adding in some way. Return for effort was considered adequate in most of the cases studied, except where the producers had very high expectations of the level of income from the venture.

The following discussion focuses on critical factors for the long-term profitability of producer-owned ventures reported by producer-marketers. The factors identified were similar to those found by Buhr (2004) and Verhaegen and van Huylenbroeck (2001), that is, maximising revenue through management of recoverable yield, price setting, accurate estimation of sales volume, minimising costs, acquisition of new skills, creating distribution channels to access the niche segment and brand promotion.

#### **5.4.1 Start-up costs – new skills and equipment**

New skills are a cost incurred in the transition to value added enterprises. Wolfe & Barefield (2007) found that producers who transitioned to value added enterprises may be overwhelmed by the new marketing skills required such as promotion, packaging, distribution channels and pricing. Verhaegen & Van Huylenbroeck (2001) identified new skills for direct marketers including new production practices, value adding processes as well as the legal and contractual arrangements within the supply chain. Producer-marketers reported significant acquisition of new knowledge and skills, although this was not considered a great impost. Producer-marketers interviewed here all had previous relevant experience in production, marketing or business and tended to form teams of complementary skills reducing the time and expense of acquiring new skills (5.3.2.7).

The producer-marketers interviewed in this study recognised opportunities, formed effective working relationships, had a vision of what they wanted to achieve, were good organisers and had a strong commitment to their product (McElwee 2005). There was a level of commitment to the quality of the product that is reflected in previous research with farmers' marketing their own produce (Griffin & Frongillo 2003). Mazzarol (1999) found that personal factors predisposed entrepreneurs to consider and launch an enterprise where there was the opportunity for new entrants in the market. In all cases, there was at least one partner that had entrepreneurial attributes to drive the vision and inspire others to keep trying when there were obstacles or a problem to resolve. For example, meat processing is concentrated in Australia and larger scale processors may not cater very well for small private lines. This study found that building supply chain relationships was an important facet in the enterprises, which may be explained by the relative novelty of short supply chains in Australian meat industries compared to Europe or the United Kingdom for instance.

Capital investment for producer-driven marketing ranged from setting up a stall at a farmers' markets and a website, to building new grow-out facilities for pigs, to investing in vertical integration to retail the product. The more committed producers were to the long-term growth of the venture, the more they invested. Investment in higher processing costs to ensure cuts were well presented and convenient contributed to the success of the home delivery case studied. Minimal investment was made by those producers who were balancing lifestyle and marketing. Producer-marketers relying on farmers' markets as an outlet invested in professional stall presentation which was seen as crucial to consumer confidence in their products safety and quality (Berger & Fitzsimmons 2008). Similarly, in upstate New York,

display presentation, producers' disposition and product quality were critical to economic success at farmers' markets (Griffin & Frongillo 2003).

#### **5.4.2 Effective promotion**

The most effective promotional activities that increased demand and sales volume were reported to be farmers' markets, multiple outlets and media articles. A continuous and reliable presence at markets increased sales volume through ongoing contact with customers to gain feedback, repeated orders and new sales. Coster & Kennon (2005) reported that farmers' markets were used to promote the brand by developing relationships with customers and gaining feedback on the products, which is also true of any customer contact in other distribution channels.

Multiple outlets increased exposure and promotion of the brand. Direct marketers had previously reported using a combination of marketing channels (La Trobe 2001; Lawson *et al.* 2008). This strategy was also found to be used to spread the risk when sales drop at a particular outlet (La Trobe 2001). Customers of the producer-marketers were prepared to search beyond the mainstream to satisfy quality specifications which, in the cases observed, included freshness, tenderness and flavour and for information about the product qualities (Gilg & Battershill 1998; La Trobe 2001; Lyson & Guptill 2004; Coster & Kennon 2005; Keeling Bond *et al.* 2006).

Some promotional activities created more demand volume than a single farm could supply because of either limited supply of livestock or labour. Producers who had business orientated goals recognised the opportunity to increase supply to meet increasing consumer demand and had plans to expand their enterprise. Producers who had personal orientated goals or alternative sources of income restricted promotional effort and sales volume to a level they could manage by attending fewer farmers' markets, or only supplying local butcher shops.

#### **5.4.3 Revenue – quantity sold and prices**

Revenue is determined by price achieved for the product and the quantity sold (Verhaegen & van Huylenbroeck 2001). In all cases, the volume sold was not reduced in producer-driven marketing ventures, largely because producers had a combination of outlets and were working to their capacity to supply. Wolfe and Barefield (2007: 398) noted that “producer-owned, value added ventures” operated near capacity to continue to be viable. Previous research found that the quantity sold through farmers' markets in Europe was less than the mainstream.

In some cases, higher prices compensated for the slight drop in volume (Verhaegen & van Huylenbroeck 2001). In Scotland and England, the reduced volume was thought to be due to saturation of farmer direct produce in the local food market and dwindling consumer support (Ilbery 2005). Specialty producers sought more stable alternatives such as their own farm shops, independent retail outlets and continued to supply the mainstream supply chains (Ilbery 2005). The Australian farmers' market phenomenon appears to be growing. However, competition is restricted due the market policies in the metropolitan Melbourne which prohibit the duplication of sellers of the same meat type.

There is a lead-time to build a client base and sales volume. Gardiner & Quinton (1998) found that direct marketing can be an important strategy to building a brand. PDM can act as an 'entry point' for differentiated products where consumers can sample the product, obtain information and form a relationship with the farmer (Conner *et al.* 2007). Gandee (2003) found that the client base and sales volume through direct marketing increased as income per capita in the target market increased and with shorter distances to a major population centres. Important facets of building the client base such as promotions, consumer confidence and product performance are discussed in later sections.

Quantity sold need not be limited by a single farm's capacity to supply in terms of human resources and production capacity. The PDM case studies indicate that the skills, experience and personal goals impact on the rate of growth in consumer demand and capacity to supply increasing volume. Entrepreneurship research has previously found that skills, experience and motivations are critical factors in new agricultural ventures (Raward 2004; McElwee 2005; Wolfe & Barefield 2007). To continue to increase the quantity sold, producer-marketers found other producers that could meet their specifications and engaged in informal arrangements or written contracts. In relation to CGH lamb production, such expansion may entail some form of assurance that the supplier is meeting CGH attributes, incurring costs to do so.

Maximising recoverable yield and minimising spoilage were key factors to achieve revenue, but incurred costs. Value adding to secondary cuts incurred additional labour costs for processing or contract kitchens. Finding larger volume retail outlets reduced spoilage of secondary cuts but sales to supermarkets and butchers were at lower prices.

Producer-marketers in the study were motivated to market beyond the farm-gate to reduce price variations unrelated to the quality of their product, and because they had little power to

negotiate price with mainstream suppliers (5.3.1). Supermarket competition to deliver low prices to consumers contributes to downward pressure on farm-gate prices for mainstream suppliers (2.7.2). Vertical alliances can reduce variation in farm gate prices to some degree by contracting prices based on a commitment to consistently supply a specified quality (Thatcher 1997).

Producers set the retail price with reference to retail prices in the same shopping location. Some aligned their price with the local supermarkets and others with specialty butchers depending on the target segments' willingness to pay a premium. The prices to the consumer were slightly cheaper (\$10.90/kg) than the average (\$12.00/kg) reported for domestic retail price in 2006-7 (Weeks & McRae 2008). Producer-marketers can have prices equivalent of the mainstream and maintain profits because they do not incur the expense of the bundle of marketing services (Smith 2006b).

Producer-marketers reduced variability in farm-gate prices by paying the production arm of the venture at an agreed rate. This practice could be detrimental where partnerships were across two families. For instance, in one case, the animals were supplied by the extended-family farm to the marketing venture initiated by the son who had agreed to pay top market price to the farm, which reduced the profitability of the marketing venture to the point where it did not compare favourably to an off-farm income. In another instance, the producers were only breaking even to support the marketing partners for a pre-determined time.

Premiums were justified on the basis of consistently good eating quality, and in some cases credence attributes related to production such as free range, stress free or environmental management. European direct marketers justified a premium on the basis of quality and traditional low input production (Gilg & Battershill 1998; Verhaegen & van Huylenbroeck 2001). Gilg & Battershill (1998) suggests that information directly from the producer attracts a premium. Branded pork competing against other meat types in the US mainstream distribution channels had to compete with comparable eating quality to substitute product (Buhr 2004). At least three of the case studies promoted their product on the basis of the region of origin. Regional branding and "sustainable production techniques" have been found to achieve a premium for Californian wine (Cullen *et al.* 2008: 278).

Premiums negotiated with supermarkets are not perpetual. In one case, premiums were eroded as a result of price increases in the generic product price. Supermarkets can contract growers

to supply credence attributes under a house brand and at prices that compete strongly with private branded product, for example own-brand organically grown produce (Sexton *et al.* 2006).

Revenues were higher than the mainstream but not without incurring additional costs, which are outlined in the following sections.

#### **5.4.4 Direct Costs**

Direct costs include commercialisation and production costs (2.11.2). Production costs in the cases observed approximated those of conventional extensive grazing regimes with minor adaptations such as low stress handling to effectively improve eating quality in the four beef and lamb cases observed. The two pork producers had adapted production to comply with various standards of ‘free range’ either for the whole lifecycle or at least for the breeding cycle (no sows in stalls) requiring more land.

Commercialisation costs encompass preparing product for sale and, in the case of meat, this includes the stages of transformation such as processing, packaging, selling by-products and value adding (Hayes *et al.* 1998). In all cases observed, commercialisation costs were minimised by negotiating rates and terms with abattoirs, changing abattoirs, using their own labour to value-add and package, innovating with trim and cuts (5.3.2.2). Cases that were selling direct to consumers incurred the same types of commercialisation costs as reported previously for direct marketing, that is packaging costs, delivery costs, food safety licenses and stall fees for farmers’ markets (Verhaegen & van Huylenbroeck 2001).

Hayes and Malcolm *et al.* (1998) estimated a benchmark for processing, packaging and retailing costs of 35% of the retail value of a carcass. In cases where lamb was marketed direct to consumers these costs were 36% and 41% of retail value, with wages at farmers’ markets accounting for the additional 5% in the latter example (5.3.3.1).

Enterprise diversification offered a source of employment for partners. The family farms observed used household resources to meet a combination of business, lifestyle and family goals (Ellis 2000; Coster 2008). In one case, the couple decided that the additional income from PDM was inadequate compared to the potential off-farm earning capacity of the spouse. There was evidence to suggest that access to the necessary experience and skills resulted in family operated ventures in the study coping well with production, supply chain coordination

and promotion of the product. Novices tended to restrict supply and sales volume or the type of outlet. Where owners were stressed by the growth in the business, they tended to be reactive to uncertainties and problems as they arose rather than having sufficient time to proactively manage the supply chain. Van der Vorst and Beulens (2002) suggest re-allocation of roles and processes to meet growing demands, which is a strategy that could be applied to one particular case where roles were blurred and the business looked like a ‘one-man show’ rather than a team effort.

Another strategy that van der Vorst and Beulens (2002: 423) suggest that would streamline the workload within a supply chain was to “eliminate non-value adding activities”, in this instance, referring to adding value to the business objectives rather than raw product. This might apply to the case where the farm enterprise was a conglomeration of several businesses such as farm stay, other farm products, as well as value added meat products. The benefit was diversification of farm income, however, together these activities also stretched the household resources, diverted energy from the main sources of farm income and being able to proactively manage uncertainties rather than react to problems (Malcolm *et al.* 2005).

#### **5.4.5 Producer investment in assurances**

The length of the supply chain and the enterprise size influenced the level of assurance and investment in accreditation. Direct marketers did not think it was necessary to formalise the verification of product claims, confirming previous findings that producers build trust with consumers through face-to-face contact (Gilg & Battershill 1998; Gordon 2000; Farnworth 2003; Keeling Bond *et al.* 2006). Consumer questions directly to producers were mainly about meat eating quality and the use of chemicals and pesticides. Producers who had direct dialogue with consumers found there was a lack of knowledge of meat production confirming previous findings by McNamara and Pahl (2004). Rarely were consumers well informed enough to ask technical questions about animal welfare or natural resources. The notion that consumers have faith that producers will be honest when the transaction is face-to-face, and that consumers will be able to detect falseness, appears to be widespread (Gilg & Battershill 1998; Gordon 2000; Verbeke 2000b; Keeling Bond *et al.* 2006).

Unlike short supply chains, endorsements and accreditations are beneficial for consumer confidence in product claims in longer supply chains (Farnworth 2003). Third party accreditation provides a level of confidence where the consumer is unable to interpret whether

a claim has technical merit and where the purchase is not inclined to be solely influenced by marketing imagery (Bhaskaran *et al.* 2006).

Two cases had formalised the verification of claims through either self-assessment or third party accreditation. A lamb producer had completed an EMS-type program, but had not gone through with accreditation due to the expense and the belief that the cost was not necessary for market access. Previous research indicates that sales would need substantial volumes and premiums to cover the annual fees for certification (Linden & Huhn 2005a). One case that supplied a number of mainstream supermarkets and specialty butchers had an RSPCA accreditation for 'bred free range' pork which cost a 2% royalty and time for bimonthly inspections. The owner was not sure that the accreditation was necessary to access mainstream supermarkets, but had not tested this idea. Producers can make self-declared claims under Australia law and may gain access to supermarkets (2.6.3). Australian food industry intermediaries did not mention animal welfare when asked why they thought 'organic' attributes were becoming important to consumers (Cary *et al.* 2004). Market access without accreditation is unlikely in the European context where supermarkets have initiated animal welfare schemes and EU policies recognise animals as sentient beings (Hubbard *et al.* 2007; Blokhuis *et al.* 2008).

#### **5.4.6 Transaction costs – information, negotiation and monitoring**

Producer-marketers incur market information costs which differ only slightly to those incurred in the mainstream. Information costs are not significant where there are industry sponsored market reports and networks of agents that can be relied upon for market information (Hobbs & Young 2000). The information is retrospective and does not account for buyers attendance and actions at the next market which creates price uncertainty (Hayes *et al.* 1998; Sexton *et al.* 2006). Producer-marketers own the animal and carcass through the transformation process, therefore they do not need to ascertain processor specifications and livestock market prices (Verhaegen & van Huylbroeck 2001). Producer-marketers gather information about customers' willingness to pay through direct feedback and response to prices set, and published industry reports.

Producer-marketers avoid agents' commissions and sales levies but spend time or pay employees to find buyers. For instance, some producer-marketers chose to spend time on courtesy calls to regular customers to ensure they were satisfied with the last order and to secure repeat orders. Producer-marketers can elect to pay a third party to deliver product to

restaurants, retailers or home deliveries. For direct marketers who attend farmers' markets, the negotiation costs include this retail activity, incurring labour and transportation costs (Chavas *et al.* 2000; Francis 2002).

Based on the figures available from the case studies, transaction costs were highest at the farmers' markets at approximately 20% of the value of each lamb sold. Transaction costs at farmers' markets were high because of the costs associated with this form of retailing and that the sales volumes through one site for half a day each week is insufficient to reduce the transaction costs. These costs were commonly justified on the basis of securing repeat orders, delivering orders and as brand promotion. Coster and Kennon (2005) found that even for those who had expanded their business the farmers' markets were still a promotional tool for the products. Farmers' markets were reported to be a comparatively cheap means of retailing with few overheads and capital investment. Coster and Kennon (2005) found that farmers' markets were a relatively inexpensive means of testing new products and businesses. Transaction costs incurred when distributing through home delivery was comparable to the 7-8% incurred when selling into the mainstream distribution channels.

Websites were auxiliary to brand promotion and were mostly used to provide more detailed descriptions of products and production systems and to substantiate credence claims. The rapid increase in orders experienced after a food review in a metropolitan newspaper was a means of promoting the brand and the websites. Websites need to be promoted and print is often the most suitable method of promotion (Vinocur 2002; Canavan *et al.* 2007). The costs associated with the promotion of websites through search engines can take the form of paid advertising space and specialist services to optimize web page ranking in searches and to create links with related pages (Goldman 2008). Otherwise, it takes longer for a website to receive sufficient consumer hits to be listed with the most popular sites (Goldman 2008).

In half of the cases, consumers could place orders via websites, although most ordering was done by phone or at market stalls. Burton (2002 in Rossignoli 2009) suggests that transaction costs would be lower through electronic purchases than through conventional channels, and that transaction costs decreased as the volume through the website increases. However, there are barriers to the purchase of fresh food over the internet. Consumers perceive risks with internet transactions, such as losing money and poor product performance. For fresh food, there are issues concerning food safety and eating quality. Therefore, internet ordering tends to occur after the consumer trusts the product (Simon 2003; Canavan *et al.* 2007).

Substitution is an uncertainty that can be managed, although at a cost. Monitoring costs were incurred to protect a brand from substitution in longer supply chains. One producer-marketer had written agreements with retailers to monitor the cuts of meat sold by the retailer and randomly take DNA samples for testing. No substitution has been detected to date. Monitoring for opportunistic behaviour may be sufficient deterrent in itself without further action, or an interim measure until trust is built within the supply chain (Rindfleisch & Heide 1997).

Other uncertainties identified in the case studies were estimation of supply volume to minimise spoilage and maintaining brand integrity within the supply chain, discussed the following sections.

#### **5.4.7 Estimation of supply volume**

Researchers have noted the impact of uncertainty of demand volume for marketing perishables (Hobbs & Young 2000; van der Vorst & Beulens 2002). Producer-marketers experienced uncertainty about weekly demand for specific cuts, impacting on coordination of slaughtering and processing. If producers' over-estimated supply volume they risked waste and loss of revenue. Estimating supply volume and production flow may be less of a problem where orders can be secured in advance. Gilg and Battershill (1998) found online ordering for direct marketers aided accurate estimation of demand and efficient distribution. Securing the order commits the customer, while waiting for up to a week for the processing and delivery to take place which van der Vorst & Beulens (2002: 421) referred to as "customer order distribution lead time". Supply chain redesign cannot speed up processing and aging for meat tenderness, however new technologies such as e-stimulation reduce the dry aging time by about one week (Pethick *et al.* 2003).

Unsold perishables must be preserved for storage or the price reduced to find a buyer (Hobbs & Young 2000). Producer-marketers had strategies to extend the life of the product by freezing or cryovacating, find larger volume retail outlets or used value added products as promotional give-aways or for barbeques on market days. Cryovacating enables the meat to age anaerobically for up to three weeks (Pethick *et al.* 2003).

Five cases mentioned not having product available to supply all the demand (5.3.2.6). Under-estimation of supply volume can result in losing sales. Options for managing under-supply of

a perishable product are limited. Two cases mentioned that the carcasses were hung in cold storage for another week at a fee and loss of some yield through trimming. Simatupang *et al.* (2004: 65) proposed a retail storage buffer, for which the formula is adapted as follows: estimate peak consumption volume of each cut or product multiplied by a “safety factor of 1.5” and allow for the lead time to replenish the buffer. However, a major constraint in this case is the maximum number of animals available at market weight per kill. Alternatively, to avoid losing the sale, Simatupang *et al.* (2004) suggests that where demand exceeds supply, producers can differentially price orders to gain a future commitment, that is, give a discount for future order commitment or discount a different product as a substitute in the interim.

Buhr (2004) found that some producer-owned ventures had established their own retail outlets to manage the production flow and variability of sales. This strategy was utilised in one case (Kartanji Park Prime Lamb) where the sales volume was increasing rapidly and the owner aimed to continue expansion. By contrast, at least two other cases had limited the supply to only fill orders, motivated by achieving a balance with personal goals.

#### **5.4.8 Product integrity**

The quality of the product is intrinsically linked with the brand promise and reputation. Uncertainty in relation to product integrity may emerge if the owner out-sources a service (Gattorna 2006), for instance processing at abattoirs and butchers, sales through retail butchers, and home delivery by couriers. Producers’ strategies to manage product integrity within the supply chain involved establishing supply chain relationships founded on trust, vertical integration to control the whole chain, and diversification of distribution channels in case one channel encountered a problem. Sahay (2003) observed that trust develops through investment to meet the buyers’ needs, protect their rights and interests, and openly share information. Sharing information indicates that motives are benevolent and that the supplier is prepared to be vulnerable through disclosure (Sahay 2003).

Immediate branding and traceability of the carcass through the abattoirs is essential to avoid inadvertent substitution with another carcass of uncertain origins which could negatively impact on the brand. In a few cases, owners had learnt to identify carcass characteristics typical to the breed. Otherwise, producers are reliant on brand stamping procedures. In four cases, the abattoirs cooperated with stress minimisation when handling livestock to contribute to the eating quality of the brand. Producers often had to change processors to satisfy their standards and to protect product integrity. Retailers commonly select suppliers based on

product qualities that meet their specifications (Wilson 1996; Fearné 1998). Substitution of generic for branded product at the retail butchers was considered a risk and incurred significant monitoring costs (5.4.6). The probability of meat substitution is uncertain and takes various forms. A recent Senate inquiry reported that substitution of hogget for lamb had occurred at a minority of abattoirs and that the inquiry had raised issues with the substitution of branded meats with generic meat that would be investigated at a later date (Rural and Regional Affairs and Transport Committee 2008).

Once the consumer purchases the product from a farmers' market or retailer, food safety is their responsibility. However, home delivery creates uncertainty that the contractor has delivered the product into the hands of the consumer and that it is continuously refrigerated for food safety reasons. Tanskanen and Yrola (2002) suggest strategies for e-grocery delivery that improve efficiency such as refrigerated or insulated delivery boxes for unattended delivery on a specific day each week.

## **5.5 Conclusion**

Producer-marketers sought an alternative means of distribution because they were dissatisfied with the mainstream due to price uncertainty, information asymmetry and their weak negotiating position in conventional markets, and where they sought additional farm income. The findings suggest that producer-driven marketing is a feasible alternative for Australian family-operated farms to market their own branded produce. Critical factors for the long-term profitability of producer-owned ventures reported by producer-marketers were acquisition of new skills, brand promotion, price setting, accurate estimation of sales volume, maximising recoverable yield, minimising negotiation costs and developing new supply chains. Synthesis of the lessons learned from the cases studied lead to the following conclusions being drawn.

Entrepreneurial skills appear to be a prerequisite to drive the enterprise in a new direction, and to build and manage the relationships in new supply chains. Managing post farm-gate marketing places additional stress on household resources that can adversely impact on family relationships and needs to be taken into consideration. It should be noted that in the context of family-operated farms some cases consciously opted to limit the supply of product to only fill advance orders as a means of balancing personal goals with business goals.

PDM served as an entry point to build the brand reputation, the client base, the volume sold and, in turn, increase revenue. Producer-marketers set prices equivalent to those experienced

and accepted by consumers in the same shopping locations. In some instances, PDM prices were lower than retailers that had to bear the costs of providing the bundle of marketing services. Revenue was also increased by maximising recoverable yield through value-adding to secondary products and minimising spoilage. Estimation of supply volume was critical to minimise waste rather than over-estimate demand or to avoid losing sales where demand is under-estimated, which was commonly reported in the cases studied. Managing a storage buffer would appear to be an appropriate strategy but does not offset the risk inherent with storage of perishable products. Offering a discount for an advance order or a substitute product may diminish the possible loss of a sale. Securing orders in advance reduced the uncertainty of the volume to process each week. Internet orders tend to occur after the consumers trust in the product is established. Wastage was reduced through food storage strategies and by finding large volume retail outlets.

The cost of preparing product for sale, that is, transformation from live animal to meat, were comparable to industry benchmarks. However, negotiation costs need to be controlled for PDM to be profitable and can be achieved by maximising sales volume for overhead costs incurred, particularly labour costs. For example, home delivery can find buyers without the overheads of retailing the product. The success of home delivery is however, dependent on cost-effective brand promotion. Brand promotion was most cost-effective where brand exposure was increased through supply to multiple outlets, where media attention was drawn to the brand through food journalism and where there was direct contact with customers through farmer's markets. Both producers and consumers rely on building a direct relationship as an assurance of product quality and genuine product claims. Formal accreditation was not necessary for market access in truncated supply chains. In longer supply chains, producers were not convinced accreditation was necessary for market access but had not tested this notion.

Multiple distribution channels provided benefits such as greater brand exposure, increasing the quantity sold, and avoiding some of the uncertainties related to brand integrity. Supplying retailers increased the possibility of adverse impacts on the brand reputation from substitution of generic meat for branded meat, and diminished product quality due to lack of in-house supervision of merchandise on the shelves. These issues are generally avoided by selling direct to consumers, and can be managed to some extent through monitoring product on the shelf and building closer relationships with retailers. All the cases investigated had at least

two distribution channels to compensate for drawbacks in each option and to gain a combination of benefits.

The following Chapter makes a comparison of revenues, costs and uncertainties found to be relevant to PDM in the context of a family farm marketing CGH branded lamb through alternative distribution channels, and supplying generic product in the mainstream. The aim of this comparison is to indicate the impact of making a strategic change on a conventional enterprise.

## **6 Integrating discussion**

### **6.1 Introduction**

This chapter discusses the implications, opportunities and constraints of the findings of the three empirical components of the thesis. The extent to which producers can meet consumer expectations and legitimately claim the points of difference is discussed in Section 6.2. Points of difference are identified through the consumer survey that defined ‘clean, green and humane through specific criteria relevant to a specific product (Rigby *et al.* 2001).

Ascertaining consumers’ expectations of CGH attributes for lamb production was important in this study as the terms ‘clean and green’ can be applied to a very broad range of product categories and are not always technically understood by consumers (Rigby *et al.* 2001).

Section 6.3 compares revenues, costs and uncertainties between supplying generic lamb in the mainstream distribution channel and producer-driven marketing (PDM) of a CGH branded lamb. This discussion draws on the findings of chapter 5 to compare these distribution channels and is intended to provide a real world context similar to producers’ decision-making (Ohlmer *et al.* 1998). Whilst producers may be motivated to differentiate product on the basis of credence attributes by a desire to create additional farm income as often as they are motivated by ethics (Veissier *et al.* 2008), the financial viability is crucial regardless of the original motivation. Planned changes need to be considered within a farm budget under the unique enterprise characteristics, “constraints, personal preferences, attitudes, competencies and experiences” Pannell (2000: 76). Business and personal goals will influence decisions about the scale of the enterprise, the investment of human and financial capital and the distribution channels (Pannell *et al.* 2006).

### **6.2 The extent to which conventional LMG producers could substantiate CGH claims**

#### **6.2.1 Consumer expectations for on-farm CGH issues**

The definition of ‘clean’ and ‘green’ determined by the survey differed in significant ways to that used by industry to describe generic lamb. Stated consumer preferences and expectations of a CGH label (Chapter 3) indicated that consumers had high expectations of a CGH label. The majority of consumers (60%) expected that a label claiming green and humane attributes would meet all of the criteria (Table 7). The majority of consumers surveyed expected a label

that was claiming to be ‘clean’ would be a pesticide free product rather than allow residues to a specified ‘safe’ limit (2.3.1). A small proportion of consumers surveyed acknowledged the practicality of pesticide use for farmers and the positive impact in ensuring food is free of parasites and disease. Most consumers surveyed expected a product claiming to be ‘green’ to extend beyond utilitarian natural resource conservation to biodiversity conservation for intrinsic values.

Consumers in the empirical survey most frequently volunteered mulesing, live export and cruelty or mistreatment as issues of concern (3.5.1.3). Consumer awareness of animal welfare issues in conventional lamb production is influenced by media and lobby groups (Cary *et al.* 2004). Potential consumers of a CGH product are expected to have high levels of involvement and therefore are likely to expend greater search effort to find information on the product, similar to green consumers (Dembkowski 1998; Vermeir & Verbeke 2006). A brand differentiated on the basis of perceived differences between generic and CGH branded lamb represent a marketing opportunity.

### **6.2.2 Claiming the points of difference**

Consumer expectations that all the criteria will be met are not consistently fulfilled across the conventional lamb industry. Farm practices vary considerably across the lamb meat industry according to individual farmers’ values and goals (NLWRA 2001; Pannell *et al.* 2006). CGH standards are mostly voluntary and legislation sets a minimum standard with prosecutions after the damage is apparent, for example satellite imagery to monitor illegal clearing and retrospective prosecutions under State Animal Cruelty Acts. Entrepreneurial producers that recognise the potential opportunity can align their product to better meet the segments’ specifications for CGH attributes (Gattorna 2006). Shifting farm production further up a continuum of standards towards higher CGH outcomes makes it more difficult for competitors to enter the market, thereby creating a defensible niche. Buhr (2004: 278) interpreted marketers’ willingness to divulge supply chain differentiation strategies as a sign that they believed they had a “defensible market niche”.

On legal and ethical grounds, the extent to which producers can meet CGH criteria should be made clear to consumers, stating lapses and how they will be managed (Standards Australia 2000). Critical failure points need to be declared or ameliorated, for example, in the LMG cases observed critical failure points were maintenance of groundcover, irrigation efficiency, protection of waterways and native habitat, and reducing greenhouse gas emissions (4.4.2.5).

Higher and more reliable rainfall is critical to the production of CGH attributes (4.4.2.1). Otherwise, compromises are made between attributes such as the environmental impact of extensive grazing in lower rainfall zones versus the impact of feed lots on livestock (4.4.4).

Consumers indicated that they preferred pesticide use to be minimised. To reduce overall pesticide use and uncertainty associated with alternative practices, CGH producers could implement a combination of conventional and alternative technologies with judicious use of pesticides and veterinarian drugs as a fall back. This is an incremental change rather than not using conventional pesticides at all. Conventional producers are economically “locked in” with farming systems that are reliant on pesticides and perceive the risk of change too great to change (Wilson & Tisdell 2001: 460). Shifting to alternative pest control methods such as organic technologies or integrated pest management would incur costs, require new knowledge and technical support (Pannell & Zilberman 2001; Wilson & Tisdell 2001).

Clear definition of product attributes can help to differentiate CGH lamb from the generic product. Conroy (2001) argues that raising consumer awareness through labelling and certification brings attention to the deficiencies of unlabelled product, thereby differentiating the product. A CGH lamb brand becomes an information cue to consumers that communicates the product claims (de Chernatony & McDonald 1998). Under the Trade Practices Act, claims should reflect what would commonly be expected from the description and symbols used (Standards Australia 2000). However, consumers may lack knowledge of agricultural production and are vulnerable to being misled (Pedersen & Neergaard 2006). For example, self-assessment against an environmental standard can evoke a ‘green’ image without presenting any substantiation of the environmental impacts. Endorsements can just as easily, even unintentionally, mislead consumers. For example, the term “bred free range” is used to describe pork breeding practices; that is not holding sows in breeding stalls. It is a valid claim *per se*, but this description may be mistaken to mean free range husbandry for the whole of the product’s life.

Consumers rely upon third party audits to detect misleading claims (Bhaskaran *et al.* 2006). However, continuous improvement accreditation systems such as an environmental management system (EMS) are problematic for substantiating a marketing claim where consumers expect that all the CGH criteria will be met immediately, not incrementally into the future. To substantiate CGH claims, the CGH criteria should be the short-term targets in an EMS, rather than longer-term objectives that a producer is incrementally working towards.

The extent to which the credence claims should apply to all produce from the enterprise making the claim is an ethical issue that is outside the scope of the consumer survey conducted in this study. Consumers' expectations of the broader enterprise commitment to CGH warrant future investigation. From an ethical standpoint, on-farm adoption of all the CGH criteria may impact positively on the welfare of all sentient beings and the biosphere that sustains them. From a physical science standpoint, adopting all the criteria may impact positively on the biophysical conditions that underpin production with some compromise between criteria for a few specific practices (4.4.4). From the agribusiness perspective, the criteria may impact both positively and negatively on the financial conditions that underpin production where demand, costs and premiums are considerations. However, individual business and consumption decisions are a combination of financial constraints and personal values.

### ***6.3 Comparison of revenues, costs and uncertainties in different distribution channels***

Distribution channels preferred by surveyed consumers for the purchase of CGH branded lamb were retail butchers, supermarkets and farmers' markets. Having established in Chapter 5 that PDM can be profitable, the aim of this section is to compare revenues, costs and uncertainties of supplying a generic product in the mainstream with producing and distributing CGH branded lamb. The purpose of this additional discussion is to consider the implications of a strategic change required for conventional producers to adopt new practices and marketing strategies; thus contributing to the broader research question of feasibility of producing and marketing CGH branded lamb. The main issues arising from the empirical work in Chapters 4 and 5 are discussed in the context of the framework proposed in the literature review (2.11). Revenues gained through PDM improved farm profitability compared to supplying generic product to the mainstream. Costs that differed significantly between the mainstream and PDM were the costs of preparing product for sale, verification of credence claims and additional labour requirements to market the product beyond the farm-gate. The uncertainties in alternative distribution channels differ from the mainstream in that they are complex to quantify whereas in the mainstream, price and grade uncertainty can be accounted for in dollar terms. Uncertainty about price and grading is reduced when selling direct to the consumer. Uncertainty in producer-driven marketing occurs when estimating demand and supply volumes, and when out-sourcing services the product integrity is at risk.

### **6.3.1 Revenue**

Revenues were improved, in comparison to supplying the mainstream distribution channels, by value adding to secondary cuts, justifying a premium for eating quality, and by providing information about production, and selling wholesale to restaurants and retailers when it was beneficial for brand exposure. The prices and quantities will differ according to distribution channel. Some enterprises chose to have multiple channels with varying prices to participate in lower priced markets with access to a larger number of consumers for secondary cuts and brand exposure.

#### **6.3.1.1 Quantity sold**

The quantity sold per year by established PDM brands can be equivalent to that sold through mainstream distribution systems (5.4.3). Mainstream suppliers can sell all lambs produced each season over a short time, whereas PDM are more likely to stagger the sale of lambs across the year. Producer-marketers maintained supplies to the mainstream and alternative channels as a type of insurance in case of brand damage or where the demand for the PDM brand did not match the production capacity.

#### **6.3.1.2 Price achieved**

Prices achieved through PDM covered marketing costs and reduced farm-gate price variability experienced in the mainstream (Table 29). A premium to cover the additional costs of producing CGH attributes is more certain in home delivery and farmers' markets and negotiable when supplying retailers (Table 29). The empirical consumer survey suggests a premium of 10-15% above the cheapest price would be acceptable to most CGH consumers (3.5.6). There is considerable evidence to support this finding in previous research, which found willingness to pay (WTP) similar premiums for food safety, animal welfare and environmentally friendly meat (2.5.2.3). Consumer WTP a premium for these attributes effectively sets a limit on the production costs that are feasible.

### **6.3.2 Production costs**

CGH lamb production costs include substantiating product claims, and operational costs such as possible investment in new machinery and infrastructure. The operational costs of producing CGH attributes will be incurred independent of the marketing channel; that is the cost of production will be the same for an individual farm regardless of the marketing channels.

Operational costs will vary according to the pre-existing enterprise assets. Extant resources and the cost of adapting to CGH production are critical to the feasibility of producing and marketing CGH lamb which can not be financially viable if costs exceed the market's WTP. The cost of implementing each CGH practice needs to be assessed in the context of an individual farm enterprise, much like the EMS guide devised for the sheep industry (Linden & Huhn 2005b). Critical failure points in meeting on-farm practices could indicate the level of costs involved (6.2). Therefore, it is recommended that an assessment of natural and human resources available to an enterprise is undertaken to determine the initial capital outlay and ongoing cost.

Ongoing labour costs for production were not specifically quantified in this study. However, producers evaluating the CGH practices mentioned that time constrained a few practices including rotational grazing, returning machinery to wash-down areas, applying nitrogen fertiliser twice at lower rates, alternatives to burning stubble and administration of an assurance system.

Table 29: Comparison of financial factors critical to the feasibility of PDM of CGH lamb

<b>Distribution channel</b>	<b>Price</b>	<b>Commercialisation costs</b>	<b>Transaction costs</b>
Mainstream commodity	Price variability Price and grade uncertainty	Minimal labour costs Industry levy covers promotions	Approx. 7-8% per animal
Supply CGH lamb to retail butchers and supermarkets	Reduced farm-gate price variability Wholesale price Premium negotiable Price certainty	Brand exposure at the cost of the retail margin Labour to coordinate supply chain Transport to abattoirs, fees to slaughter and trim carcass Possibly value adding and packaging costs	Labour to find buyers Delivery to retailers Checks for substitution of branded meat with generic
Home deliver whole CGH lamb	Reduced farm-gate price variability Marketing margin and premium Price certainty	Brand promotion costs Labour to coordinate supply chain Transport to abattoirs, fees to slaughter and trim carcass Value adding and packaging	Labour to find buyers Delivery costs approx. 8% per animal
Supply CGH lamb through farmers' markets	Reduced farm-gate price variability Marketing margin and premium	Retail brand exposure at the cost of the market stall Labour to coordinate	Attendance at markets: 20% per animal – includes labour to find

	Price certainty	supply chain Transport to abattoirs, fees to slaughter and trim carcass Possibly value adding and packaging	buyers
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The cost of producing CGH credence attributes may increase above what conventional producers' experience, for example time spent fencing and managing biodiversity, administering pain relief prior to surgical procedures and time monitoring pests and natural resources. In the cases observed, production costs might include more flexible stocking regimes, more efficient irrigation infrastructure, minimum tillage machinery and acquiring the knowledge and skills to reduce pesticide use (4.4.5). More flexible grazing regimes would facilitate the maintenance of groundcover, managed grazing of areas of biodiversity conservation value such as native habitat and waterways. Compensating for low rainfall might entail changing to more flexible stocking regimes such as fattening store lambs, rather than maintaining permanent breeding stock, incurring greater financial risks because of differences in buying and selling prices.

Taken in isolation of the benefits that might accrue, and other triggers for implementation of best practices such as government programs (Pannell *et al.* 2006), if all of these production costs were incurred on the one property it would take some years to recoup the investment through premiums. Whilst some conventional producers routinely invest in soil and water conservation technologies (Vanclay & Hely 1997; Walker 2007), for others with economic rather than conservation goals, the high "up-front costs and delayed benefits" make changes unattractive (Pannell *et al.* 2006: 1415). Napier *et al.* (2000) concluded that perceptions of a short-term return were critical to the decision to invest in conservation farming practices such as conservation tillage, buffer strips and integrated pest management.

Production costs include the time to administer assurances such as the Livestock Assurance Program under the National Vendors' Declaration (NVD), or accreditation to substantiate product claims. Producer-marketers own the carcass through the processing so do not complete an NVD. However, the carcass is still subject to inspection through random sampling for residues from the slaughter chain at the abattoirs.

### **6.3.2.1 Substantiating product claims**

The costs associated with substantiating product claims can differ between long and short supply chains. Gaining consumer trust in claims can occur through direct relationships. Direct marketers reported that questions from consumers were mostly related to chemical use and that re-assurance about food safety. There is evidence from past research that trust develops as a result of the face-to-face relationship with the producer (Gordon 2000; Farnworth 2003). Producer-marketers in the study were of the view that formal accreditation, apart from food safety compliance, was unnecessary in truncated supply chains where dialogue existed between the consumer and producer (5.3.2.4).

Accreditation can expedite a trial purchase of the CGH product where consumers have no past experience of a product and the producer is unknown, (Farnworth 2003; Vermeir & Verbeke 2006). Substantiating product claims avoids consumer scepticism and criticism of the brand claims (Duffy *et al.* 2005, Conroy 2001). As outlined in section 2.6 not all accreditation systems accommodate food safety, environmental management and animal welfare. It becomes inefficient and costly to apply different assurances for each attribute, although self-declared claims and Safe Quality Food (SQF) Accreditation accommodate all three attributes (Noonan 2004). These options incur different costs and administrative burdens, and provide different levels of consumer recognition and credibility.

Self-declared claims that comply with the Trade Practices Act (1974) are probably the simplest and lowest cost option (2.6.3). Third party accreditation schemes incur administration and audit costs and consumer recognition of international and national standards is low (Toyne *et al.* 2004; Higgins *et al.* 2008). In both cases, product promotion is essential to gain a premium and rationalise any accreditation costs.

### **6.3.3 Commercialisation**

Commercialisation costs in the mainstream are low compared to PDM. In addition to promotion and labour costs to prepare product for sale, PDM incurs the cost for transportation to processors, processing and packaging. Controlling these additional costs is critical to the feasibility of PDM. Costs were reduced by changing service providers or using household labour for processing and packaging. Further discussion of differences in promotion costs and labour follow.

### **6.3.3.1 Promotional costs**

Promotion is critical to achieving sales volume and the feasibility of PDM. To attract consumers interested in CGH lamb production, producer-marketers would need a campaign to promote the brand attributes. Credence attributes need to be effectively and efficiently communicated via the label, promotional material and, for those wanting more information, a website or through direct contact with the producer (Ariely 2000).

Websites in the cases studied provided information about the business, the farmer, the product and its history, and is a cost not normally associated with supplying the mainstream. Websites supplemented other media promotions but were not the predominant source of sales. The consumer survey supports this finding with a small proportion (younger age group) using the internet to search for information about food and farming, and that very few consumers were interested in on-line ordering to purchase branded lamb (3.5.3 and 3.5.4 respectively).

Previous research found that the internet was a significant information channel for differentiated product but only significant for sales after trust in the product and services had been established (Tanskanen *et al.* 2002; Ilbery 2005; Canavan *et al.* 2007). Gilg and Battershill (1998) found the advantages of websites for direct marketers were communication of policies to match consumer expectations and feedback from consumers to align product and services to satisfy those expectations.

The cost of promotion differs for each channel (Table 29). Generic lamb is promoted on a whole-of-industry basis through Meat and Livestock Australia (MLA) and there are no identifying marks for the property of origin (de Chernatony & McDonald 1998). Producers contribute to the industry-wide promotions through a levy for each animal sold. Wholesaling branded lamb to retailers can provide brand exposure at the cost of, part or all, of the retail margin. Farmers' market stalls are a promotional activity for a branded product, even after the brand is established, and are important to build a relationship, customer loyalty and to exchange information about the farm and the product (Chapter 5) (Coster & Kennon 2005). In most cases, producer-marketers thought that the cost of market attendance was worthwhile in terms of centralising delivery and brand promotion. Distribution through home delivery would potentially need to increase promotional activities compared to other channels.

### **6.3.3.2 Labour costs for marketing**

Labour for marketing differs significantly between mainstream and producer-driven ventures. Mainstream commodity producers prepare large numbers of livestock for sale at once

incurring labour for mustering, weighing, ear tagging, crutching, drafting, and then mustering and loading each consignment (estimated at 1-2% of the value of the animal). Marketing product beyond the farm-gate incurs labour to select animals for slaughter, coordinate slaughter, processing and packaging, brand promotion and distribution (Verhaegen & van Huylenbroeck 2001).

For a sole operator, the labour to produce and market a CGH product would be an additional cost critical to feasibility. Verhaegen & van Huylenbroeck (2001: 451) concluded that small scale direct marketing, where farmers subsume the functions of wholesaler and retailer will only be profitable where there is available “relatively cheap family labour – hiring people for the commercialisation activity would be too expensive”. Without additional labour the production and marketing activities compete for one person’s time and increase the risk that product quality or quantity will suffer (Verhaegen & van Huylenbroeck 2001). Paid employees may be affordable once the brand is established and there is sufficient growth in sales (Coster 2008).

For family farms in this study, marketing beyond the farm-gate was a means of farm-based employment, with older children contributing to the venture (Chapter 5). Ellis (2000) found that small farms used a range of strategies for their livelihood, drawing on a range of household resources. Coster & Kennon (2005) found that smaller farms looking for supplementary farm income worked as a household team (couples and sometimes children). Children were involved not only for ‘pocket money’ but also for the value of the work experience (Coster 2008). However, there was also evidence in two cases that the household resources were being stretched by the marketing effort. Wolfe & Barefield (2007) found that producers transitioning to marketing value added product, did not adequately analyse labour and management needs to keep up with the growth in business. In some cases, a benchmark for farm-based employment used was whether the profit produced was equivalent to off-farm earning potential and taking personal goals into consideration.

The labour requirements in different channels in the cases studied were met by a combination of family labour, paid labour or out-sourced services, such as a specialist courier for home deliveries. If family labour was used as much as possible, then farmers’ markets and home delivery would have similar and higher labour requirements than supplying retailers, respectively. Distribution through farmers’ markets entailed an average of 25 hours labour, for preparation (killing, processing and packaging) and attendance at one market (5.4.6)

which concurs with previous findings (Coster & Kennon 2005). Labour for home deliveries would replace the labour for attendance at farmers' markets.

#### **6.3.4 Transaction costs**

Transaction costs include the cost of obtaining market information, monitoring of compliance with agreements, and negotiation costs to find a buyer and deliver the product (Hobbs 1997). Information costs have minimal impact on PDM or mainstream suppliers in well developed markets (Hobbs 1997). The meat industry's peak body in Australia, MLA, provides regular market reports to enable price discovery and mainstream carcass specifications. The cost of monitoring product integrity and substitution is only incurred when distributing a branded product through retailers (Table 29). In general, mainstream suppliers do not incur the cost of monitoring agreements.

Negotiation costs were found to vary considerably depending upon distribution channels and may be critical to the feasibility of a distribution channel (Table 29). Negotiation costs for mainstream suppliers are estimated to be 7-8 % of the value of an animal. Total marketing costs in the mainstream are described as a low percentage of the value of livestock (MLA 2008c).

For PDM, negotiation costs included the search for customers (Chavas *et al.* 2000). The PDM case studies indicate that negotiation costs were approximately the same as the mainstream supplier for home delivery, were lowest where the producer-marketer sold higher volumes to retail supermarkets or specialty butchers, and were highest where product was sold through farmers' markets (5.3.3.1). Costs for selling through farmers' markets were increased by labour costs to prepare and staff the stalls, and reduced by providing central pick-up locations for efficient delivery of orders. The negotiation costs per animal decreased as the volume sold at farmers' markets increased. In a case where 15 lambs were distributed via each market, negotiation costs were approximately 20% of the value of a lamb, with paid non-family labour being the greatest component of this calculation. This analysis indicates that efficient delivery of orders incurs less cost than having even a rudimentary retail presence. Tanskanen *et al.* (2002) conclude that sales volume is a critical factor in making such a comparison between channels. Negotiation costs for each transaction would decrease at farmers' markets when labour costs were reduced or when volume sold at each market increased. Volume sold at farmers' markets would need to increase by a factor of about 2.5 for the negotiation costs to compare with other channels. There is limited opportunity to reduce the cost of providing

retail services to stay solvent if sales volume decreases (Tanskanen *et al.* 2002). The threshold is estimated to be a fall in sales of 10-15% for most supermarkets in Europe (Tanskanen *et al.* 2002).

Delivery once a week at a pre-arranged time or clustered pick-ups from a central place such as an office or shop front within a district is more efficient than attended home delivery (Tanskanen *et al.* 2002). Distance to buyer can erode profits generated by PDM (Ilbery 2005). The cases studied were further away from metropolitan markets than the average distance for stall-holders at those markets (Coster & Kennon 2005).

### **6.3.5 Uncertainties**

Producers' ability to moderate the impact of uncertainties is important in assessing the feasibility of PDM. The sources of uncertainty were substantially different between the mainstream and alternative distribution channels (Table 29). Sources of uncertainty common to all distribution channels for CGH lamb were supply quantities, pilfering during processing and changes to farm practices.

Price and grade uncertainty are major issues in the mainstream meat distribution channels which are largely avoided by PDM. PDM had greater flexibility to set prices within a range acceptable to their customers and process different weighted carcasses. However, they relied on processors for price information and as a conduit to markets for by-products. Verhaegen and van Huylenbroeck (2001) found more price certainty where farmers were marketing beyond the farm gate, either as individuals or co-operatively, than through common marketing channels.

Mainstream suppliers sell in bulk consignments and are divested of ownership, avoiding the types of uncertainty that can occur during processing. However, in the mainstream there is more price and grade uncertainty. Producers have little influence over price uncertainty when selling at auction but can contract a price directly with supermarket buyers (2.11.4.1). Grade uncertainty can be managed to some degree by scanning and drafting ewes that are at the same stage of pregnancy into mobs, and livestock assessment prior to consignment. In the future, information technologies should improve assessment by tracking growth rates and pedigree (Carter 2006).

The major source of uncertainty in the PDM cases studied related to over-estimation of supply volumes and wastage (5.4.7). As noted previously, variability in demand volume can result in spoilage and negatively impact revenue (Hobbs & Young 2000; van der Vorst & Beulens 2002). Strategies that were employed to manage supply volume uncertainty included taking orders, extending the shelf life and finding additional outlets. Other uncertainties mentioned above were not as constant as this issue and were related to the supply chain.

The integrity of branded meat is at risk of substitution with generic product, particularly through retail butchers where meat is not pre-packaged and labelled. This risk cannot be quantified at present (Rural and Regional Affairs and Transport Committee 2008). The substituted meat may or may not provide the same eating quality and could damage the consumers' perception of the brand. Monitoring retail outlets is an option that comes at a cost (5.4.8). Similarly, where product is sourced from other properties, for instance in a horizontal alliance, then producer-marketers point out that there is uncertainty regarding the quality control on other properties and validity of the credence attributes. Monitoring and perhaps accreditation of outside sources of product also increases costs. Selling direct to consumer avoided any risk of damage to brand integrity, such as substitution.

Pilfering at butchers during the break down and packaging of the carcass was reported in the case studies. The response was to contract a different butcher or to vertically integrate that process. Gattorna (2006) suggests paying an incentive to out-sourced services. In this case, an incentive may be paid where a butcher's schedule of tare pack weights, off-cuts and bones, reconciles against the total weight of the carcass according to the abattoir ticket. However, monitoring will add to the transaction costs and may only be warranted when volume reaches a certain level.

Uncertainty relating to changing farm production was reported, including unknown outcomes of certain practices, the possibility of technical failure of the practice, unknown lag time before the practice benefits are realised and the potential for financial loss. These have been previously observed by other researchers (Moschini & Hennessy 2000; Marra *et al.* 2003; Malcolm *et al.* 2005; 2005; Pannell *et al.* 2006).

The demand for continuous year round supply of lambs creates uncertainty about the impact of production on the validity credence attributes. The impact on lamb survival, feed availability, maintaining groundcover and farm work schedules needs to be managed

according to specific climatic and production conditions. However, the weight ranges of selected animals by producer-marketers for slaughter are more flexible than mainstream specifications, enabling producer-marketers to have more flexible stocking rates.

### **6.3.6 Summary of revenues, costs and uncertainties in different distribution channels**

Critical factors for the feasibility of making a strategic change from supplying the mainstream with generic product to producer-driven marketing of CGH lamb are the price achieved, and the control of production costs, commercialisation costs and negotiation costs. Prices achieved through PDM covered the marketing costs incurred beyond the farm-gate and were less variable than mainstream supply of unbranded lamb. The producer-driven marketer's ability to capture the marketing margin or gain a premium was reduced when supplying retail outlets.

Production costs for CGH lamb include the operational costs to adapt farm resources and are determined by the extant resources independent of the choice of marketing channel. Labour costs to modify farm practices and infrastructure were not specifically quantified in this study; however, producers' evaluating practices mentioned the additional time required to undertake some practices as well as the investment that may be required to fence certain areas or buy new technologies, technical assistance and acquisition of new skills. It is recommended that individual properties need to assess resources and the investment required compared to the revenues that can be gained. The cost of substantiating claims is also a production cost and is minimised in truncated supply chains by self-declaring product attributes in accordance with Standards Australia guidelines and the Trade Practices Act (1974).

Commercialisation costs were comparatively low for mainstream suppliers of generic product. To control commercialisation costs such as promotion and labour to get the product to market, PDM found various strategies, as follow. Cost-effective promotions included gaining media attention or regional cross-promotional activities. Websites provide supplementary information about the producer, the farm production system and the product for highly involved consumers but don't necessarily lead to increased sales volume. Farmers' markets increase brand exposure, promotional opportunities and broaden the customer base through direct dialogue. However, this retailing effort can stretch the household labour resources on a family farm or incur the cost of additional labour. Family farms tend to rely on household labour to control costs and often view the marketing beyond the farm-gate as farm-based

employment. For a sole proprietor, labour costs to promote and coordinate the preparation and marketing of product can be prohibitive.

Transaction costs (information and negotiation costs) were comparatively low in the mainstream. For PDM the negotiation costs, that is, the search for customers, were lowest when supplying retail outlets and highest when selling through farmers' markets. Maximising the volume of sales or minimising the labour costs could control negotiation costs to retail the product through farmers' markets. The volume sold through farmers' markets would need to substantially increase beyond that sold in the cases studied here to reduce the negotiation costs, which are three times higher than home delivery or the mainstream distribution channel. Selling CGH lamb at farmers' markets would incur more costs and time, but would enable face-to-face customer contact associated with increased confidence in the product claims, provide direct feedback about product performance and simplify order delivery. Capturing the whole marketing margin incurs the cost of delivering a perishable product safely to the consumer. Selling to supermarkets and butchers appears to be an effective means to maximise volume sold but has some drawbacks for producer-marketers including selling at a reduced premium or at wholesale price; the risk of substitution and brand damage; and consistent supply volumes. The supply volumes required in the mainstream could be overcome by forming horizontal alliances between producers. However, such alliances increase price uncertainty and assurance costs to substantiate CGH claims from several producers. Alternatively, a single producer could negotiate with one or two supermarkets to supply the brand, which is particularly beneficial for moving secondary cuts and value-added products.

To reduce negotiation costs by maximising volume sold in the case of home delivery, orders were boxed as whole or half sides of lamb. The incentive for consumers to receive higher volumes were the inclusion of value added pre-prepared meals and convenient, innovative cuts. This presentation of cuts also incurred higher processing costs. Among the options investigated home delivery gained the entire marketing margin for least cost. The challenge for home delivered product is cost-effective promotion to attain a client base, particularly given the low level of consumer interest in farm-to-door as a purchasing preference found in the consumer survey (3.6.4).

Finally, a strategic change from supplying the mainstream reduced the price and grade uncertainty. However, PDM dealt with other types of uncertainty including estimating supply quantity, pilfering and substitution, the latter two were manageable. Changing to CGH farm

practices created some uncertainty regardless of marketing channel due to the possibility of technical failure. Maintaining a year round supply could result in technical failure of one or more CGH attributes where seasonal conditions are unfavourable.

## 7 General conclusion

The study was able to answer the three main research questions, with limitations that are discussed below: a) *Which ethical attributes are relevant to consumers and what criteria would consumers expect to define the production of CGH attributes?* b) *To what extent can conventional producers in this study meet consumer expectations and substantiate the ethical claims of branded lamb;* and c) *Given the constraints for new product entry in the mainstream, is producer-driven marketing a feasible alternative for Australian family-operated farms to market a CGH branded lamb product?*

To investigate the first question, ‘clean, green and humane’ (CGH) attributes were defined through a literature review of relevant issues (2.2). These issues were used as the criteria (Table 7) for a consumer survey to establish preferences and expectations of a CGH label. The survey found that there was consumer interest in the bundle of attributes (Chapter 3). Evidence from the empirical consumer surveys demonstrates that a niche market exists for lamb differentiated on the basis of minimising the risk of pesticide residues, conserving biodiversity as well as maintaining a productive natural resources base, and minimising the mental and physical suffering of livestock as well as maintaining a high standard of animal welfare. Surveyed consumers preferred and expected the highest standards to be met for a lamb product that was claiming to be ‘clean, green and humane’ (CGH) and stated they would be willing to pay 10-15% more for a product with these attributes. It is acknowledged that the stated preference method used is not a reliable means of estimating absolute market size and willingness to pay for CGH lamb when they might otherwise substitute for a cheaper meat with the similar attributes. Reliable indicators of market demand may be determined, instead, using revealed preference field surveys with a ‘test’ hypothetical product (Arnot *et al.* 2004; Lusk & Norwood 2006). This method would reduce the social desirability bias by observing consumer behaviour towards the test product in the context of budgetary constraints, rather than asking direct questions about possibly sensitive product attributes such as animal welfare and environmental management. Consumers express ethical responses to survey questions that do not reflect their actual behaviour and therefore do not relate to actual market demand (Hartmann & Apaolaza Ibanez 2006). A particular aspect of consumer expectations of product claims that could be investigated is whether consumers expect producers to meet all the CGH criteria all of the time, and whether the criteria should apply not just to the branded product but across the whole enterprise, including working dogs and other livestock.

Future research might assess consumer knowledge of conventional lamb production, that is, which CGH criteria do they think are met, to inform promotional points of difference. Cary (2004) also suggested further exploration of consumers' understanding of sustainable production. Consumer awareness and understanding of production methods and their expectations change, generally with exposure to media reporting and campaigns and therefore, the findings of a consumer survey have limited currency. Nevertheless, the points of difference need to be clearly communicated and promoted to enable consumers to differentiate the CGH branded lamb from the generic lamb.

Producers were interviewed to investigate the second research question, that is, to what extent could conventional producers meet consumer expectations and substantiate CGH claims (Chapter 4). The same CGH criteria as were used in the consumer survey were used to select on-farm 'best' practices that would produce CGH criteria. A panel of experts rated the importance of each on-farm practice. Interviews with producers from three lamb marketing groups (LMG) indicate that most practices and therefore CGH attributes are achievable most of the time in conventional production systems. The survey would have been improved with the additional of a construct to measure participants' familiarity with the practices evaluated, bearing in mind that interview length is a constraint. If best practices were implemented on a routine basis it would be a straight forward matter for a conventional lamb producer to substantiate CGH product claims. However, the lapses and constraints to practices need to be managed. In the cases studied, major constraints included low and unreliable rainfall, a lack of technical knowledge to reduce reliance on conventional pest control practices, and infrastructure costs such as fencing, more efficient irrigation and minimum tillage machinery (Chapter 4). The initial investment in infrastructure and skill acquisition could be prohibitive in some instances, depending on the extant farm resources. An assessment of farm resources including human and natural resources is recommended to estimate initial outlays. The ongoing labour costs for production of CGH criteria were not quantified in this study, however, the difference in time spent producing lamb to CGH standards will depend on current practices and changes required. A time study could be an objective for further investigation, to measure the change in time spent managing the production of lamb in a different way.

The findings of the producer evaluation of practices are only applicable to similar biophysical and enterprise conditions. The biophysical and market constraints vary considerably between regions therefore locally applicable studies are recommended, confirming the same

conclusion drawn by previous researchers (Cary *et al.* 2002; Webb 2004; Knowler & Bradshaw 2007). Future research could investigate the impact of lapses in CGH practices, for instance, the extent to which adaptive technologies in low rainfall areas such as feed lots can claim to be humane by assessing the impact on stress, disease and natural behaviours, and the limitations on reducing pesticide use in feedlots.

The extent to which conventional producers can meet consumer expectations and substantiate CGH claims was discussed in Section 6.2. The implication of the findings of the consumer survey for the conventional lamb producers in general is that consumers expect a significantly higher standard for 'clean and green' production of than is currently implemented across the lamb industry. Currently best practices that produce CGH attributes are voluntary and variably adopted across the mainstream industry. To meet consumer expectations the CGH criteria should be a minimum standard in any assurance system adopted rather than targets for continuous improvement models. A CGH brand becomes a promise to implement farm practices that aim to achieve these criteria as a minimum standard compared to the generic product. Therefore, substantiating a claim to be producing CGH attributes should clearly state critical failure points and how these are to be managed.

Shifting individual farm production along a continuum of standards towards higher CGH outcomes makes it more difficult for competitors to enter the market, creating a defensible niche. The presence of a CGH brand may raise questions about the production methods of generic lamb, some of which are already being raised by some advocacy groups and activists. The existence of a CGH brand in the mainstream would fulfil a niche created by the education campaigns conducted by advocacy groups and activists which aim to raise consumer awareness and encourage change in purchasing behaviour towards more environmentally friendly or animal friendly products. Also, the literature indicates that for many conventional producers, financial pressure constrains the voluntarily adoption of recommended 'best' practices. Given the increasing levels of farm debt and declining terms of trade, it is unlikely that governments will legislate for the mandatory adoption of CGH practices unless access to significant markets are at risk. The implication for conventional lamb producers deciding to meet consumer expectations with a CGH branded lamb is that the niche may be defensible for some time into the future.

The feasibility of producing lamb differentiated on the basis of 'clean, green and humane' criteria is not only determined by the production of CGH lamb but also finding a profitable

means of distribution. In answering the third research question evidence suggested that producer-driven marketing (PDM) was a feasible alternative for marketing a CGH branded lamb in the context of an Australian family-operated farm. Profitability could be attributed to the entrepreneurial skills obvious among the cases studied, which enabled the producer-marketers to solve problems, build supply chain relationships and promote their brand (Chapter 5). Also critical to the profitability of producer-driven enterprises were pricing strategies, strategies to manage supply estimations and controlling negotiation costs by maximising volume sold for the costs incurred (Chapter 5). Additional benefits of producer-driven marketing of a branded product include less variability in farm-gate price, capture of the marketing margin, direct feedback from consumers, and better control over product and brand integrity in some channels. Producer-marketers sought an alternative means of distribution because they were dissatisfied with the mainstream due to price uncertainty, information asymmetry and their weak negotiating position in conventional markets, and where they sought additional farm income. The adequacy of the profit gained was reconciled with personal goals, such as farm-based employment for spouses or to support a farming lifestyle. Distribution of a CGH branded lamb presents new challenges to family farms which has implications for family life and inter-personal relationships, such as increasing stress and impinging on family life, that warrant further investigation.

Single farms face barriers to entry into the mainstream for new brands such as consistent, year round volume of supply, lead-time to build a client base, and in the interim a small volume of demand (Plunkett & Kingwell 2001; Conner *et al.* 2007). To reach the niche segment with a new brand, PDM can be a market entry point where a premium to cover the post farm-gate marketing costs cannot be negotiated in the mainstream distribution channels. Once the brand is established, horizontal alliances provide a co-operative structure to supply the volumes required for a brand to enter the mainstream channels (2.9.1). Vertical alliances with mainstream retailers would provide some price certainty for suppliers in return for guaranteed product qualities and attributes (2.9.2). Further research could investigate the resources and processes required for transition from single property production and marketing to a horizontal alliance to supply a brand to mainstream retailers.

Based on the evidence from the producer-driven marketing cases, third party accreditation may not be necessary to gain a client base, and that self-declaration can be sufficient in truncated supply chains where some level of producer-consumer interaction is likely to occur. Past research indicates that assurances can expedite market acceptance and credibility for a

new product, particularly given the lack of consumer awareness of lamb production. The cost of accreditation may be worthwhile to expedite consumer trust, particularly in longer supply chains and where the accreditation body logo is widely recognised by consumers. However, direct dialogue between consumers and producers appears to negate the need for third party accreditation through the development of a relationship and trust over time. Consumers' questions to producers were mostly related to food safety. Relatively few respondents in the consumer survey said they had attended the farmers' market to purchase meat. The novelty of buying meat products from a refrigerated trailer at a market may explain the line of questions, which is an issue that could be investigated further.

Using the framework discussed in the literature review (2.11) a comparison of the revenues, costs and uncertainties of supplying the mainstream with generic product and PDM of CGH lamb revealed the comparative benefits and disadvantages of different distribution channels (6.2). PDM gained additional revenue for the enterprise by marketing beyond the farm-gate. Negotiation costs for PDM to find a buyer were significantly higher than mainstream suppliers. However, the additional negotiation cost could be defrayed by maximising the volume sold, for example, by distributing branded product through bulk packs of a side or whole lamb. The high negotiation costs incurred at farmers' markets could be defrayed by increasing the sales volume at each market, either by selling bulk packs or increasing the volume of advance orders. Supplying retailers or restaurants incurred fewer negotiation costs than selling direct to consumers, but it was also difficult to negotiate more than a conventional wholesale price, perhaps with the exception of specialty butchers where a small premium may be secured. The benefit of distribution through farmers' markets, independent supermarkets and retail specialty butchers was the brand exposure and positive impact on promotional costs. Supplying the mainstream with unbranded product reduced uncertainty that is likely to be experienced in producer-driven marketing of CGH lamb; supplying the mainstream reduces financial risk, increases certainty about the volume of sales, has lower expectations for production standards and reduces the distractions from production. Critical to the feasibility of producing CGH attributes were the extant farm assets which determine the adaptation costs. It is recommended that individual properties need to assess resources and the investment required compared to the revenues that can be gained.

The framework was modified from that proposed by Verhaegen and van Huylenbroeck (2001) which included the acquisition of human skills as a transaction cost. These costs are not recurrent with each exchange (transaction) and were treated as start-up costs in Chapter 5.

Therefore, the comparison made in Section 6.3 excludes the acquisition of new skills to produce and market CGH lamb through alternative distribution channels, which may be significant. Also, the framework makes a comparison on purely economic criteria and therefore excludes the social and environmental benefits related to the CGH production and alternative means of distribution, some of which are difficult to quantify. Suffice it to say, to gain these intangible benefits consumers appear to be willing to pay a premium or shop at farmers' markets and some producers have chosen to differentiate and market their own brand making environmental and animal welfare claims.

The literature review and empirical findings addressed the central interest for this study, indicating that it is viable to produce and market ethical attributes for lamb in the domestic market. It is possible to develop a brand, supply chains and distribution channels to find the niche market that appears to exist. Maximising sales volume in relation to costs incurred in PDM appears to be the key to profitability. Gaining sufficient return to cover the initial investment is largely dependent upon the level of change required to production, and to natural and human resources.

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## 9 Appendices

### Appendix 1 - Consumer survey

	<b>Excuse me, would you be willing to do a 10 minute survey about your preference for the way lamb is produced?</b>
<b>Male / F</b>	<b>[bolded brackets are procedural and not to be read out; left column is for responses]</b>
<b>Y / N</b>	1. <b>[ask at farmers markets only]</b> Firstly, can I ask if you shop here regularly?
<b>[circle]</b>	2. <b>[ask at farmers markets only]</b> What do you come to buy?
<b>1</b>	<b>fruit/veg</b>
<b>2</b>	<b>meat</b>
<b>3</b>	<b>other items ... please specify ...</b>
<b>4</b>	<b>generally better quality products ... In what way are they better?</b>
	3. Using one of the following responses
	<b>[ 1            2            3            4            5 ]</b>
	not at all    not very    unsure    quite    extremely
	How interested are you in:
#	what chemicals are used on farms
#	the welfare of sheep and lambs
#	the effect of farming on the environment
#	how lamb is produced
#	how far your food has travelled
<b>Yes / No</b>	4. Do you do the household food shopping?
<b>%</b>	5. What proportion of the shopping?
	<b>[show options sheet &amp; circle code in the left column]</b>
	6. How would you prefer lamb to be produced?
<b>1</b>	Pesticide free <b>OR</b>
<b>2</b>	Pesticides used but only within safe limits
	7. Which category best describes your preference for lamb production?
<b>1</b>	Animals have adequate food, water and are treated for diseases <b>OR</b>
<b>2</b>	Animals have all the above plus experience minimal stress, fear and pain, and have good shelter <b>OR</b>
<b>3</b>	Animals have all the above plus they have free range and can express natural behaviours
	8. Do you have any particular animal welfare issues that relate to lamb production?
	9. Which category best describes your preference for environmental management on a farm?
<b>1</b>	Environmental practices include minimising soil erosion, maintain soil fertility, efficient use of water and fossil fuels, salinity controlled <b>OR</b>
<b>2</b>	Environmental practices include all the above plus no pollution of streams, controlling noxious weeds and feral animals, culling kangaroos only with permission <b>OR</b>

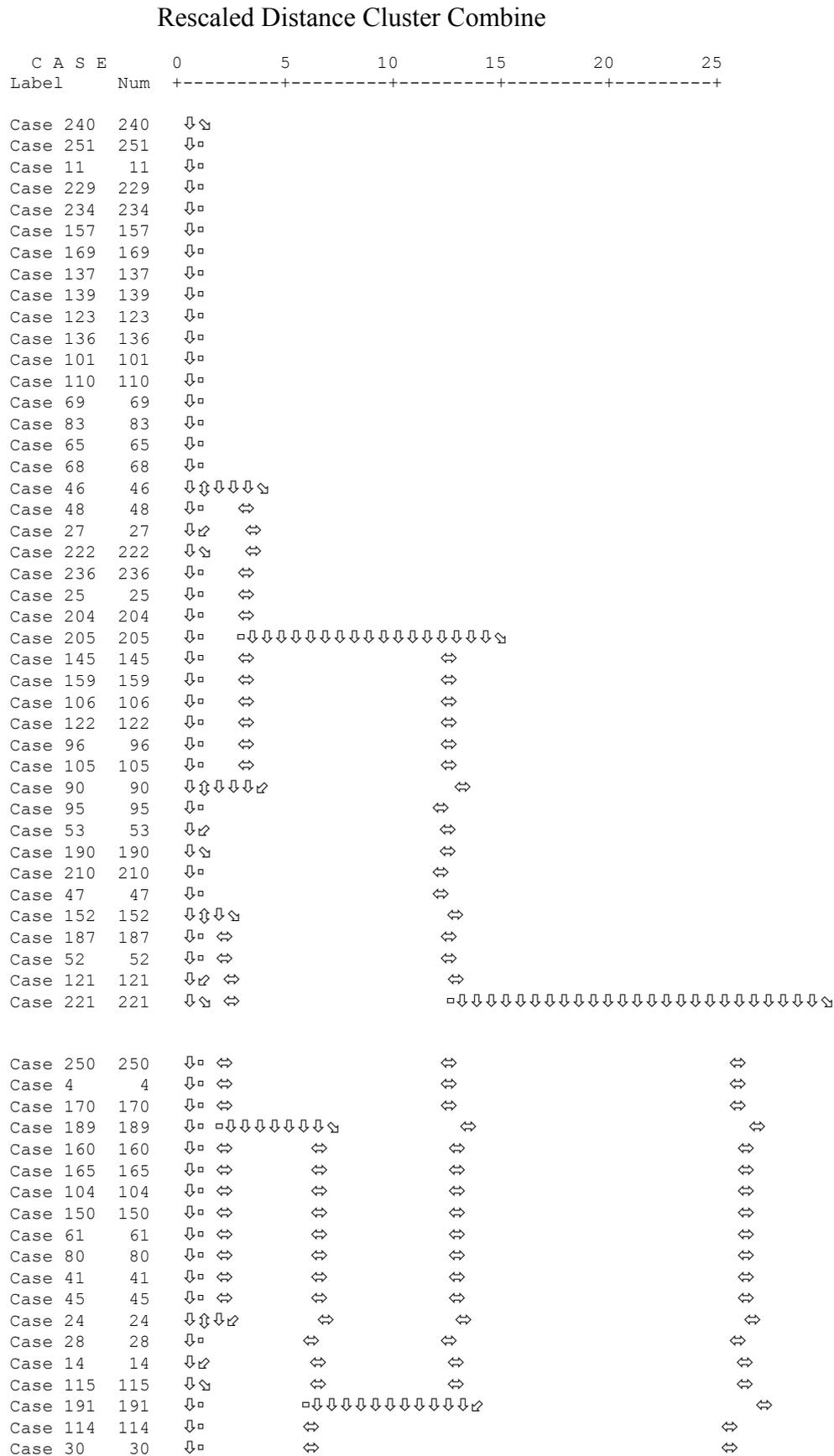
3	Environmental practices include all of the above plus reducing greenhouse gases and native bushland and wildlife conservation
	10. Do you have any particular environmental issues related to lamb production?
	<i>11. deleted</i>
	12. Would you consider a lamb product with the options you've chosen to be good value and affordable if it were: <b>[stop at the first No]</b>
Y / N	the same price as the cheapest price available at the time?
Y / N	up to 10% more expensive than the cheapest price available at the time?
Y / N	what if it were 11-15% more expensive than the cheapest?
Y / N	and 16-20% more expensive than the cheapest?
%	<b>[If yes to 20% then ask]</b> How much more would you be prepared to pay?
#	<b>13. [refer to sheet]</b> Which category best describes what you would expect of a lamb product labelled clean, green and humane? <b>[confirm free or safe]</b>
	<b>14.</b> To best describe your household food purchases, how strongly do you agree or disagree with the following statements, using one of the following responses
	<b>[ 1            2            3            4            5]</b>
	strongly disagree    disagree    unsure    agree    strongly agree
#	I always shop for the cheapest prices
#	Buying 'healthier' options is affordable
#	I use purchasing choices to 'vote' for farming methods
#	When I purchase food value for money is balanced against the way food is produced
#	Flavour and eating quality are the main considerations
	<b>15.</b> Where would you prefer to shop for a lamb product with your chosen qualities?
	<b>[read the list and circle code in left column for a yes]</b>
1	supermarket
2	retail butcher
3	farmer's market
4	health food/organic food shop
5	website – online shopping
6	farm to door direct delivery
	<b>16.</b> Please indicate which of the following are your main sources of information about food and farming?
	<b>[read the list and circle code in left column for a yes]</b>
1	newspapers
2	magazines
3	television
4	radio
5	internet
6	supermarkets
7	Any other .....
	<b>17.</b> Would you mind telling me which of the following age groups you're in?
1	18 yrs to 25 yrs
2	26 yrs to 35 yrs
3	36 yrs to 45 yrs
4	46 yrs to 55 yrs
5	56 yrs to 65 yrs

<b>6</b>	Over 65yrs
#	<b>18.</b> How many children do you have under 12 years of age?
#	<b>19.</b> How many dependent children do you have between the ages of 12 and 18?
	17. Would you mind indicating your annual gross income category from the following?
<b>1</b>	Up to \$29 999
<b>2</b>	\$30 000 to \$39 999
<b>3</b>	\$40 000 to \$59 999
<b>4</b>	\$60 000 or more

That was the last question. Thank you for your participation.

## Appendix 2: Dendrogram of cluster analysis of consumer preferences

### Dendrogram using Ward Method







Case 108	108	↓□	↔
Case 109	109	↓□	↔
Case 102	102	↓□	↔
Case 107	107	↓□	↔
Case 99	99	↓□	↔
Case 100	100	↓□	↔
Case 94	94	↓□	↔
Case 98	98	↓□	↔
Case 92	92	↓□	↔
Case 93	93	↓□	↔
Case 88	88	↓□	↔
Case 91	91	↓□	↔
Case 84	84	↓□	↔
Case 85	85	↓□	↔
Case 81	81	↓□	↔
Case 82	82	↓□	↔
Case 77	77	↓□	↔
Case 78	78	↓□	↔
Case 70	70	↓□	↔
Case 75	75	↓□	↔
Case 66	66	↓□	↔
Case 67	67	↓□	↔
Case 62	62	↓□	↔
Case 63	63	↓□	↔
Case 59	59	↓□	↔
Case 60	60	↓□	↔
Case 57	57	↓□	↔
Case 58	58	↓□	↔
Case 55	55	↓□	↔
Case 56	56	↓□	↔
Case 50	50	↓□	↔
Case 54	54	↓□	↔
Case 39	39	↓□	↔
Case 40	40	↓□	↔
Case 37	37	↓□	↔
Case 38	38	↓□	↔
Case 35	35	↓□	↔
Case 36	36	↓□	↔
Case 32	32	↓□	↔
Case 33	33	↓□	↔
Case 26	26	↓□	↔
Case 29	29	↓□	↔
Case 18	18	↓□	↔
Case 21	21	↓□	↔
Case 15	15	↓□	↔
Case 16	16	↓□	↔
Case 12	12	↓□	↔
Case 13	13	↓□	↔
Case 7	7	↓□	↔
Case 10	10	↓□	↔
Case 5	5	↓↑↓↓↓↓↓↓↓↓↓↓↓↓	
Case 6	6	↓□	
Case 2	2	↓↘	

### Appendix 3: LMG Survey

*Thanks for agreeing to take part. I should emphasise that the report from this project won't be identifying any individuals, although we may use short, anonymous verbatim quotes when someone has expressed an issue in an insightful way. Participation in these interviews is entirely voluntary, and you are free to withdraw at any time. The information we get is stored in a secure place.*

#### PART 1:

**The first part of the questionnaire is about you and your farm. These details help us make sure all farm types are represented. As mentioned before, your response is completely confidential and anonymous.**

<b>1.1</b>	
1	Male
2	Female
<b>1.2</b>	<b>Please indicate which of the following age groups you are in?</b>
1	less than 35
2	35 – 45
3	46 – 55
4	56 – 65
5	older than 65
<b>1.3</b>	<b>Please indicate which of the following education levels or training have you undertaken?</b>
1	Secondary education
2	Tertiary education
3	Other agriculture/land management courses
<b>1.4</b>	
#	<b>How long have you been farming?</b>
<b>1.5</b>	<b>Which of the following best describes how you came to be managing the farm?</b>
1	Inherited
2	Purchased
3	Leased
4	Managed for the owner
<b>1.6</b>	<b>Do you see yourself continuing to farm in</b>
1	5 years time
2	10 years time
3	15 years time or more?
<b>1.7</b>	<b>Please prioritise the following statements from 1 to 4 with 1 being the least motivational and 4 being your primary motivation for farming</b>
	the farm is a means of obtaining income and security
	being a farmer expresses who I am and is fulfilling
	farming is a valuable activity in its own right
	I have a sense of belonging to the farming community, feel that there is recognition and prestige in being a farmer and in continuing the family tradition.

<b>The next few questions ask you to describe your farm enterprise.</b>	
	<b>Which of the following categories best describes your farm?</b>
#	1. hills and ranges    2. mountains    3. plains    4. floodplain
#	1. basalt                    2. clay loams    3. cracking    4. alluvial    5. sandy loam
<b>1.8</b>	<b>What percentage of your pasture is ...</b>
%	introduced
%	developed native
%	undeveloped native
<b>1.9</b>	<b>Can you estimate the percentage of your farm that remains as natural woodland?</b>
%	
<b>1.10</b>	<b>Which of the following best describes how you normally finish your lambs?</b>
#	1. dry-land lucerne    2. grain fed    3. other, please specify .....
<b>1.11</b>	<b>Can you estimate a 10 year average annual gross income from lamb production?</b>
\$	
<b>1.12</b>	<b>Can you estimate the percentage of net farm income that comes from these sources</b>
%	lamb production
%	other agriculture
%	off-farm income
<b>1.13</b>	<b>Can you estimate the total freight cost for buying and selling ewes &amp; lambs in 2005 financial year? (include costs paid by buyers)</b>
\$	
<b>1.14</b>	<b>How many lambs did you turn off in 2005? And what was the average dressed weight of lamb produced in 2005?</b>
#	
kg	
<b>The next section asks for your views about market demands.</b>	
<b>2.1</b>	<b>Which of the following choices best describes whose product specifications you aim to meet?</b>
1	Indirectly, the retail customer
2	Your direct customers in the supply chain
3	the lamb marketing group
4	any I haven't mentioned? [probe]
<b>2.2</b>	<b>To indicate your main sources of market information I'll read a list for you to select from...please say whether it is a primary [1] or secondary source [2]</b>
0, 1 or 2	rely on the marketing board for information
	commissioned market research
	market reports
	media reports
	watching competitors
	watching overseas trends
	feedback through the supply chain
<b>2.3</b>	<b>How important are each of the following in deciding the direction of market trends? eg. choices on supermarket shelves. Using 1 to 7, with 1 meaning not important, 4 meaning important and 7 meaning very important.</b>
1- 7	consumer purchasing choices

	company buyers representing consumer demand
	government regulations
	public liability
	Are there any others I've not yet mentioned? [probe & rate 1 to 7]
<b>2.4</b>	<b>Why do you think those particular pressures are important?</b>
<b>2.5</b>	<b>Do you think overseas consumers have different expectations for clean, green and humane production to Australian consumers?</b>
Y / N	
<b>2.6</b>	<b>[If yes]</b> Which export markets are you thinking of and how do they differ?
<b>2.7</b>	<b>Most producers now voluntarily sign a National Vendors Declaration to assure that chemical residues are under the Maximum Residue Limit. Do you give any other assurances or marketing descriptions for your lamb?</b>
Y / N	
	<b>[If 'yes']</b> What are these? [official titles where possible]
<b>2.8</b>	<b>What kinds of records you currently need to keep for these claims?</b>
	<b>The next few questions ask about future domestic market access. Please give a score between 1 and 7, where 1 means <i>not important</i>, 4 means <i>important</i> and 7 means <i>very important</i>.</b>
<b>3.1</b>	<b>How important do you believe environmentally friendly production will be in?</b>
	3 years
	and in 10 years?
<b>3.2</b>	<b>How important do you believe chemical use and residue management will be in</b>
	3 years?
	and in 10 years?
<b>3.3</b>	<b>How important do you believe animal welfare issues will be in</b>
	3 years?
	and in 10 years?
<b>3.5</b>	<b>[Ask if score is higher for 10 years than 3 years ] Why do you think the importance for [from above response] will change over the longer term?</b>
<b>3.5</b>	<b>How interested are you in marketing a clean, green and humane product?</b>
	<i>1. not at all                      2. not very                      3. unsure                      4. quite                      5. extremely</i>
<b>3.6</b>	Why is that?

#### PART 4

This last section of the questionnaire will be most useful to make distinctions and marketing claims that set your groups' product apart from the rest. You are asked to rate specific practices using a series of statements relating to different management areas on your farm. It should take about 30 minutes do you wish to contribute to this part of the survey?

**[IF YES]** The statements are based on best practice guides available to farmers. Some of the practices may be new to you, please ask for further clarification at any time during the questionnaire and add your comments on the way. Some practices may not be

applicable to your enterprise or may not be important to you and that's a valid response. In fact, frank and honest responses are needed to provide a quality result back to the group. Of course, your responses are confidential, with your answers kept separately from your name and contact details. You are welcome to a printout of your own responses. And when the results are analysed I'll be sending a summary to all the survey participants.

**[IF NO]** Thank you very much for your help with this. If you'd like to discuss anything we've raised today further, please feel free to contact me on 02 4832 1134. A summary of results late this year to be mailed to everybody. Thanks again for your contribution.

**4.1 Which of the following management areas are the highest priority for your farm productivity and viability. Sort the following categories from 1 to 8 with 1 being the lowest and 8 being the highest priority.**

	pasture composition and good groundcover
	animal health and welfare
	greenhouse gas emission reduction
	biodiversity (native species) conservation
	chemical risks to people and the environment
	soil health and fertility
	weed control
	Balancing the water needs of agriculture and ecosystems

**4.2 How often are these pasture management practices achievable?**

**[1. Never 2.Rarely 3. Sometimes 4. Often 5. Always]**

	rotational grazing
	managing stocking rates to avoid overgrazing
	maintaining leaf area and length between 5-15cm or 2-6 inches for fast regrowth
	allowing seeding over spring-summer every other year
	applying fertilisers and lime according to pasture species response
	avoiding detrimental effects of herbicide on unimproved native pastures
	minimising bare ground to reduce the impact of drought and dry seasons

Any Comments you'd like to make, such as the barriers to achieving these practices?

**4.3 How often are these soil management practices achievable?**

**[1. Never 2.Rarely 3. Sometimes 4. Often 5. Always]**

	maintaining 70% groundcover including litter and dry matter all year round
	maintaining deep-rooted perennial pastures to reduce groundwater and salinity, and to reduce acidification through rainfall leaching past the root zone
	protecting slopes over 18 degrees by lightly stocking and avoiding cultivation
	soil test every 4-5 years to indicate the need to apply amendments and limiting nutrients
	check soil pH every 2-3 years to indicate the need to apply lime
	apply fertiliser when there is more than 70% groundcover and when plants are actively growing
	check the quality and content of fertilisers and lime
	maintain erosion control structures to avoid failures

Any Comments you'd like to make:

**4.4 How often are these weed control practices achievable?**

[1. Never 2.Rarely 3. Sometimes 4. Often 5. Always]

	maintaining pastures with good competitive cover to out-compete weed seedlings
	preventing seeding where possible
	regularly inspecting the property and control new infestations rapidly
	monitoring for new weeds in feed out areas and paddocks with new stock
	designating a truck/machinery wash-down area to prevent weed spread from one paddock to another or from another property
	using a combination of treatments to avoid herbicide resistance

**4.5 This next question asks which weed control treatments you primarily (score as 1) use, which are secondary (2) and if any are not used at all (0):**

	herbicide
	ploughing
	strategic grazing pressure
	by hand
	tractor drawn mechanical removal ... what sort of implement do you use?

**4.6 How often are these greenhouse gas reductions achievable?**

[1. Never 2.Rarely 3. Sometimes 4. Often 5. Always]

	finding alternatives to the burning of stubble
	applying low doses of nitrogen during active plant growth to ensure its taken up rather than lost to the atmosphere
	using minimum tillage to reduce the release of nitrous oxide and carbon from the soil
	aiming to reduce the number of grazing days required for each animal to reach market weight, thereby reducing methane gas
	efficient use of fossil fuels

**4.7 How often are these chemical risk management practices achievable?**

[1. Never 2.Rarely 3. Sometimes 4. Often 5. Always]

	compliance with chemical users recommended practice, eg. applying correct rates and safe handling procedures
	compliance with the requirements of the Livestock Production Assurance program and National Vendors Declaration
	checking the residue content of feeds and fertilisers bought onto the property
	excluding stock from contaminated sites, particularly during drought when stock might ingest more soil
	avoiding 20m buffer zones alongside streams when spreading super, lime and pesticides
	using a range of integrated pest control options to avoid resistance
	resting pastures for 10 weeks to interrupt worm lifecycles
	promoting habitat for natural predators to reduce the reliance on insecticides
	selecting resistant animals (a heritable trait) indicated by condition score 3 and low faecal worm egg counts

	allowing resistant animals to harbour non-resistant worms to dilute the resistant gene pool
	rotational grazing of diverse pasture composition to promote immune response to parasites
	selection of lice and blowfly treatments with nil or negligible withholding periods
	use of biological controls, such as pheromone traps for blowies (new)
	legal disposal of rubbish, old tyres, chemical drums and unused chemicals and oil

Any Comments you'd like to make, such as the barriers to achieving these practices?

**4.8 How often can the water needs of agriculture and the ecosystem be balanced?**

[1. Never 2.Rarely 3. Sometimes 4. Often 5. Always]

	operating efficient irrigation systems that avoid leakage through the soil, maximise plant uptake, are uniform across the field and irrigate for a calculated length of time
	managing willow infestations to avoid the huge losses of water to the atmosphere
	growing crops that are appropriate to the climate, soil and seasonal conditions
	designing deep dams with smaller surface areas to reduce evaporative losses
	protecting stream bank stability to avoid siltation of streams
	controlling stock access to streams and installing off-stream watering points

Any Comments you'd like to make, such as the barriers to achieving these practices?

**4.9 How often are can biodiversity management be achieved?**

[1. Never 2.Rarely 3. Sometimes 4. Often 5. Always]

	culling nor clearing only within legal permitted limits
	reducing feral animals and weeds in woodlands
	avoiding cultivation or broadly applied fertilisers and herbicides in woodlands
	avoiding destruction of seedlings to allow natural regeneration
	wetland conservation practices, such as removing stock in wet months to avoid pugging
	maintaining a healthy diversity of native animals, birds, understorey and canopy plants that provide shelter, clean water, predators for insect pests, pollinators, groundwater control, soil microbes, soil health and stability

Any Comments you'd like to make, such as the barriers to achieving these practices?

**4.10 How often can these animal welfare practices be achieved?**

[1. Never 2.Rarely 3. Sometimes 4. Often 5. Always]

	increasing pasture diversity and <u>length</u> to improve animal nutrition and reduce parasite infections
	removing stock from wetlands in wet months to avoid parasites
	providing shelter from extreme hot or cold weather to reduce lamb deaths and to increase growth rates

	ensuring feed and clean water are adequate for all conditions including pregnancy, lactation, cold exposure and growth
	using best practice to minimise the pain and stress of mulesing, docking, castration and other surgical procedures
	avoiding unnecessary trimming or grinding of teeth
	quickly and painlessly destroying chronically ill, weak or injured animals
	minimising fear, stress or discomfort
	accommodating natural behaviours, allowing space to lie out-stretched and avoiding social isolation (for any longer than necessary)
	avoiding injury in races and transport

Any Comments you'd like to make, such as the barriers to achieving these practices?

***That was the last question. Thank you very much for your help with this.***

***If you'd like to discuss anything we've raised today further, please feel free to contact me on 02 4832 1134. A summary of results will be mailed to all lamb marketing group members. Thanks again for your contribution.***

Recommended 'best' practices in Part 4 were sourced from various agency guidelines and fact sheets

(Latham 1995; Gherardi & Seymour 1996; Wakefield & Goldney 1997; Sheahan 1998; Acid Soil Action 2001; Bureau of Animal Welfare 2002; Mackay 2002; NSW Agriculture 2002; NSW DPI 2002; McFarland *et al.* 2003; SCARM 2003; MLA 2004; RSPCA 2005).

**Appendix 4: Respondents' ratings of achievability of practices, mode responses are shaded**

'Clean' Criteria	On -farm practices	not applicable never rarely sometimes often always						
		not applicable	never	rarely	sometimes	often	always	
pesticides used within safe limits	compliance with recommended practices					20	10	
	compliance with LPA				1	7	22	
	check residues in feeds and fertilisers	1	9	4	4	6	6	
	exclusion from contaminated sites	11			3	5	11	
	integrated pest control to avoid resistance			1	4	14	11	
	Low WHP treatments for lice and flies		6	2	6	13	3	
pesticide free	promoting habitat for natural predators		4	6	10	7	3	
	animal nutrition through diverse pastures		3	9	8	8	2	
	resting pasture to interrupt worm lifecycle	1	10	6	7	6		
	selecting resistant animals	3	11	3	7	1	5	
	resistant animals as harbour for non-resistant worms	3	12	4	4	5	2	
	biological controls for pests, eg flies	1	20	3	3	2	1	
controlling noxious weeds	out-compete with desirable species		1	3	8	16	2	
	preventing seeding			1	8	20	1	
	inspection and control of new weeds				4	16	10	
	monitoring feed out areas and new stock	3		1	5	15	6	
	designated machinery wash-down	6	12	3	3	4	2	
	combining treatments to avoid resistance		2	1	5	13	9	
'Green' criteria	minimise soil erosion and maintain soil fertility	rotational grazing	1	2	2	8	14	3
		managing stocking rates			2	4	18	6
		minimising bare ground			1	10	15	4
		maintain 70% groundcover		1	3	8	14	4
		maintain leaf area	2		9	12	7	
		allowing pasture seeding	4		9	8	7	2
		appropriate fertiliser and lime for response	1		3	5	12	9
		avoid herbicide on natives	14	1	1	1	4	9
		soil test 4-5 years		2	2	9	8	9
		pH test 2-3 years		4	5	9	7	5
		check quality of fertiliser and lime		12	4	2	5	7
		protecting slopes over 18 degrees	26		2	1	1	

'Green' Criteria cont'd	On-farm practices	Frequency					
		not applicable	never	rarely	sometimes	often	always
acidity and salinity controlled no pollution of streams	maintain deep-rooted perennials	5		1	3	14	7
	maintain erosion control structures	18		1	2	5	4
	fertilise when 70% cover and active growth	3	6	5	4	6	6
	20m buffer zones alongside streams	12		2	1	7	8
	stream bank stability	13	1		4	5	7
	off-stream watering points	13	2		5	2	8
	disposal of tyres, chemicals, drums, oil			2	3	14	11
reducing greenhouse gases	alternatives to burning stubble	4	2	3	8	8	5
	low doses of nitrogen	5	4	4	2	10	5
	minimum tillage				4	18	8
	reduced grazing days			2	1	10	17
native bushland and wildlife conservation	culling and clearing with permits	2	2	1	2	7	16
	reducing feral animals and weeds in woodlands	2	1	2	2	14	9
	not cultivating woodlands	4	1	1	1	7	16
	allowing natural regeneration	1	3	4	2	11	9
	maintain ecosystem services	1		1	4	15	9
	wetland conservation, removing stock in wet months	14	2	1	2	3	8
'Humane' criteria adequate food, water and disease control	ensure feed and clean water				1	13	16
	pasture diversity and length		1	1	11	14	3
	remove stock from wetlands in wet months	19		2	3	4	2
provide shelter	providing shelter from extreme hot or cold weather			1	7	14	8
minimise stress, fear and pain	minimise fear, stress or discomfort					16	14
	best practice to minimise pain during procedures				1	10	19
	avoiding teeth grinding		1		1	1	27
	humane destruction of ill or injured animals					6	24
	avoiding injury in yard races and transport					17	13
able to express natural behaviours	accommodating natural behaviours			1		4	25



**Appendix 5: Comparison of soil practices rating by group**

Bars represent % of each rating, White= mode rating, black = not applicable, grey = all other ratings.

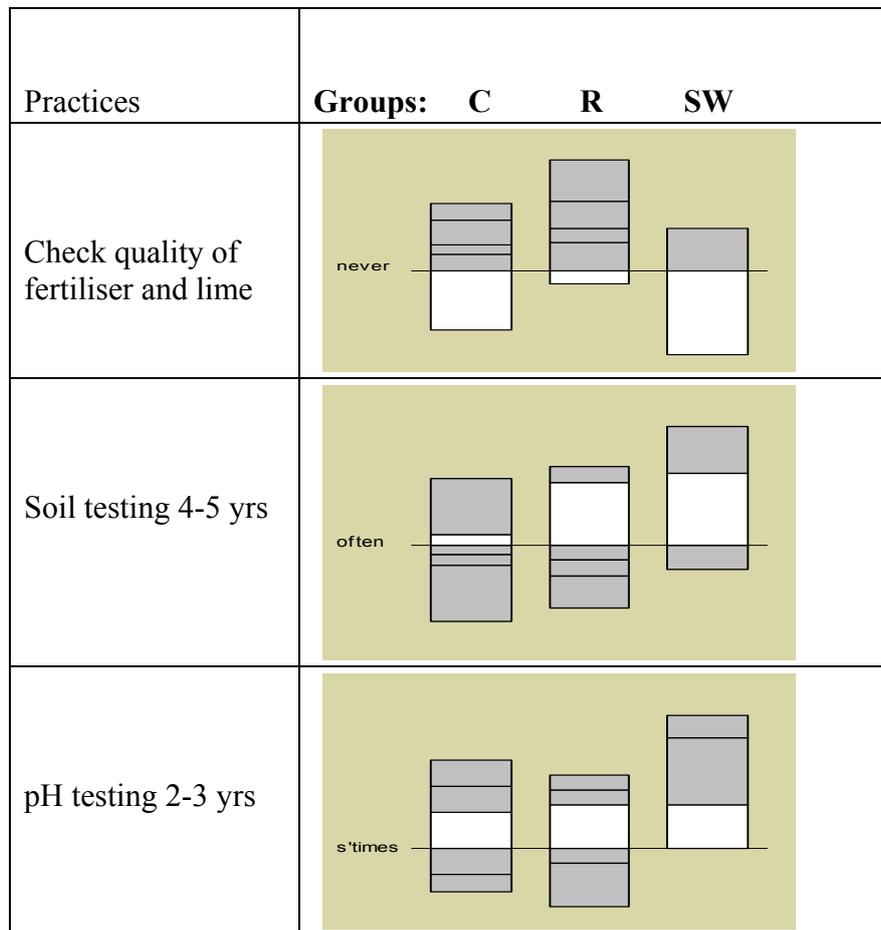
Practices	Groups: C R SW
Maintain 70% groundcover <i>H7.924,df2,.019</i>	
Minimise bare-ground to reduce the impact of drought and dry seasons	
Rotational grazing <i>H5.732,df2,.057</i>	
Managing stocking rates to avoid overgrazing	
Maintaining leaf area for fast regrowth	
Allowing seeding over spring-summer every other year	

**Appendix 6: Comments and ratings for soil conservation practices**

n = number of similar comments, C=Campaspe responses, R=Rutherglen responses and SW=South West responses.

<b>Practices (mode rating)</b>	<i>Always</i>	<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>
Maintain 70% groundcover & minimise bare-ground <i>(often)</i>	Use containment paddocks or feedlot ewes (n = 2, C R)		Late summer pastures die back (n = 5, C R) Herb structure of lucerne (n = 3,C) Lack research and/or information to address bare-ground (C)		
	Grass, legume & annuals (n = 2, SW) and under Lucerne (R). Clover dies off early summer (C)				
Rotational grazing <i>(often)</i>		Not with lambs to avoid mis-mothering (n = 3,C SW)		Time factor (C)	
		Rotation determined by Lucerne growth stage (n = 2, C)	Summer pastures often die back (n = 3, C R)		
		Rely on irrigation or stubble or containment over summer (n = 3, C R)		Infrastructure costs (n = 2, R SW)	
Maintain leaf area <i>(sometimes)</i> Allowing seeding <i>(rarely)</i>			Winter growth too slow (R)	Lack of summer rain determines leaf length Some seed hard to successfully broadcast (SW)	

**Appendix 7: Comparison of ratings for soil fertility practices by groups,**  
white= mode, black=not applicable. Bars represent % for ratings; C = Campaspe, R =  
Rutherglen and SW = South West.



**Appendix 8: Comments and ratings relating to soil fertility practices.**

n = number of similar comments, C=Campaspe responses, R=Rutherglen responses and SW=South West responses

<b>Practice (mode rating)</b>	<b>never</b>	<b>rarely</b>	<b>sometimes</b>	<b>often</b>	<b>always</b>
pH testing ( <i>sometimes</i> )		pH checked at crop establishment 2-3 yrs or lucerne rotation 6-10 years (n = 6 C R); then applications depends on affordability and priorities (C); only lime good soils (R)		little response to lime due to Al+; (SW)	
	Lime only needed every 10 years (n = 2 R)		acidity not a significant problem (n = 3 C SW)		
	Lucerne tolerates pH in the range of 4.5 to 5.2 (n = 3)				
Soil testing ( <i>sometimes</i> )	observe growth as indication of soil health (R)	soil tested less often (n = 4 C R SW)			
	Soil test at cropping/lucerne/pasture rotation, between 5-10 yrs (n = 5 C R)				
			soil test every 4 yrs on cropping rotation (C)		soil test 3-5 years when cropping rotation (n = 3 C R)
Check quality of fertiliser and lime ( <i>never</i> )	Rely on supplier or agronomist to check the quality of fertilisers (n = 19 C R SW) and lime (n = 15 R SW)				
Deep-rooted perennials to reduce salinity and acidification ( <i>often</i> )	salinity and acidification aren't issues (n = 2 C); Lucerne not affected (C)		salinity not a problem (n = 2 C SW) slightly acid surface soil (n = 6 C); need amendment to establish Lucerne or crop (n = 2 C) Salinity is an issue (R)	salinity nor acidity a significant problem (n = 2 C R)	

**Appendix 9: Comparison of ratings of water efficiency practices by group.**

Bars represent % of each rating, White= mode rating, black = not applicable, grey = all other ratings.

Water efficiency practices	Groups: C R SW
<i>Operating efficient irrigation systems</i>	
<i>Designing deep dams with small surface area</i>	
<i>Managing willow infestations</i>	
<i>Growing crops appropriate to climate, soil and seasonal conditions</i>	

**Appendix 10: Producer comments on water efficiency practices by ratings.**

n = number of similar comments, C=Campaspe responses, R=Rutherglen responses and SW=South West response

<b>Practices (mode rating)</b>	<i>NA or Never</i>	<i>Rarely</i>	<i>Sometimes</i>	<i>Often</i>	<i>Always</i>
Operating efficient irrigation systems <i>(not applicable)</i>	rely on bores (n = 3) and 2" polypipe from irrigation channel	Use flood irrigation and is aware of the impacts	Laser levelled most paddocks; recycling bays not in place		Laser levelled and water recycled (3)  Centre pivots have little run-off
Dam design to avoid evaporative losses <i>(often)</i>				Sandy sub-soils restrict depth of dams Cost of excavation of silted dams	
Managing willow infestations <i>(not applicable)</i>		Willows or non-invasive species not considered a problem (n = 5)		Basket willows are a problem	
Crop selection appropriate to conditions <i>(always)</i>					lucerne has a shorter growing season to take advantage of the rain

**Appendix 11: Comparison of rating for water quality practices by group.**

X Axis = median score; bars represent % of each rating above and below the median. White = median rating, black = not applicable, grey = all other ratings.

Water quality practices	Groups: C R SW
<i>Protecting stream bank stability to avoid siltation of streams</i>	<p>Stacked bar chart showing the distribution of ratings for 'Protecting stream bank stability to avoid siltation of streams'. The X-axis represents the median score, which is 'sometimes'. The Y-axis represents the percentage of each rating. The bars are stacked with black at the bottom (not applicable), followed by grey (all other ratings), and white (median rating). Group C has a small black base, a thin white layer, and a thin grey top. Group R has a larger black base, a larger white layer, and a larger grey top. Group SW has a similar distribution to R.</p>
<i>Controlling stock access to streams, install watering points</i>	<p>Stacked bar chart showing the distribution of ratings for 'Controlling stock access to streams, install watering points'. The X-axis represents the median score, which is 'rarely'. The bars are stacked with black at the bottom, followed by grey, and white. Group C has a large black base, a thin white layer, and a thin grey top. Group R has a smaller black base, a larger white layer, and a larger grey top. Group SW has a similar distribution to R.</p>
<i>20m buffer zones along streams when applying super, lime or pesticides</i>	<p>Stacked bar chart showing the distribution of ratings for '20m buffer zones along streams when applying super, lime or pesticides'. The X-axis represents the median score, which is 'often'. The bars are stacked with black at the bottom, followed by grey, and white. Group C has a large black base, a thin white layer, and a thin grey top. Group R has a smaller black base, a larger white layer, and a larger grey top. Group SW has a similar distribution to R.</p>
<i>Apply fertiliser when 70% cover and active growth</i>	<p>Stacked bar chart showing the distribution of ratings for 'Apply fertiliser when 70% cover and active growth'. The X-axis represents the median score, which is 'sometimes'. The bars are stacked with black at the bottom, followed by grey, and white. Group C has a small black base, a thin white layer, and a thin grey top. Group R has a larger black base, a larger white layer, and a larger grey top. Group SW has a similar distribution to R.</p>
<i>Disposal of rubbish, tyres, chemicals and drums</i>	<p>Stacked bar chart showing the distribution of ratings for 'Disposal of rubbish, tyres, chemicals and drums'. The X-axis represents the median score, which is 'often'. The bars are stacked with black at the bottom, followed by grey, and white. Group C has a large black base, a thin white layer, and a thin grey top. Group R has a smaller black base, a larger white layer, and a larger grey top. Group SW has a similar distribution to R.</p>
<i>Apply low doses of nitrogen during active growth</i>	<p>Stacked bar chart showing the distribution of ratings for 'Apply low doses of nitrogen during active growth'. The X-axis represents the median score, which is 'often'. The bars are stacked with black at the bottom, followed by grey, and white. Group C has a large black base, a thin white layer, and a thin grey top. Group R has a smaller black base, a larger white layer, and a larger grey top. Group SW has a similar distribution to R.</p>

**Appendix 12: Producer comments by ratings related to stream protection.**

n = number of similar comments, C=Campaspe responses, R=Rutherglen responses and SW=South West responses.

<b>Practice (mode rating)</b>	<i>Always</i>	<i>Often</i>	<i>Sometimes</i>	<i>Rarely</i>	<i>Never</i>
Protecting stream bank stability to avoid siltation of streams ( <i>not applicable</i> )	Have fenced off creeks and installed watering points or bores (n3, C R SW)		Initial costs or flood damage to fences (n2, C R) Access for weed control (R) Working on it (SW)		Unsure of financial advantages of stopping erosion (C)
	CMA assistance for fencing (n3, C SW)				
Controlling stock access to streams and installing off-streams watering points ( <i>not applicable</i> )	Stream conservation practices were both rated consistently ( <i>G.977; .000</i> ); and comments are amalgamated above.				
Applying low doses of nitrogen during active plant growth to ensure its taken up ( <i>often</i> )	Applied only at establishment of crop (n9, C R)				
	At establishment as well as later (n3, C R)			Don't know the value (C) Takes time (C)	
Apply fertiliser when there's 70% groundcover actively growing ( <i>never, often &amp; always</i> )			Flat topography so low risk of run-off (R)	Applied in Autumn prior to rainfall (n7,C R SW), while fertiliser cheaper (SW) and traffickable (n2, C R)	
Buffer zones of 20m alongside streams when spreading super, lime and pesticides ( <i>not applicable</i> )	Hadn't considered before but believes it should be achievable (R)		20m too much out of production (R)		
Legal disposal of rubbish tyres, chemical drums and unused chemical and oil ( <i>often</i> )	Chemical disposal requires booking and gets little publicity (n4,C R SW )				
	Drum collection at council (n3, C R)	Tyres & oil at local tip/mechanic (n2,C); on-farm recycling (n4, C R)	No facility for oil disposal (n4,C) Council charges \$5-\$10 for tyres (n3,C)		

**Appendix 13: Comparison of group ratings for conservation practices.**

X Axis = median score; bars represent % of each rating above and below the median. White= median rating, black = not applicable, grey = all other ratings.

Conservation practices	Groups: C R SW
<i>Avoiding destruction of seedling to allow natural regeneration</i>	
<i>Avoiding cultivation or fertilisers and herbicides in woodlands</i>	
<i>Reducing feral animals and weeds in woodlands</i>	
<i>Culling or clearing only within legal permitted limits</i>	
<i>Maintaining a healthy diversity of species for ecosystem services</i>	
<i>Wetland conservation eg removing stock in wet months</i> H10.886, 2, .004	

**Appendix 14: Producers comments by ratings of native species and ecosystem conservation**

. n = number of similar comments, C=Campaspe responses, R=Rutherglen responses and SW=South West response.

<b>Practices (mode ratings)</b>	<b>Always</b>	<b>Often</b>	<b>Sometimes</b>	<b>Rarely</b>	<b>Never</b>
Culling and clearing only within legally permitted limits ( <i>always</i> ). Reducing feral animals and weeds in woodlands ( <i>often</i> )	Plantations, State Forests and reserves, and absentee/ungrazed properties are harbour for roos and ferals (n = 6, C, SW)				
	Few or no trees left to clear (n = 2) or cull (n = 1)				
	roos just passing through (C)	Permit process too bureaucratic (n3) and replacement number of tubestock is arbitrary (n = 2, R)			
Avoiding cultivation or broadly applied fertilisers and herbicides in woodlands ( <i>always</i> )		No woodland (n = 3, R,SW)	saltbush planted under woodlands (C)		
Avoiding destruction of seedlings to allow natural regeneration ( <i>often</i> )	All remnants fenced off (n = 2, C) or work ongoing (n = 5, C)		fenced remnants, not river (C) intend to fence remnants (R)		Fenced veg. harbour foxes (n = 2,R)
		Controlled grazing of remnants for fire control (C)			
	Some funding (eg 25%) provided (n = 2, R, SW)	Incentives sufficient (R) Takes time and own money to complete (C)			
		few natural areas remain (C)		Little to no trees remain (n = 3, R, SW)	no natives left (SW) veg. grazed in the paddock (R)
		aiming towards more native plantings for shelter (R)		would plant tubestock instead of natural regen (R)	tubestock mortality due to drought (R)
Maintaining a diversity of native species ( <i>often</i> )	Individuals' ratings for maintaining biodiversity and regeneration were fairly consistent (V.626, .001), and comments are inseparable.				
Wetland conservation practices, such as removing stock in wet months ( <i>not applicable</i> )	Fencing off wetland to direct drill a mix of species. Stock graze wetlands Dec-Feb (C)	Wetland fenced out and drained (SW)	Fenced out low areas and strategically graze (R)		Graze wet areas. Drained Greta Swamp still wet in good years (C)

**Appendix 15: Comparison of rating for reducing greenhouse gas practices by group.**

X Axis = median score; bars represent % of each rating above and below the median. White= median rating, black = not applicable, grey = all other ratings.

Reducing greenhouse gas practices	Groups: C R SW
<i>Reducing grazing days to gain marketable weight</i>	
<i>Using minimum tillage to reduce the release of greenhouse gases from soil (H11.549, 2, .003)</i>	
<i>Applying low doses of nitrogen during active plant growth to avoid losses to the atmosphere</i>	
<i>Finding alternatives to burning of stubble (H10.516, 2, .005)</i>	

Appendix 16: Producers comments and ratings of reducing greenhouse gases

Note: Comments were related to more than one rating. n = number of similar comments, C=Campaspe responses, R=Rutherglen responses and SW=South West

Practices ( <i>mode rating</i> )	<i>always</i>	<i>often</i>	<i>sometimes</i>	<i>rarely</i>	<i>never</i>
Finding alternatives to burning stubble ( <i>sometimes</i> )	New machinery since 1982 (C) Contractors burn to save time (R)	Have to burn occasionally, tines cant manage soil/roots (n2 C R)	Stubble grazed (n2 R)	Root mat too dense, particularly on heavy soils (n5, C R)	
		Trash promotes insects and disease, burning kills weeds and rust in next crop (n4 C R)			
		New machinery costs \$40-50K (n5 C R) and cant handle stony ground or cant justify with little cropping			
Applying low doses of nitrogen to prevent losses to the atmosphere ( <i>often</i> )	Use small amount of N prior to sowing, then some later (n3 C R)			Don't know value of applying nitrogen later (C) Time to apply nitrogen twice (C)	
	Nitrogen only applied at crop establishment (n9, C R)				
Reduce grazing days and methane production ( <i>always</i> )	Select genetics for fact growth; in future will select for efficient food conversion; modifying rumen function with microflora (SW)	Aim for target weight at contracted date (n2, C)			
Minimum tillage to reduce nitrous oxide and carbon release from the soil ( <i>often</i> )	Direct drilled since 1982, has improved soil structure (C)	New machinery costs, \$40-50K to handle crop root mats (n5,C,R) but not always successful on stony ground; amount of cropping doesn't justify cost			

Appendix 17: Evidence for 'clean' propositions  
(the number of similar comments are in brackets)

Propositions	Practices constraining 'clean' criteria	Evidence that practice is constrained
Inputs, knowledge and uncertainty constrained practices that meet the 'clean' criteria: a). Farm inputs and equipment constrained practices that reduce chemical use and residues.	compliance with recommended chemical users' practices	Often but not always achievable (20); awkward, inconvenient equipment and personal safety lapses (12)
	check residues in feeds and fertilisers	Never to sometimes achievable (17); suppliers don't have or don't volunteer information (3); rely on suppliers for feed (5), or for fertiliser (11)
	selecting resistant animals indicated by condition and egg count	Never to sometimes achievable (21); breeders have control (7); ongoing research into maintaining desirable carcass characteristics along with resistance
	designated machinery wash-down area to prevent weed spread between paddocks and farms	Never to sometimes achievable (18); time consuming to return to area; better if portable
b). Lack of knowledge and uncertainty constrained practices that reduce chemical use and residues.	pasture diversity and length to reduce parasite infections	Never to sometimes achievable (20); not convinced of efficacy (2)
	promoting habitat for natural predators	Never to sometimes achievable (20); due to past clearing the ratio of predator to pest is insufficient (1), plantings for pest predators (3).
	stock exclusion from contaminated sites	N/A (11) and sometimes (3); unmapped and unknown location of old dip sites (3).
	integrated pest control to avoid resistance	Rarely/sometimes (5) & often (14); references to alternating the use of drenches (7); lack of or vague information (3)
	low withholding period treatments for lice and flies	Never to sometimes achievable (14); risk of failure is a concern and mode of action not understood (5)
	resting pasture for 10 weeks to interrupt worm lifecycle	Never to sometimes achievable (23); contradictory information and advice regarding rest period and larval survival (5)
	selecting resistant animals as harbour for non-resistant worms to dilute the resistant gene pool	Never to sometimes achievable (21); lack knowledge of practice (3)
biological controls for pests, e.g. fly traps	Never to sometimes achievable (26); considered a 'leap of faith' (2); perceived failure of luci-traps (2)	

**Appendix 18: Evidence for 'green' propositions**  
(the number of similar comments are in brackets)

Propositions	Practices constraining 'green' criteria	Evidence that practice is constrained
Biophysical conditions constrained practices that meet the 'green' criteria: a). Unreliable rainfall constrained the maintenance of groundcover.	maintain 70% groundcover including litter and dry matter all year around	Rarely to sometimes achievable (11); Location in higher rainfall area (S.W.) was a direct factor in maintaining groundcover (F 5.191 (2,27) $p=.012$ ) and rarely achievable in summer in north (8), dependent on adaptive finishing system (2).
	minimising bare ground to reduce the impact of drought and dry seasons	Never to sometimes achievable (12); see above.
	maintain leaf area and length between 5-15cm or 2-6 inches for fast regrowth	Rarely to sometimes achievable (21); lack of rainfall in summer (1), winter growth slow (1)
	rotational grazing	Rarely to sometimes achievable (12); erratic rainfall (5)
b). Clay soils constrained alternatives to burning stubble.	finding alternatives to burning stubble	Never to sometimes (13); Moderate association with clay soil and consequently root mat density (V.566, .010).
Costs constrained practices that meet the 'green' criteria: a). Costs constrained rotational grazing	rotational grazing	Rarely to sometimes achievable (12); time to shift stock (1), cost of infrastructure (1), and avoided during lambing (3).
b). Costs of greenhouse gas reduction practices	finding alternatives to burning stubble	Never to sometimes (13); Campaspe more likely to achieve alternative than other groups (H 10.516, 2, .005), cost of new machinery (6)
	applying low doses of nitrogen during active plant growth to ensure its taken up rather than lost to the atmosphere	Never to sometimes achievable (10); no value in this practice (1), time (1), applied at establishment to avoid risk of failure(6)
	minimum tillage to reduce the release of nitrous oxide and carbon from the soil	Strong association with mixed farming, south-west group rarely crop (H 11.549, 2, .003).
c). Costs constrained water conservation practices.	protecting stream bank stability to avoid siltation of streams	Never or sometimes achievable (5); fencing cost (1), grants help (3), flood damages fencing (2), weed control problem (1)
	controlling stock access to streams and installing off-stream watering points	Never or sometimes achievable (7); flood damages fencing (2), cost (1), grants help (3), weed control problem (1)
	operating efficient irrigation systems that avoid leakage through the soil, maximise plant uptake, are uniform across the field and irrigate for a calculated length of time	Half of the irrigators had invested in efficiencies (3); investment constrained by comparatively low returns.
Conservation practices are largely undertaken where they converge with production goals.	allowing pasture seeding	Rarely to sometimes (17); some seed hard to establish through broadcasting (1), seed-head is nutritious feed (1)
	maintain leaf area and length between 5-15cm or 2-6 inches for fast regrowth	Rarely to sometimes achievable (21); under stock to maintain (1)

## Appendix 18: Continued ... Summary of evidence for 'green' propositions

(the number of similar comments are in brackets)

Propositions	Practices constraining 'green' criteria	Evidence that practice is constrained
Conservation practices are largely undertaken where they converge with production goals.	fertilise when 70% cover and active plant growth	Never to sometimes (15); significant association with applying at Autumn break (V.861, .000)
	avoiding 20m buffer zones alongside streams when spreading super, lime and pesticides	N/A (12) and rarely to sometimes (3); production loss too much (1); hadn't considered before (1)
	avoid destruction of seedlings to allow natural regeneration	Never to sometimes achievable (9); little to no remnants left (4), scattered trees or remnants still grazed (12), time and money to fence (1); feral harbour (2), controlled grazing (1)
	wetland conservation practices, such as removing stock in wet months to avoid pugging	Rarely to sometimes achievable (5) and N/A (14); wetlands are strategically grazed (5), drained and sewn to pasture (2).
Government services constrain compliance with regulations for the disposal of native species and waste.	culling and clearing only within legally permitted limits	Never to sometimes achievable (5); arduous bureaucratic processes (2)
	legal disposal of tyres, chemicals, drums, oil	Never to sometimes achievable (5); disposal requires booking (4), no facilities for oil (4), disposal fees (3)
Producer's under-estimation of risk constrained rating of 20% of 'green' practices.	applying low doses of nitrogen during active plant growth to ensure its taken up rather than lost to the atmosphere	Never to sometimes achievable (10); no value in this practice (1), nitrogen applied at establishment to avoid risk of failure(6)
	soil test 4-5 years	Never to sometimes achievable(13); moderately associated with Lucerne & crop rotations (V .597, .030)
Producer's under-estimation of risk constrained rating of 20% of 'green' practices.	pH test 2-3 years	Never to sometimes achievable (18); moderately associated with perceived insignificance of acidity as lucerne root depth is below surface acidity (V .628, .019)
	designated machinery wash-down area to prevent weed spread between paddocks and farms	Never to sometimes achievable (18); risk perceived to come from outside the farm boundaries therefore self sufficient in machinery (5); or contractors responsibility (2)
	managing willow infestations to avoid the large losses of water to the atmosphere	N/A (26) and rarely (2) achievable; less invasive species not considered a risk (4)
	check quality and content of fertiliser and lime	Never to sometimes achievable (18); relied on supplier to check fertiliser (19) and lime (15); risk of cadmium contamination not mentioned.

**Appendix 19: Evidence for 'humane' propositions**  
 (the number of similar comments are in brackets)

Propositions	Practices constraining 'humane' criteria	Evidence that practice is constrained
Humane animal treatment depends upon the stockman's ability to read the behavioural and physiological signs of pain or distress.	all practices	Most respondents rated all practices as often or always, pasture diversity rated lower with lucerne pastures being a monoculture and 2 unconvinced of benefits to immunity. Comments: welfare affects productivity (7), improving shelter with plantings (4), gentle or muzzled dogs (4), don't mules (8), shelter after shearing (1), difficult to get training for mulesing contractors (2).
Adaptive finishing systems facilitate 'clean and green' practices.	maintain deep-rooted perennial pastures to reduce groundwater and salinity, and to reduce acidification	Lucerne is predominant deep-rooted species; worm burden less of a problem in lucerne areas thought to be due to drier conditions, resting and rotations height of grazing/browsing is largely away from the soil.
	rotational grazing	Weakly associated with finishing system ( $V=.552, p=.05$ ); 70% of those responding often or always achievable had lucerne pastures.
	alternatives to burning stubble	Moderately associated with finishing systems ( $V=.523, p=.012$ ) such as feedlots, irrigated pastures and grazing stubble rather than burning
	reduced grazing days required to reach market weight, reducing methane gas.	Supplementary feeding with grain (8) or forage crops (5).
	resting pasture for 10 weeks to interrupt worm lifecycle	Lucerne moderately associated with rest for 10 weeks ( $V=.512, p=.050$ ), after flowering and leaf loss.
	combining treatments to avoid weed herbicide resistance	Lucerne and cropping rotations were significantly associated with use of a combination of treatments ( $V=.423, p=.03$ )

## Appendix 20: Case study interview protocol – direct marketers

Aims of the study are to:

- explain why producers are direct marketing meat products;
- explain why these businesses are succeeding.
- 

*[propositions that guide the interview are in brackets]*

1. Can you briefly describe the steps from paddock to plate? (names of businesses)
2. How many people involved in supply?
3. Who coordinates processing and distribution?
4. What are the main benefits of the present operation?
5. What are the main risks of the present operation?

*[Value adding and direct marketing increases farm profit margins]*

6. Would you say the farm profitability has improved as a result of value adding and direct marketing?
7. What indicators do you use to understand your profitability? – internal rate of return, net profit or other.
8. How frequently do you peruse financial reports?
9. What is the farm gate price per kilogram? Has this improved in the past few years?
10. How do you establish the farm gate price?
11. What are the processing and distribution costs?
12. What about licenses and commissions, stall fees etc?

*[These businesses experience strong demand]*

13. How many clients do you have now? How many are regulars?
14. Do you know how much return business you're getting?
15. What kind of growth have you experienced over the years?
16. How many animals does the business now turn off per year?
17. What indication is there that there is unmet demand for your product? sell out often?
18. Do you have strategies to meet this demand?
19. Do you source animals from other farms to meet this demand?
20. How do you maintain the product quality and attributes from other farms?

*[Producers that direct market have entrepreneurial skills, experience and personal attributes that lead to success]*

21. What do you think has led to you success so far?
22. Has there been any market research done to know what consumers are looking for?
23. Was there an initial investment required?
24. What sort of person do you think does well at direct marketing?
25. Have you had past experiences that you think have given you a good grounding for this business?
26. What skills have you acquired along the way?
27. What skills do your partners and staff, bring to the business?
28. How did you start the supply chain?
29. How well is it working now?
30. Do you get good feedback from processors and customers?
31. How much competition is there amongst supply chain businesses into the same markets?
32. Does the business keep you inspired? What aspect sustains you ... keeps you going?
33. How many hours a week would you work on marketing the product?

34. Are you satisfied with the amount of time you can spend with family, friends, rest and leisure?

*[“Relationship marketing” builds a reliable client base and trust]*

35. Why do you think customers buy direct from you?

36. How much interaction is there with your regular customers?

37. What are some typical questions about your products from current or prospective customers? What answers do you have for them?

38. Do they ask about farm practices? What on-farm practices are they interested in?

*[Producers that direct market are strongly committed to the quality and/or attributes of their products]*

39. Was the initial motivation to start this business purely financial?

40. How much did lifestyle and personal values play a part in the decision to start this business?

41. How would you define success for the business?

42. Do you have a business plan that you monitor progress against regularly?

43. What are your main business goals?

44. Are you satisfied with the progress toward those goals?

45. What goals do you have for the business in the next 5 years?

46. What challenges do you foresee in achieving these goals?

*[Producers that direct market can brand their product based on trust rather than maintaining formal accreditation against a recognised standard]*

47. How are your products described or branded?

48. Do you make any promotional claims about how the meat is produced? environment? animal welfare?

49. What indicators do you use to gauge your progress or performance?

50. What changes would you make to the farm to enable you to do some things better?

51. Do you need to maintain any formal accreditation?

52. Why do you find that necessary? or why not?

53. What advantage or disadvantage do you see in these formal processes?

54. Do you need to show compliance with the Livestock Assurance Program? [signed NVD]

*[Selling into the mainstream meat distribution system does not adequately recognise nor reward producer commitment to quality, environmental management nor animal welfare]*

55. How did you sell your product prior to direct marketing?

56. Have you dealt with mainstream suppliers and supermarkets?

57. Was the reward adequate? Why or why not?

58. Do you have a comment to make about standards in the mainstream?

59. Do you think your meat quality has improved as a result of your current operation? Why is that?

60. Have you tried to access supermarkets with your products?

61. What issues do you see in supplying supermarkets with your product? [numbers? costs? premiums? profit margins?]

What are the benefits do you see for other parties in the supply chain? Can I contact two or three? Would they like feedback from them on what they see are the benefits?