Influencing sustainable water use in Australian irrigated agriculture: a value chain management approach

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Abstract

The Australian irrigation industry is a significant component of the nation’s food and fibre value chains, contributing one third of the nation’s agricultural production and half of its agricultural profit. Despite this the Australian water reform process, and the growing community interest in appropriate water use, has placed significant pressure on Australian irrigators to justify their access to water in the face of competition from urban, industrial and especially environmental needs. This pressure peaked during the unprecedented Australian drought conditions that commenced in the late 1990’s and prompted the Australian Government to form the National Water Commission in order to focus on sustainable water management. Irrigator engagement in the water reform process has been increasingly defensive and although sustainable water management was being pursued at a firm (or farm) level, as well as through industry funded initiatives and programs, the individual irrigator has generally been left with the responsibility for sustainable water management.

This research recognises a value chain as the physical chain of processes that sources inputs, transforms them into marketable goods and distributes them through to final consumers. The potential for the entire irrigation value chain to share in the responsibility to respond to water reform provides a background for the key research question of: how can value chain management principles assist Australian irrigated agriculture producers secure access to irrigation water? Literature regarding the water reform process, value chain management principles, value chain responses to environmental pressure, and corporate social responsibility is considered in order to investigate the potential for all members of irrigated value chains to not only ensure, but also share responsibility for, sustainable water management. This thesis considers that problem by addressing an identified gap between the water reform and value chain management literature.

The research design, based on a constructivist paradigm, involved participant observation in a single case study, which was supported and triangulated by in-depth semi-structured interviews with a range of water reform and irrigation industry opinion leaders. The analysis found that: (i) value chain management principles promote sustainable irrigation management practices; (ii) whilst value chain management promote sustainable irrigation management practices, they are not sufficient to secure sustainable irrigation management practices; and (iii) despite limitations, value chain management is the most likely business management strategy to secure sustainable irrigation management practices.
This study’s contribution has been to address the gap between water reform and value chain management literature and provides conclusions as to how value chain management principles can assist fuller engagement in the water reform debate. This informs possible future research in the area of sustainable management of all natural resources, and formation of appropriate industry and government policy.
Declaration by author

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

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No publications.

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No publications included.

Contributions by others to the thesis
No contributions by others.

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None.
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Thanks are also due to the management and staff of the Matilda companies used as the case study in this research, and I particularly express my sincere appreciation to the Jauncey family for their assistance. Their willingness to engage with me in this research, and to provide significant access to their organisation and supply chains throughout the highs and lows of their business experience, was extraordinary.

Finally I would like to thank my friends and colleagues for supporting me in this quest, and to my wife Anita and our wonderful children – please know that it has been your understanding, support and encouragement that has sustained me in completing this thesis.
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water reform, horticulture, relationship

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<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>ACF</td>
<td>Australian Conservation Foundation</td>
</tr>
<tr>
<td>AFFA</td>
<td>Agriculture, Forestry, Fisheries Australia</td>
</tr>
<tr>
<td>AFGC</td>
<td>Australian Food and Grocery Council</td>
</tr>
<tr>
<td>AICD</td>
<td>Australian Institute of Company Directors</td>
</tr>
<tr>
<td>ARLP</td>
<td>Australian Rural Leadership Program</td>
</tr>
<tr>
<td>AVIDG</td>
<td>Australian Vegetable Industry Development Group</td>
</tr>
<tr>
<td>BOM</td>
<td>Bureau of Meteorology</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CRBIA</td>
<td>Condamine River Basin Irrigators Association</td>
</tr>
<tr>
<td>CRC</td>
<td>Commonwealth Research Centre</td>
</tr>
<tr>
<td>COAG</td>
<td>Council of Australian Governments</td>
</tr>
<tr>
<td>CRCIF</td>
<td>Commonwealth Research Centre for Irrigation Futures</td>
</tr>
<tr>
<td>CSR</td>
<td>Corporate social responsibility</td>
</tr>
<tr>
<td>C2S</td>
<td>City to Soil</td>
</tr>
<tr>
<td>DDV2000</td>
<td>Darling Downs Vision 2000</td>
</tr>
<tr>
<td>DEH</td>
<td>Department of Environment and Heritage</td>
</tr>
<tr>
<td>DPMC</td>
<td>Department of Prime Minister and Cabinet</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental management system</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>ESD</td>
<td>Ecologically sustainable development</td>
</tr>
<tr>
<td>EUREPGAP</td>
<td>European Retail Parties Standards for Good Agricultural Practices</td>
</tr>
<tr>
<td>HACCP</td>
<td>Hazard and critical control path</td>
</tr>
<tr>
<td>HBR</td>
<td>Harvard Business Review</td>
</tr>
<tr>
<td>IAA</td>
<td>Irrigation Association of Australia</td>
</tr>
<tr>
<td>IAMP</td>
<td>Innovation Agricultural Marketing Program</td>
</tr>
<tr>
<td>IEA</td>
<td>Institution of Engineers Australia</td>
</tr>
<tr>
<td>IFIQ</td>
<td>International Food Institute of Queensland</td>
</tr>
<tr>
<td>MDB</td>
<td>Murray Darling Basin</td>
</tr>
<tr>
<td>MDBC</td>
<td>Murray Darling Basin Commission</td>
</tr>
<tr>
<td>MF</td>
<td>Matilda Farms</td>
</tr>
<tr>
<td>MFF</td>
<td>Matilda Fresh Foods</td>
</tr>
<tr>
<td>NCP</td>
<td>National competition policy</td>
</tr>
<tr>
<td>NGIA</td>
<td>Nursery and Garden Industry of Australia</td>
</tr>
</tbody>
</table>
NSESD  National strategy for ecologically sustainable development
NWC  National Water Commission
NWI  National Water Initiative
PMA  Produce Marketing Association
QDPI  Queensland Department of Primary Industries
R&D  Research and development
RIRDC  Rural industries research and development corporation
RPC  Returnable plastic crate
SAI  Sustainable agriculture initiative
SCM  Supply chain management
SECROC  South East Queensland Regional Organisation of Councils
SME  Small to medium enterprise
TBL  Triple bottom line
TCC  Toowoomba City Council
UK  United Kingdom
US  United States
VCM  Value chain management
VIEN  Vegetable Industry Exporters Network
WAMP  Water allocation management plan
WELS  Water Efficiency Labeling and Standards Scheme
WMC  Wildlife management conservatories
WSAA  Water Services Association of Australia
WUE  Water use efficiency
1 Introduction

1.1 Background
In recent decades there has emerged a significant focus in Australian society on water supply and management needs for all users in the community. Led by governments at all levels, this focus on sustainable water use throughout the nation is commonly referred to as the ‘water reform process’. Australian irrigated agriculture, as an industry sector, is a significant player in the national water reform process. As the largest user of water resources in Australia (National Water Commission, 2010), and as an industry that provides benefits to all Australians, the irrigation industry’s involvement in, and responses to, water reform are of national significance.

“All Australians benefit from irrigation, both directly through the supply of quality fresh fruit and vegetables, grains and fibre; and economically from the irrigated production that is a significant contributor to national wealth generation” (Meyer et al, 2005, p 3).

As indicated in Table 1.1, the water reform process is a key challenge facing Australian irrigated agriculture, especially given that the sector consumes 67% of the nation’s water resources, provides 28% of the nation’s agricultural produce and 51% of total agricultural profit.

Table 1.1 Irrigation across Australia

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total irrigated area</td>
<td>2,506,000ha</td>
</tr>
<tr>
<td>Proportion of Australian agricultural area</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Proportion of world irrigated area</td>
<td>1%</td>
</tr>
<tr>
<td>Water diverted for irrigation</td>
<td>16,660 GL</td>
</tr>
<tr>
<td>Proportion of total water (potable, industrial, agricultural and amenity) used</td>
<td>67%</td>
</tr>
<tr>
<td>Irrigated farm gate revenue</td>
<td>$9.6 billion</td>
</tr>
<tr>
<td>Proportion of total agricultural production</td>
<td>28%</td>
</tr>
<tr>
<td>Irrigated farm profit as a proportion of total agricultural profit</td>
<td>51%</td>
</tr>
</tbody>
</table>

(Meyer et al 2005, from BAS, 2004)
Although an evolving debate since settlement\(^1\), national water reform in Australia has gained significant momentum since the mid-1990s (McKay, 2005) under the influence of the Council of Australian Governments, and through to the establishment of the National Water Commission (NWC) in 2004. A key principle promulgated by the NWC is that market forces should be allowed to determine the most efficient use of water wherein ‘water flows to its highest value use’\(^2\).

Throughout this process there has been, and continues to be, a developing focus on sustainable management of the nation’s water resources in the interests of the economic, social and environmental wellbeing of the country for present and future generations.

Literature relating to the Australian water reform process indicates that the challenge of balancing these economic, social and environmental factors is fundamental to environmentally sustainable management processes (see section 2.4.1). The response of irrigators to this challenge is therefore recognised as one that inevitably involves compromises such that access to irrigation water cannot so much be maximised in order to pursue economic benefits in isolation, but rather secured in the face of other social and environmental imperatives.

From an agriculture perspective, one of the themes of national water reform is that of broader community involvement in the process beyond the individual in the irrigation industry. Armed with increasingly available information regarding the need for sustainable management of water resources, and encouraged by water reform stakeholders to become involved in the debate, the Australian community has come to demand the appropriate allocation of the nation’s limited water resources among all uses (potable drinking water, amenity needs such as parks, industrial and agricultural) together with continuing improvements in water use efficiency (Corish and Garrett, 2003; McKay, 2005). As a result community members have become environmental advocates in their own right.

This thesis considers the water reform theme from the perspective of the irrigator and the entire chain of firms in which they participate – that is to say “the chain of firms that takes inputs, converts them into product or services, distributes and retails them to consumers” (AFFA, 2003, p2). The concepts of supply or value chains are further defined in section 2.3.2 of this thesis. It is proposed that the basis of an effective response to water reform demands should be developed through the entire chain as this chain not only represents elements of the immediate community that

\(^1\) The evolution of the water debate in Australia reflects development phases in water reform since Colonial times as outlined in section 2.2.1.

\(^2\) The concept of ‘water flowing to its highest value use’, and the associated mechanism of water trading, are key principles of the National Water Commission as outlined in section 2.2.1.
an irrigator operates within, but also includes ultimate consumers of products sourced from irrigated agriculture. As members of the broader community these consumers carry out their environmental advocacy partly through their purchase decisions. The rationale for a value chain management approach (see section 2.3.2) to the research problem considered in this thesis is in part based on the increasing and broadening community involvement in the water reform process.

In this thesis, the value chain management principles of collaboration and the sharing of investment and benefits so as to improve a value chain’s long term competitiveness in meeting consumer needs and expectations, are considered. As outlined above, community expectations regarding the environmental effectiveness of water reform are placing increased pressure on the competitiveness of Australian irrigated agribusiness value chains in particular. Based on a consideration of sustainable environmental management examples in value chains both in Australia and internationally (refer section 2.4) it is proposed that whilst there is increasing government and industry association encouragement of sustainable environmental management practices in Australian agribusiness value chains, there is a lack of such leadership and initiative from within the chains themselves.

Literature on value chain management and corporate social responsibility is considered in order to investigate reasons why those members of value chains closest to the increasingly influential final consumer should consider not only ensuring but also sharing responsibility for sustainable environmental management in the irrigation value chains of Australian agribusiness.

Based on this literature review a research methodology is developed that adopts a value chain management approach to the supply and sustainable management of water in Australian irrigated agriculture. Before moving on to consider the relevant literature and present the proposed methodology for this research, the next section outlines the key research problem being addressed.

This research is supported by the Commonwealth Research Centre for Irrigation Futures (CRCIF) through its ‘Policy and Planning for Change Program’ wherein it is proposed that: “sustainable futures for irrigation communities rely on effective policy frameworks and cohesive, proactive community responses to future challenges. In this context, sustainability requires integration of social, economic and environmental responses” (CRCIF, 2006, p. 1).
1.1.1 Limitations

The Australian irrigation industry is dynamic given the global market pressures, together with environmental pressures, including water reform, which it must contend with. The value chain management approach taken in this thesis is by its very nature focused on strategic management of on-going change, rather than the development of a static policy or planning platform. Accordingly, the results of this research must be interpreted in relation to the progress of the water reform process, which will continue to evolve both during, and after, this research project.

The Australian water reform process and the case study considered in this research involve value chains that extend nationally and internationally. Whilst the research methodology includes a series of in-depth interviews across various irrigated agribusiness value chains, time and logistical constraints have resulted in the selection of a case study that was based in southeast Queensland and northern New South Wales. This case study is based around the ‘Mary’ and ‘Condamine-Balonne’ river systems in Southern Queensland, and the ‘Commissioners Waters’ water source in northeast New South Wales. Reference to national key opinion leaders during the research was also undertaken to assist in ensuring its relevance and reliability in relation to other agribusiness industries and irrigation regions throughout the nation.

Irrigated agribusiness value chains in Australia exist in both the food and fibre industries. One of the characteristics of irrigated fibre value chains in Australia, which are largely in the cotton industry, is that almost 100% of ginned cotton is exported for further processing into yarn and hence woven or knitted fabrics. Given the complexity of considering the myriad of fibre value chains that extend across numerous countries, this thesis considers domestic food value chains in more detail, in particular through the horticulture case study used.

The thesis is focused on the individual irrigation business within the food value chain in which they operate. As outlined in section 1.2 most irrigators are unable to engage directly with policy makers in relation to the water reform debate, and most at the same time do not liaise directly with end consumers in their business dealings. This thesis therefore addresses the agribusiness management strategies that irrigators employ (see section 2.3) and hence is concerned with other value chain members with whom the irrigator interacts directly in achieving their business and, in the context of this thesis, sustainable irrigation water management objectives. In doing so the thesis considers the position of the irrigator and their ability and capacity to engage in value chain relationships to manage water access challenges for their business. The activities of other value chain members with which most irrigators do not interact directly (e.g. government and consumers), whilst
acknowledged (see Figure 1.1), are therefore outside the scope of this thesis, other than a reference to areas for further research outlined in section 5.5.

### 1.1.2 Definitions

The following definitions apply in this thesis.

1. **Australian agribusiness.**
   
   As outlined in section 2.3.1 Australian agribusiness refers to firms and groups of firms engaged in the full range of agricultural input supply activities, agricultural production, and the downstream handling, storage, processing and retailing of agricultural produce.

2. **Irrigation industries.**
   
   Irrigation industries refer to agricultural production that uses water resources managed under either a regulated or unregulated irrigation system for the purposes of producing food and fibre.

3. **Water reform.**
   
   Water reform refers to the ongoing process in Australia regarding appropriate allocation and use of the nation’s water resources, as outlined in section 1.1.

4. **Triple bottom line.**
   
   Triple bottom line (TBL) refers to a basis of assessing the sustainability of an activity in terms of its economic, environmental and social impacts.

5. **Environment.**
   
   In most instances in this thesis environment refers to the natural environment including land and water resources, although some authors referenced use the term in its broader context of the prevailing surrounding conditions within which an issue or subject is being considered.

6. **Optimisation (vs. maximisation).**
   
   Throughout this thesis the concept of optimising access to irrigation water (rather than maximising it) is used to reflect the balance or trade-off between economic, social and environmental imperatives.

### 1.2 Research problem

One of the key features of the water reform debate in Australia that can be drawn from the above background is the increased pressure on irrigators to justify their access to water supplies. This pressure largely emanates from community expectations for increased environmental flows across water catchment areas, either as captured in rivers and streams or absorbed into the land via overland flows. The expectation is that such increased natural water flows are secured through the reduction of regulated and unregulated diversions for irrigation or other community purposes, as
well as improved water use efficiency. McKay (2005) outlines increasing government and community involvement in the water reform debate which reveals differing expectations from various stakeholders and certain imperfections in the market for water. In the absence of such imperfections the market could allocate water between competing uses including agriculture, urban and industrial (Sunding (2000). With the evolution of water reform in Australia (see section 2.2.1) and growing community knowledge about the imperfections of the market for water, the market cannot be relied upon to manage allocation appropriately in its own right. During the last decade as drought conditions have begun to significantly impact on most of the larger cities in Australia, community attention has also been drawn to the relative share of water resources consumed by irrigators compared not only with environmental needs, but also with those of urban and industrial users.

In response to this pressure a range of agricultural industries, government agencies, and most notably the CRC for Irrigation Futures, have begun to embrace the call for sustainable irrigation use of the nation’s water resources. The challenge for irrigators, who continue to grapple with international competition in global markets for their produce, is to balance environmental and efficiency pressures with their own need to maximise the performance of their irrigation based businesses. Irrigators can address these challenges through either direct initiatives in their own businesses and the value chains within which they operate, or by participating fully in the water reform debate by engaging with policy makers and government representatives. For most irrigators such policy involvement is neither practical nor affordable given the day to day demands and pressures of managing complicated irrigation businesses.

If direct involvement in policy development is impractical for most irrigators the question becomes what strategies are available to them. In a Californian context, Sunding (2000) suggests that the operation of a water markets has to be a key feature of allocation of irrigation and other water uses in California. He contends that ‘trading makes a high level of environmental quality compatible with a high level of economic productivity’ (Sunding, 2000, p. 4) and that ‘...farmers select irrigation methods and cropping patterns to maximise profit given water price and availability, and a host of other relevant economic factors’ (Sunding, 2000, p. 9). However in also suggesting that water use efficiency can be influenced by the potential for economic returns, Sunding (2000) indicates that recognised value of irrigation water is a key consideration in water markets, which in turn implies that irrigators still need to engage with others in the community to argue the value of irrigation water.
From the perspective of an irrigator and in terms of a potential value proposition, a focus on sustainable water management and water use efficiency, would ensure the maximum return on available water resources at the same time as reducing exposure to water scarcity situations such as drought or external allocation decisions, and hence strengthen the irrigation lobby for access to water.

Consistent with increased community involvement in the water reform debate, environmental and economic pressures on irrigators are being applied through public discussion and the mass media, as well as directly through consumer preferences and purchase decisions within value chains. This thesis is focused on how such pressures are best managed by individual irrigation operations in the interests of their own businesses, the irrigation industry as a whole and the broader community. Therefore the research problem considered in this study is:

“What role can value chain management principles play in assisting Australian irrigated agriculture producers to secure access to irrigation water and maintain sustainable irrigation management practices?”

In water access arguments, often based solely on economic multiplier and social impact assessments, the irrigation industry is finding it difficult to compete (in terms of maintaining and/or increasing access to water supplies) with other users including those of environmental, industrial and potable water (Pratt Water, 2004). This has particularly become the case since the advent of the so called ‘National Maturity Stage’ of Australian water reform (McKay, 2005; see section 2.2.1) wherein community expectations for sustainable water supply to non-irrigation uses is couched in a water reform culture of conservation to reduce waste and land degradation. Whilst attempts are regularly made to place irrigation needs in context with these other needs that are more obvious to the bulk of the Australian population, there has been little attempt to communicate the benefits for irrigation value chains and the linkage this represents between irrigators and consumers.

The research problem will be considered in this thesis from the perspective of the potential for collaboration in the value chain to “market” the value of irrigation to both members of the irrigated agribusiness value chain as well as to the broader community, in order to assist in securing irrigation water access in the competitive market for water. The fields of marketing, relationship management and sociology contribute to some of the key theoretical underpinnings of value chain management in terms of coordination, co-operation and collaboration (see section 2.3.4). Gifford et al (1988) stress the importance in agribusiness of cooperating rather than competing with other chain members in order to be ultimately competitive with other chains. In the case of irrigated
agribusiness value chains this thesis considers that collaboration needs to focus on sustainable water use and the promotion of that objective to the wider community.

1.3 Research questions
With the above research problem in mind, the following research questions are addressed in this thesis. These questions, whilst presented in a hierarchical order below, are nevertheless interdependent.

7. A key issue in this research is to determine how significant sustainable irrigation management practices are to managers throughout irrigation value chains in comparison to the other challenges they must deal with as managers. The relevant research question therefore is:

   Research Question 1:

   How do sustainable irrigation practices compare against other strategic management issues facing managers of irrigation firms within Australian food value chains?

8. It is important to consider how irrigators may be influenced in terms of their production practices by others in the value chain. In terms of the communication and feedback processes that occur in irrigated agricultural value chains, responsiveness to environmental pressures, among other strategic management issues, are carried through the value chain itself. It is expected that this could occur from any other chain members, especially between those who are in regular direct contact with each other (e.g. in the case of horticulture between the grower and the processor packer).

   Research Question 2:

   Can members other than the irrigator-producer in Australian food value chains influence sustainable irrigation water use practices, and if so, how?

9. Consistent with value chain management theory, the benefits and costs involved in value creation that improves the competitiveness of the whole chain (Gifford et al, 1988) should be shared equitably throughout the chain (Susskind, 2005). The success or otherwise of irrigated agriculture managers in terms of securing access to water supplies has significant impacts on the performance and competitiveness of the entire value chain. In terms of sharing the responsibility for addressing and responding to these challenges, and according to theory, value chain management principles could assist the chain as a whole to respond positively to these pressures at the same time as maintaining the chain’s competitiveness. If a positive or
appropriate response to environmental pressure is in the best interests of the competitiveness of
the entire chain, the investment required for that response could be shared by chain members.

*Research Question 3:*
*Does the presence of value chain management (VCM) principles ensure that responsibility
for sustainable irrigation water management can be shared throughout the food value
chain, and if so, how?*

### 1.4 Research Objectives

By considering the above questions, the objectives of this research are to:

1. *Determine how relevant VCM principles are to managers of irrigation enterprises in
   Australian irrigated agriculture value chains, in terms of their need to manage both their
   access to water and their sustainable water use.*

2. *Determine the significance of VCM principles to managers of irrigation enterprises in
   Australian irrigated agriculture value chains, in relation to other management strategies
   employed in their enterprises and the contemporary business management challenges they
   face.*

3. *Consider how VCM can best be implemented as a business strategy in Australian irrigated
   agriculture value chains in order to secure sustainable irrigation management practices.*

### 1.5 Research Justification

The literature reviewed for this thesis explores how value chains can influence environmental
sustainability, and how various value chains have responded to such pressures. Whilst there are
some examples and case studies in the literature of value chain management approaches to
environmental sustainability, there is little reference to water; and encouragement for the adoption
of such approaches has largely been from external agencies rather than from within Australian
irrigation value chains themselves. The literature points to the benefits of increased
competitiveness and efficiency, the achievement of environmental outcomes, and improvement of
corporate performance and reputations if sustainable environmental management practices are
embedded in the value chain.

Water reform literature reviewed for this thesis points to an increasing involvement of the broader
community in the water reform debate and mounting expectation that the priority of water needs
other than irrigation, especially the environment, should be addressed. This thesis considers whether or not the difficulty that Australian agribusiness irrigation supply chains have experienced in maintaining access to water supplies in recent years is based on a lack of shared focus on long term irrigation water sustainability throughout the value chain. These issues are addressed by considering the principles of value chain management and the characteristics of value chains most likely to succeed and prosper under mounting community concerns regarding their utilisation of natural resources.

This research was supported by the CRCIF as a project that could provide valuable information regarding the role that value chain management principles may play in influencing sustainable water use in Australia. Evidence gathered through the case study (see Chapter 4) provided the basis for conclusions presented in Chapter 5 related to value chain management principles and sustainable irrigation management practices. Those conclusions have addressed gap in the literature (see section 4.4.4) that lie at the intersection of the Australian water reform process, and value chain management.

### 1.6 Structure of this research

The structure of this research project outlined in this thesis is as follows:

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The issues considered, and how they come together in scoping out the research problem, are represented in Figures 1.1 and 1.2. It should be noted that whilst this thesis largely considers environmental pressures on irrigation value chains, it is recognised that the success of an individual
value chain member, and the entire value chain, is dependent on responses to both environmental and economic pressures.

Figure 1.1 The impact of water reform on and within the irrigation value chain

Figure 1.1 represents the pressure to improve environmental performance that has been placed on Australian agribusiness irrigation value chains through the water reform process. It is proposed, as evidenced in the literature reviewed in section 2.2, that water reform exerts pressure for environmental performance on all members of the value chain. The following points are relevant in this regard.

- Agribusiness value chains must operate in the context of a range of pressures – both market and environment based.
- The Australian water reform process exerts significant pressure, to varying degrees, on all sectors of the Australian community including domestic, urban, industrial and agricultural consumers of water.
- Agribusiness irrigation value chains have to deal with environmental pressure and this has been traditionally faced by the actual water user – the irrigator producing raw food and fibre products.
- Consumers have an increasing awareness of irrigation water use and are becoming increasingly influential in environmental decision-making in the chain.
- It is proposed, based on the water reform literature reviewed in section 2.2, that the consumer responds to environmental pressure in three different ways:
  - through their own personal water use practices;
by demanding products that are based on water use efficiency principles throughout the value chain that supplies them; and

by being an environmental advocate in the community.

- It is further proposed that members of the value chain supplying consumers, including input suppliers, irrigated agriculture producers, transport and handling service providers, processors and retailers, are expected to be efficient users of water. Those closer to the consumer (for example, processors and retailers) are able to respond to these pressures by promoting responsible sourcing procedures to the consumer.

In terms of this thesis a key issue is what influences can best motivate the irrigator to respond in a manner that is seen positively by other members of their value chain in line with expectations of the broader community. Increasing community involvement in the water reform process, as outlined in section 2.2, suggests that the success of each part of the chain in responding to the applied environmental pressure is based on the quality of their feedback as judged by the consumer and those other elements of the community advocating environmental responsibility. Figure 1.2 focuses on the success or otherwise of this feedback from the irrigator and the value chain of which they are a member.

Figure 1.2 Irrigator responses to water reform pressure
Figure 1.2 is based on the following:

(i) Water reform pressure, as indicated in Figure 1.1, is applied to the irrigator directly (by adjacent members of the value chain) as well as indirectly (e.g. by consumer demand and expectation signals) through the value chain. This involves community expectations regarding water use efficiency and supply for other uses.

(ii) Demands on the irrigation value chain include both the supply of products for consumers and appropriate management of environmental impacts of the chain’s activities.

(iii) The response to these pressures for environmental performance (and supply performance) is ultimately judged positively or negatively by the consumer and other advocates for environmental responsibility in the community. It is proposed that negative or no feedback will lead to a loss of access to irrigation water supplies and the resulting inability, or reduced ability, to produce could jeopardise the irrigator’s position in that value chain. Positive feedback could help to achieve optimal access to irrigation water.

Using Figure 1.2 as a reference for the literature review component of this document, water reform pressure is addressed in section 2.2, the irrigation value chain is addressed in section 2.3, and responses to environmental pressure are addressed in sections 2.4 and 2.5.

Figure 1.2 is also reviewed in Chapter 5 as a basis for considering the research problem, questions and objectives outlined in sections 1.2, 1.3 and 1.4.
2 Literature review and context

2.1 Introduction
Chapter 1 of this thesis introduced the issue of the position of the Australian irrigation industry in the midst of the national water reform process that has been focused on sustainable water use and critique of appropriate allocations to various water uses in the community. Given the broad range of community opinions on these issues, and the fact that irrigators, in getting their food or fibre products to market, manage their operations amidst a chain of other firms, the research problem to be addressed in this thesis is presented in Chapter 1 as: ‘what role can value chain management principles play in assisting Australian irrigated agriculture producers to secure access to irrigation water and maintain sustainable irrigation management practices?’

This Chapter reviews literature relevant to the issues raised in the research problem together with the research questions outlined in Chapter 1. Key themes from the literature are therefore reviewed in relation to the research questions at the end of this Chapter (see section 2.6).

This literature review commences with a background to the water reform process in Australia from early settlement through to the establishment of the National Water Initiative in 2004.

Secondly, the review considers concepts and issues in Value Chain Management (VCM) to establish a management based theoretical framework, highlighting the relevance of VCM principles to Australian irrigation value chains.

Thirdly, the concepts of environmental sustainability are addressed with reference to how such issues are being considered in a range of value chains.

Finally, downstream (and closer to the ultimate consumer) members of value chains not directly linked to resource consumption are considered in terms of what responsibility they hold, if any, for irrigation sustainability issues further back up the supply chain.

Issues associated with the water reform process, relevant VCM theory, the pursuit of environmental sustainability, and issues for downstream value chain members are drawn together so as to provide a theoretical framework for this thesis.
2.2 The Australian water reform process – the meeting of irrigation and other needs in the community

2.2.1 Background – from the “magic pudding” to a national water management initiative

According to the Australian Government’s Bureau of Meteorology (BOM), Australia is the driest inhabited continent on earth\(^3\). As emphasised in the words of renowned Australian poet Dorothea Mackellar (1985), “I love a sunburnt country...of drought and flooding rains...” it has also been long recognised as a continent of extreme weather vagaries. The drought experienced in the Murray Darling Basin\(^4\) and other areas of Australia since late 2001 was reported by BOM as “very severe and without historical precedent”\(^5\). It is in that context of drought and water shortages across the country that this thesis is set.

With an initially agriculturally based economy, a growing population since settlement, and inhabiting what is often cited as the driest continent on earth, the Australian community has gradually become more engaged in discussion and debate regarding water resource management. This national discussion is commonly referred to as the water reform process (McKay 2003; COAG 2004). Through this process, the nation’s earlier focus on water, particularly irrigation water, as a driver of economic wealth and hence social stability, has given way to an increased recognition of a range of environmental and sustainability issues in water allocation and management (McKay 2003).

This progress of water reform up to the 2004 announcement of the National Water Initiative (DPMC 2004), can be traced from the early settlers and colonial governments, through the establishment of state control over irrigation that was enshrined in the Constitution, to the emergence of an increasing federal role in encouraging and driving water reform for largely environmental reasons (McKay 2005). Irons and Arthington (2001) map the reform of water management and control through what they term the phases of growth of the nation: ‘colonial gestation’, ‘birth of the nation’, ‘national development’ and ‘national maturity’. They suggest that the predominant cultures of water control that have evolved during the growth of the nation are evidence of the complexity of an adaptive society.\(^6\)

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\(^4\) The Murray Darling Basin is a 1 million km\(^2\) river basin and major agricultural production area extending through the states of Queensland, New South Wales, Victoria and South Australia.

\(^5\) The Australian Newspaper, 11 October, 2008: “Longest, hottest drought on record, says Bureau of Meteorology”.

\(^6\) The concept of an adaptive society also relates to systems theory, addressed in section 2.3.4.4, and agility and resilience addressed in section 2.3.4.5.
The concept of broader society involvement and influence in the water reform process is further explored later in this Chapter, but it is important to recognise that in the context of water management and reform history in Australia, our society has had to adapt to a different climate than that of the mainly European forebears of early settlers. In recent years further adaptation in water management has begun due to an increased awareness of environmental water needs (as opposed to water required for agricultural, urban and industrial purposes) and the impacts of climate change.

Table 2.1 provides a chronological list of developments in the Australian water reform process. This summary includes references to the increasing emergence of a national approach to water management coinciding with the growing recognition of the plight of the status of natural water resources in the face of earlier inappropriate allocation methods and decisions.

Whilst irrigation industries have largely been the focus of water reform discussions, commencing with the outdated late 1800’s ‘magic pudding approach to watering of the land’ (McKay 2005, p. 35) through to the current recognition of sustainable water allocation requirements, urban, environmental and recreational needs have come to the fore in recent decades. McKay (2005) explains that it was generally accepted by the late 1990’s and early 2000’s that over-allocation of irrigation water access in the past had placed the nation’s resources in a state of significant stress.

Australian governments, often blamed for past over-allocation of water decisions that have favoured irrigated agriculture, have responded to the developing water debate and in particular to growing community concerns regarding the status of the natural environment versus the sustainability of irrigated agriculture production systems. This response is consistent with the governmental control of water access and use (COAG, 2004) that has evolved since settlement, as outlined by McKay (2005).

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7 Climate change is defined by the United Nations (Framework Convention on Climate Change, Article 1) as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”
Table 2.1 Development phases in Australian water reform

Colonial Gestation Phase: A water control culture of release from Aboriginal systems of control and use.
- Prior to 1788 water catchments were based on tribal boundaries
- 1788: Early settler exploration
- Terra nullius ruling meant no indigenous water issues
- 1800: Colonial governments’ exploitation of water:
  - “Magic pudding” approach
  - “Rain follows the plough”
  - Water can be managed in isolation
  - Water is a free good
  - Desert will bloom with irrigation.

Birth of the Nation Phase: A water control culture of reorganisation to meet the needs of European colonists.
- 1901: Section 100 in the Constitution gave power to states over irrigation
- Reliance on technical experts for water management
- Environment ignored
- Colonial socialism – water development funded by the taxpayer.

National Development Stage: A water control culture of exploitation to support a first world economy.
- Significant development underway in the 1950’s
- By the 1970’s there began a growing recognition of salinity and other water related environmental issues

National Maturity Stage: A water control culture of conservation to reduce waste and land degradation.
- 1980: Victoria and South Australia attempt to control overland flow
- 1983: Tasmanian Dams case (wherein the High Court vested the Commonwealth with power to adhere to nature conservation treaties and to override the power of the State to build a dam) mobilised public opinion against the construction mentality
- 1991: Mabo case dispelled terra nullius on land and opened the way for freshwater claims
- 1992: Intergovernmental agreement on “Environment precautionary principle” and private sector participation in water operations in NSW
- 1994: Reforms induced by the Council of Australian Governments (COAG)
- 1994: Water reform framework brought within National Competition Policy
  - Markets for water entitlements to improve efficiency
  - Full cost recovery
  - Allocation of water for environmental and social needs
- 1998: Murray Darling “cap” to limit diversions

Adapted from Irons and Arthington (2001) and McKay (2005)

By 2004 the national water debate had led to the formation of the National Water Initiative (NWI) under an agreement signed at the 25th June 2004 meeting of the Council of Australian Governments (COAG). The National Water Commission (NWC), subsequently established as an independent statutory agency within the Department of Prime Minister and Cabinet to administer and implement the National Water Initiative, noted that:

*Australia’s highly variable and often scarce water resources are crucial for our economic, social and environmental wellbeing. We need to continue to improve the productivity and efficiency of our water use, while maintaining healthy river and groundwater systems.*
The NWI addresses the vital importance of such questions to Australia. It encompasses a wide range of water management issues and encourages the adoption of best-practice approaches to the management of water in Australia. In particular, the NWI will result in:

- expansion of permanent trade in water bringing about more profitable use of water and more cost-effective and flexible recovery of water to achieve environmental outcomes;
- more confidence for those investing in the water industry due to more secure water access entitlements, better and more compatible registry arrangements, better monitoring, reporting and accounting of water use, and improved public access to information;
- more sophisticated, transparent and comprehensive water planning that deals with key issues such as the major interception of water, the interaction between surface and groundwater systems, and the provision of water to meet specific environmental outcomes;
- a commitment to addressing over-allocated systems as quickly as possible, in consultation with affected stakeholders, addressing significant adjustment issues where appropriate; and
- better and more efficient management of water in urban environments, for example through the increased use of recycled water and storm water. (DPMC, 2005, p 1).

The NWI has been successful in gaining strong support from across the Australian community. The COAG objectives outlined above (including water trading as an efficient allocation method; facilitation of water investment and improved access to scheme information; comprehensive water planning; and addressing over-allocated systems and more efficient urban water use) are well noted elsewhere in the literature by water commentators as appropriate approaches to sustainable water use planning (Counsell 2003; Barton Group 2005). The Institution of Engineers Australia, whose members are often involved in specific water management planning and infrastructure development, similarly supports the water reform agenda. They specifically emphasise the importance of local community involvement in water and environmental management (IEA, 2003).

It can be seen from the above brief review that the Australian water reform process has progressed to the stage of a coordinated national approach, with government, industry and community engagement and support. The following section outlines in more detail the various parties involved in the reform debate and the way in which broad community engagement has been sought. It is relevant to this thesis to consider community engagement with particular reference to the irrigation industry.
2.2.2 Stakeholders in the water reform debate
As further explored in section 2.2.3 the national water debate, particularly through the establishment of the National Water Commission, has attempted to address the need for increased recognition of environmental needs in water allocation and management discussions. In doing so, the engagement of the wider community beyond just the direct water users themselves and those charged with administering and policing irrigation water delivery schemes, has been actively sought (EPA 1997; Corish and Garrett 2003).

In reflecting on the history of the water reform process, as outlined in section 2.2.1, the gradually increasing involvement of the wider community as a key feature of the water debate should be noted. It is clear that reform has been driven by a range of environmental, economic and social factors that would indeed be of interest to the broader community, beyond just those involved directly in water management and use. McKay (2005) notes an awareness of economic and social factors in terms of the drivers of the reform process over the past 200 years (see Table 2.1), including:

(a) exogenous factors associated with the establishment of a new colony and its needs and the gradual federalisation of water matters; and latterly more endogenous factors associated with increased environmental and economic awareness;

(b) a general movement of the focus of water management considerations from a basis in the constitutional powers of the states through to increased attention being paid to national and interstate issues as a result of COAG reforms in 1994;

(c) a broadening of water management attention to embrace environmental, social and cultural issues;

(d) the linkage of water reform considerations by the Australian Government to broader economic development agendas through the National Competition Policy, and the resultant increased participation of the market and private sector in water management together with the continued evolution of institutions and institutional arrangements in the water sector.

It is apparent, therefore, that consideration of national water issues from a political and ecological perspective, as well as the traditional economic industry development perspective, has encouraged community participation in the process of mapping out future allocation and water use scenarios. Discussions regarding these scenarios, the methods of argument employed and particularly the
broadening context of water reform processes in Australia, hold particular interest for those who are focused on the engagement of total irrigation industry supply and value chains\(^8\) in the water debate.

Roberts et al. (2006) note that it is the availability of water that has influenced economic development in Australia and that this has been evidenced no more so than in agricultural production. In recommending water markets\(^9\) as an efficient basis for water allocation (for economic and environmental purposes) they stress that the implementation of such initiatives requires commitment from all governments and stakeholders. ‘This commitment will be critical to achieving an efficient allocation of water in Australia and obtaining the subsequent economic and environmental benefits’ (Roberts et al, 2006, p. 67).

McKay (2005) notes that as governance issues in water management and supply corporations have become important given the reform process, the considerations of stakeholders of such corporations (including customers, shareholders and the public) have similarly increased in significance. This is partly due to the growth in privatisation amongst such entities, and the fact that water rights debates have begun to involve non-irrigator members of irrigation value chains. Therefore it is not just irrigators themselves who are actively lobbying for the interests of one use or user over another. Wolfenden et al. (2001) and Reeve et al. (2003) provide examples of cotton farmers, industry organisations and community groups in New South Wales and Queensland jointly engaged in irrigation water access lobbying processes. Similarly the National Farmers Federation and Australian Bankers Association (both representative bodies for key components of irrigation value chains) have led debates on compensation where competing rural production and environmental interests have come head to head (McKay 2005).

Based on the above review of the increasing involvement of legislators, irrigators, community groups, environmentalists and industry associations in the water debate, the next section will move on to consider how, and on what basis, such diverse interests have interacted.

### 2.2.3 The language and interpretations of reform stakeholders

Much of the water access debate has involved (and to a certain extent still does involve) passionate and angry reactions to the water reform process on the part of irrigators and the communities that support them. In early 2006 for example, horticulture and cotton industry groups in Queensland

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\(^8\) The concepts of supply and value chains of firms that convert sourced inputs into goods for ultimate distribution to final consumers are further explored in section 2.3.

\(^9\) The operation of state and national water markets, wherein water market forces can ensure water is traded to its highest value use (and therefore secure efficient use), is encouraged by various water industry commentators including the NWC.
reacted strongly to proposed Queensland Government water resources charges, claimed by the Government to be in line with NWI guidelines (Growcom and Cotton Australia, 2006). A review of various rural media publications from recent years reveals numerous similar reports of angry and frustrated reactions from irrigators to proposals that are perceived to restrict or further manage water access conditions.

In an apparent recognition that the water reform process will continue despite irrigator expressions of anger, irrigation industry stakeholders have recognised the need to play a constructive role in access debates. For example, Growcom has claimed that it will “continue to work with the government in a bid to reach practical and sustainable water pricing arrangements” (Growcom, 2006 page 3). Other efforts to coordinate irrigator responses to water reform in Northern New South Wales have also noted a growing sense amongst irrigators of the need to avoid conflict and the need to balance competing interests (Wolfenden, 2003).

A significant issue therefore relates to way in which communities, interest groups and regulators can constructively debate competing uses for limited water supplies and the common voice or common language they can adopt. In relation to the research to be conducted for this thesis (see Chapter 3), Fontana and Frey (2000, p. 654) outline that it is important to understand both ‘culture’ and ‘language’ in the study context. In terms of the water reform debate, whilst the National Farmers Federation and Australian Conservation Foundation (two groups whose constituents have often clashed in the developing water reform debate) were successful in publishing a joint statement on ‘Principles for a Long Term Australian Water Policy Framework and Action Plan’ (Corish and Garrett, 2003), there are few references to such collaboration at the ‘grass-roots’ level. This is due to not only the competing arguments themselves, but also the different measures and interpretations of available data on water management issues. For example, the continuing debate in the community of Toowoomba in South East Queensland regarding the pros and cons of recycling effluent for potable use, prompted the formation of an independent review group on the basis that “…as the debate on the future of water bogs down in unverified information, misinformation and fear induced scare mongering……it is now essential that the public and community leaders have access to balanced, credible information on which to make decisions” (Harland, press release 15th March 2006).

In another example, Queensland State Government viability investigations into a proposed South East Queensland Recycled Water Project in 2003 included a consultancy brief that did not require consideration of economic multipliers on the basis that “the Queensland Treasury Economic
Evaluation Guidelines state – ‘multipliers, which measure the secondary or indirect benefit of a project on the economy, should not be included as benefits in an economic analysis’” (Psi-Delta, 2003 p 17). Nevertheless, apparently indicating that they disagree with this directive, the commissioned consultants did provide economic multiplier analysis “for completion and to demonstrate that there are potential impacts of the scheme across Australia” (Psi-Delta, 2003 p 17).

These discussions, and the examples given, are evidence of the different measures and interpretations of information used by parties involved in water access and allocation debates. The literature refers to a myriad of assessment tools used in debates regarding water allocation and management. These can be broadly grouped into:

- the more traditional economic approaches to water investment analysis (whether that involves new water infrastructure such as dams and pipelines, or changed water allocation scenarios), such as economic multiplier effects, and transaction and opportunity cost analysis; and
- the more recent consideration of sustainability measures involving traditional water engineering disciplines together with social and ecological schools of thought.

Wolfenden et al. (2001) suggest that sustainability measures provide a more appropriate basis for considering the costs and impacts of water allocation and management issues over and above that of the traditional economic analysis approach. Such sustainability measures, often referred to as ‘triple bottom line’, include social and cultural arguments put forward by all sides of such debates at a national, state and especially regional level.

Whether used to support dogged, uncompromising arguments, or in more conciliatory, cooperative approaches, the measures and interpretations outlined in the paragraphs above have to be ultimately considered and analysed by government. Consistent with the responsibility vested in government for water management decisions, it is state and federal water policy and treasury officials who are largely responsible for such analysis and subsequent advice to political decision makers.

To complete a review of the language used by stakeholders in the reform process, recognition should be made of the less measurable and usually less objective analyses and arguments that are brought to the fore in political lobbying. Such political processes are outside of the scope of this review, but their existence is acknowledged nonetheless.

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10 Relevant literature regarding the concept of sustainability is further explored in section 2.4
11 As outlined in section 1.1, triple bottom line assessments consider the social, economic and environmental aspects of a proposed initiative.
Faced with the complexity of analysing the competing arguments of those engaged in water access debates, and in the midst of debate regarding appropriate measures of the impacts of water initiatives, the NWC, as an independent statutory agency advising the Federal government, has clearly recognised the need to ensure a baseline of uniform water data. This is consistent not only with the NWI objectives themselves (DPMC, 2005) but also the objectives outlined by other interested parties (Barton Group, 2005; Productivity Commission, 2005). Specifically, the NWC Chairman Ken Matthews is quoted as suggesting that:

“Providing a national framework for measuring, monitoring and reporting water use is fundamental to improving public confidence in water availability and management….this is one of the pillars of the National Water Initiative” (MDBC e-letter, 2005).

The water reform debate has therefore involved increasing reference to social and environmental impacts and measures, together with traditional economic analyses. Debate does continue however, and the search for independent water accounting information, together with management impact assessments, carries on.

2.2.4 Reform progress and where to from here

Based on the above review of the background of water reform in Australia and the role of irrigation industry stakeholders in the process; the broader community involvement in the debate; and the measures and languages being used in the debate, it is instructive for the purposes of this thesis to also consider recent commentary on the progress of this reform.

Whilst the literature notes that much has been achieved in the water reform process, including an ambitious program for the coming decades, criticisms of progress have included a lack of common benchmark data and measurements; different stages of progress between state legislations; lack of skill in both reform process and water management innovations; attachment to old schemes, and presumably technologies (e.g. dam building vs. water recycling); and a general state of reform fatigue (McKay & Hurlimann, 2003). In many ways it is clear that the objectives of the NWI (see section 2.2.1) have been designed to address such concerns.

In a statement supportive of the NWI and its objectives, the Productivity Commission’s review of National Competition Policy (NCP)\textsuperscript{12} reforms in early 2005, stressed the importance of Governments pressing on with the water reform agenda, with particular reference to:

- integrating rural and urban water reforms including water trading;

\textsuperscript{12} The water reform framework was placed under National Competition Policy in 1994.
addressing the scarcity value of water and managing environmental externalities;
ensuring urban waste and water recycling proposals are cost-effective and environmentally sustainable; and
ensuring that monitoring arrangements post-NCP reforms do progress water reforms. (Productivity Commission, 2005).

The Productivity Commission report goes on to note the broad community support for the Australian water reform agenda, and in particular notes the views of the Australian Conservation Foundation (ACF) including:

“Effective management of Australia’s water resources is critical to the health of our ecosystems. Australia has not managed its water resources well. The problems are clearly illustrated in the Murray-Darling Basin … but these concerns are not isolated to the Murray. The damage to the environment caused by over-use and poor management is replicated in river systems across Australia” (Productivity Commission, 2005, p 201).

Whilst the attention increasingly paid to the environment in the reform agenda is supported broadly by the Australian community, including irrigation communities (Wolfenden, 2003), the allocation debate does continue. Many challenges remain in securing an appropriate share of the resource for all users, including the environment. During a February 2006 tour of Australian irrigation regions, Malcolm Turnbull, at that time the newly appointed Parliamentary Secretary to the Prime Minster with responsibilities for water policy, was quoted as calling upon those championing the cause of the environment to prove such allocation needs alongside other users such as irrigators. He said that there “needs to be a full and even handed accountability for both consumptive and environmental water users. Both should be accountable as consumptive flows” (Turnbull, 2006, p.1).

2.2.5 Conclusion
Recurrent themes in Australian water reform literature and commentary include:

• an increase in broader community involvement in the debate;
• various arguments and interpretations about impact measures;
• the broadening of measures to include environmental and social as well as economic issues;
• a continuing pursuit of independent and robust water accounting information; and
• the pressure on all water users, including the environment, to justify their share or allocation of the limited water resource.
Whilst such developments are constructive and contribute to the debate, much of the challenge remains with the direct users of water resources in agriculture to implement and take responsibility for practical water reform initiatives. Dunne (1999) recognises that agriculture is driven by a range of factors including the increased involvement of people in general in influencing agricultural production and resource management decisions. In the case of Australian irrigation value chains it is clear that people in the community at large have become increasingly involved in the water reform processes with resultant efficient production and environmental sensitivity demands and pressures being placed on irrigators themselves.

There is little reference, however, to the broader community actually sharing responsibility for such initiatives. Value chain management literature (see section 2.3) addresses the concept of chain members sharing the costs and benefits of value creation that is in the interests of the competitiveness of the entire chain (Gifford et al, 1988; Susskind, 2005). In terms of irrigated agricultural value chains this implies that the cost and responsibility associated with ensuring sustainable irrigation management practices should be shared throughout the chain. It is apparent however that this is not the case within Australian irrigated agribusiness value chains and that the onus for water reform progress is placed on irrigators amidst the other competitive pressures they must manage in the interests of the long-term profitability of their enterprises.

The next section considers the concepts of the value chain and value chain management as a basis for considering the nature and operation of irrigation value chains as well as the way in which such chains can participate in the water reform debate. If the sustainability of an irrigator’s enterprise is dependent on their ability to maintain access to irrigation water supplies, the value chain of which that irrigator is a member must similarly be concerned with water supply access and the water reform agenda.

The concept of broader responsibility for water reform through irrigation industry value chains is further explored in section 2.4.5.
2.3 Value chain management as an agribusiness strategy

2.3.1 Background
As a study of Australian irrigation value chains, this thesis is clearly set in an agribusiness context. Agribusiness as a concept was originally defined as the processes involved in the full range of agricultural supply and inputs, the production of agricultural commodities and the storage, processing and distribution of that produce to final consumers (Davis & Goldberg, 1957). As further defined in the next section of this thesis, this series of processes between firms collectively focused on meeting a consumer need is referred to as a value chain. The management of such a series of processes, from a system or chain perspective, is referred to as value chain management (AFFA, 2003, p2). The value chain management concept has received a great deal of attention in the agribusiness management literature over the last 15 years.

The global pressures on agriculture and agribusiness, the changes this sector must continue to deal with, and the technology, coordination and competitiveness drivers leading to value chain management approaches in agribusiness, are well reviewed by a range of writers including Sonka (1990), King and Sonka (1988), Streeter, Sonka and Hudson (1991), and Dunne (2001). It is clear that agribusiness provides a rich context for value chain management research given the complex, dynamic and competitive nature of food and fibre chains and the need for appropriate management strategies.

With this agribusiness context in mind, the next section introduces the definition and concept of value chain management adopted in this thesis.

2.3.2 Definitions of supply chain and value chain management
This thesis describes the recent history of value chain management in order to provide a point of reference for issues later identified as elements of successful value chain management. The following attempt to identify a clear definition of value chain management is not only necessary for this thesis, but also is an effective way of explaining the features of value chain management.

The value chain management literature has arisen from an initial focus on the pursuit of logistical efficiency in industry (typically manufacturing), including efforts in relation to quality management and the concepts of customer-supplier relationships, through operational management approaches to supply chain efficiency, to a more recent recognition of the concept of systems-based supply chain management (SCM) and value chain management (VCM).
Much of the literature refers to the terms ‘supply chain’ and ‘value chain’; and ‘supply chain management’ and ‘value chain management’ interchangeably. The following section draws from this literature, referring to both supply chains and value chains, before concluding that “value chain” is the term best suited for the purposes of this thesis. Nevertheless, both definitions are included for the purposes of a comprehensive review.

A useful starting point is to consider definitions used within agribusiness in Australia, beginning with the concept of a supply chain and the strategy of supply chain management. According to the Department of Agriculture, Forestry, and Fisheries Australia (AFFA):

*The chain of firms that takes inputs, converts them into product or services, distributes and retails them to consumers is called a supply chain (AFFA, 2003, p2).*

AFFA goes further in explaining that supply chain management ‘is a business strategy that sees the whole chain as the competitive unit, not the individual firms within that chain’ (AFFA, 2003, p2).

Dunne (2001) considers a range of definitions and makes the point that the objective of value creation should be included in any such definition. Dunne refers in particular to Lambert and Cooper’s (2000, p.66) definition as an appropriate one:

*Supply chain management is the integration of key business processes from end user through original suppliers that provides products, services and information that add value for customers and other stakeholders.*

Similarly Walters and Lancaster (2000, p. 178) suggest that

*Supply Chain Management is the management of the interface relationships among key stakeholders and enterprise functions that occur in the maximisation of value creation.*

From the literature it is clear that academics, management practitioners and consultants have encountered some difficulty in reaching a common language in relation to the various approaches to effective supply chain and or value chain management. In reference to SCM literature, Wisner (2003) for example suggests it can be grouped into (i) supplier management activities and strategy, (ii) customer relationship activities and strategy, and (iii) system-wide supply chain management strategy. Wisner goes on to state, by quoting Mabert and Venkataramanan (1998), that the term supply chain management is not used consistently within the literature, and in many cases the reader is left to decide how best to classify a particular piece of research (Wisner 2003, p3).
In the midst of this uncertainty, it is ironic that much of the debate which had its beginnings in Porter’s (1980, 1985) work on competitive strategy and value chain analysis, further discussed in section 2.3.4.2, appears to have considered the various business and logistics management themes mentioned above, before an apparent return to the concept of the value chain. Porter’s (1985) value chain principles largely focused on competitive strategy elements within the firm rather than how a chain, including a number of different firms or organisations, could be managed in the interests of the competitiveness of the chain as a whole (AFFA, 2003). Porter’s (1985) extension of the firm value chain concept to what he defines as the ‘value system’, where he takes account of the fact that an individual firm’s value chain is inevitably ‘embedded’ in a larger stream of activities, does lead to the concept of value chain management (Kippenberger, 1997b). It should be noted that Porter’s reference to supplier, channel and buyer value chains (and his argument that managers need to understand their own firm’s value chain as well as these other value chains in their industry – i.e. the industry’s overall value system) remains focused on the perspective of the individual firm.

Based on this discussion this thesis adopts a value creation perspective – hence the term value chain is adopted. Walters and Lancaster (2000, p. 178) suggest that:

*The value proposition becomes the means by which the customer understands the value offer (typically made explicit as a series of product/service attributes) and by which the value chain enterprise components formulate, evaluate and decide on their value-adding contributions.*

As will be further explored in the next section, the focus is also on the whole chain, not just an individual firm. Value chain is therefore adopted as the term to describe the chain itself (recognising that other writers continue to use the term supply chain) and value chain management refers to the management of the chain as a whole (again recognising other writers continue to use the term supply chain management).

### 2.3.3 Perspectives on the value chain management concept

The evolution of the value chain concept can be traced through the literature to connections with operations management, marketing and systems thinking.

The various ways in which the value chain concept has been adapted, other than from Porter’s (1985) work, is suggested as including (Kippenberger, 1997a):

- the quality movement inspired by Edwards Deming;
- ‘business process re-engineering’;
‘activity-based costing’ in the accounting field;
‘supply chain management’, based on Porter’s concept of the value system comprising all individual value chains which it is suggested remained underdeveloped in his 1985 book;
the concepts of outsourcing, partnership sourcing and strategic alliances as part of supply chain management;
internal business process measures; and
the ‘benefit chain’ concept used in the development of marketing strategy.

Dunne (2001) provides a similarly broad commentary on the theoretical background of value chain management as being multidisciplinary, making particular mention of economics, strategic management and marketing. These concepts are further explored in section 2.3.4.

Wisner (2003, pp. 2-3) also provides a useful summary of various concepts embodied in supply chain management. He explains that:

*Increasing global competition, the demands of customers for higher product quality, greater product selection, and better customer service, the desire of firms to shrink their supply bases while striving to contain costs, and the rising costs of natural resources today have led many organisations to adopt cooperative, mutually beneficial partnership strategies with suppliers, distributors, retailers, and other firms within their supply chains to maintain or improve profitability and overall firm performance. The strategic management literature has discussed the relationship between these activities and firm performance.*

Like others (Kippenberger, 1997a; Dunne, 2001), Wisner (2003) suggests that supply chain management is addressed using many different terms including integrated logistics, JIT13 purchasing and logistics, quick response, and supply chain synchronisation among others. His contention however that value chain management is yet another term for supply chain management that has confused the discussion, appears to ignore the broader perspective of value creation that a value chain focus embodies, and appears to be yet another example of the confusion in the value chain management relevant literature (particularly when he refers to Porter’s value chain work whilst appearing to maintain a logistics based operations perspective). Nevertheless, Wisner’s (2003) references to natural resources as components of the supply chain and the relationship between chain activities and individual firm performance are of particular interest in this thesis.14

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13 “Just in time” system of purchasing to meet immediate production requirements and avoid holding excessive stock
14 Wisner (2003) and others (Porter and van der Linde, 1995; Jones, 2002) have referred to natural resources and the environment in discussions regarding value chains. This relationship is a key consideration in this thesis and is further explored in section 2.4
Whilst at the outset the literature and the terminology used therein relating to supply chain and value chain management may appear confusing, it does highlight the rich and complex background of the various disciplines, schools of thought and practices that have been drawn upon to develop the concept of VCM. Walters and Lancaster (2000, pp. 177-178) provide an explanation which incorporates the concept of value recognition and delivery:

*Value Chain Management is a coordinating management process in which all of the activities (and their suppliers) involved in delivering customer value satisfaction are maximised and the objectives of the stakeholders involved (the suppliers of activities, processes, facilitating services, etc.) are optimised such that no preferable solution may be found.*

*Successful value chain management requires an identification of customer value criteria and an understanding of the key success factors which are necessary for creating both competitive advantage and resultant success.*

As value chain management forms part of the theoretical foundation of this thesis, and given the confusion observed in the literature, the following terms are reiterated:

(a) the value chain is the physical chain and processes that source inputs, transform them into marketable goods and distribute them through to final consumers; and

(b) value chain management is the management of the chain as a whole so as to optimise the benefits for all chain participants, but with a particular focus on value as perceived by the end consumer.

Before exploring the theoretical underpinnings of value chain management further it is interesting to note that Kippenberger (1997a) summarised emerging criticism of the strategic value chain. Whilst acknowledging Porter’s fear that so many management tools have been developed in recent years, including those based on his value chain concepts, that many managers have lost sight of the fundamentals of strategy, the author suggests that criticisms such as those listed below are all part of the development of the value chain concept:

- the neatly compartmentalised functions of the value chain model cannot accommodate the push to create horizontal cross-functional processes;
- the one-step-at-time view of value creation is too simplistic and does not recognise the multiple ways that value is added or created nowadays;
- poor applicability of the value chain concept to service industries; and
the value chain model is too static a description of insular firms when, in today’s environment, boundaries between companies and organisations are increasingly being broken down.

Such criticisms of the value chain concept may be fair if an individual firm focus is maintained, but the literature has moved on to embrace the chain as a whole. Dunne (2001) provides a useful commentary on the concept of value creation and the important economic and competitiveness considerations that it involves within the firm. He emphasises that the linkage between these largely internal firm considerations and the external considerations of relationship marketing provides the basis for value chain management.

To complete a review of value chain management literature, it is necessary to consider the theoretical background of value chain management and some of its main schools of thought.

2.3.4 Theoretical underpinnings of value chain management

As noted in the previous section, a range of academic disciplines have contributed to the development of the concept of value chain management, from traditional engineering and operations management approaches, through to strategic management perspectives that couple consideration of the firm with that of the entire value chain. As outlined, management literature contains a wide commentary on what can be described as the various precedents and components of successful value chain management. The following discussion identifies these elements in terms of their disciplinary origins. Dunne (2001) suggests that the main contributing disciplines are economics, competitive strategy and marketing.

(a) Economics

Porter’s (1980, 1985) theories of competitive strategy and competitive advantage were largely based on a single firm model where the value chain as he described it was focused on value creation within the firm itself. As has been outlined in section 2.3.3, other writers have extended this concept to incorporate the value chain made up of firms interacting to create and share value.

Given that Porter’s work emanated from traditional economic considerations of firm performance and strategy, and that his later work on the ‘Competitive Advantage of Nations’ (Porter 1990) extends the discussion of competitiveness from firms and industries to nations and their economic performance in global markets, Porter is recognised as a leader in developing the contribution from traditional economics to the concept of value chain management. Other writers have also used economic models of competition in order to understand value chains and their management.
The economic theory of transaction costs (Coase, 1937) suggests that a firm will carry out functions within its own organisation provided the cost of those internal transactions is less than seeking such services from the open market. Based on the seminal work of Coase (1937), other authors (Williamson, 1971; O’Keeffe, 1994; Heilbron and Roberts, 1995; Hobbs, 1996) have proposed, the study of transaction costs and the resulting pursuit of efficiency balance between activities within the firm and external market transactions, has provided important background to the concept of value chain management. Firstly, in considering the cost of an internal transaction in comparison to that of an alternative market transaction, a firm is attempting to ensure its own efficiency. This is in the best interests of the efficiency of the firm and the value chain of which it is a part. Secondly, when a firm undertakes external market transactions, the value chain management concepts of relationships with other firms and cooperation and coordination throughout the value chain, come into play (Dunne, 2001).

(b) Business strategy and the value chain

Porter’s contribution to value chain management literature through his analysis of a firm’s value chain and the management strategies that can be employed to develop its competitiveness, has been reviewed above.

Kippenberger (1997a) provides a brief overview, not only of Porter’s introduction of the value chain concept in 1985, but also of what is claimed to be first use of the word ‘strategy’ in a business context. The author suggests that Newman (1951) began a focus by management researchers, ‘in sharp contrast to economic models of perfect competition’, on the notion that firms in the same business and using the same technology often performed differently. It became apparent ‘that firms in the same industry adopted different approaches to products, distribution and organisational structures’ … and ‘these differences, within similar market environments, came to be known as ‘strategies’ (Kippenberger, 1997a, p.6).

In referring to Normann and Ramirez (1993), Walters and Lancaster (2000) explain that strategy is the value-creating system in which members work together to create value. Whilst describing strategy as the art of creating value they go on to suggest ‘the value chain as both the analytical and facilitating concept in which value strategy is:

...primarily the art of positioning a company in the right place on the value chain - the right business, the right products and market segments, the right value-adding activities (Walters and Lancaster, 2000, p. 161).
It follows that the key strategic task therefore is the on-going reconfiguration and optimisation of value chain roles and relationships in order to ‘mobilise the creation of value in new forms and by new players’, with the underlying goal being to ‘create an ever improving fit between competencies and customers’ (Walters and Lancaster, 2000, p. 161).

It is clear that value chain management is an on-going challenge in which changes within the industry, the market and the value chain itself require constant monitoring and management\textsuperscript{15}. The complexity in dealing with such change is evidenced by the challenges and strategic options continually discussed in management literature, such as those presented in the Harvard Business Review’s annual survey, HBR List of Breakthrough Ideas for 2005 (HBR 2005):

- the strive to close the gap between an organisation’s performance and its potential;
- the concept of a ‘velcro organisation’ versus traditional matrix structures where relationships can be rearranged quickly, easily and effectively;
- the need to focus on demand side innovation in terms of orchestrating customer interactions and relationships rather than a dependence on searching for innovation in products, services and business efficiency on the supply side; and
- the treatment of intellectual property rights protection as a strategic issue, particularly in China, when considering manufacturing relationships, business structure and the ultimate control of information.

These “Breakthrough Ideas”, whilst largely related to the strategic management of individual organisations, also indicate the types of contemporary challenges and opportunities faced in value chain management. The need for firms, and the chains within which they operate, to be responsive to such challenges, and the concept of change management, is further addressed in section 2.3.4 (e). For chains to operate cooperatively to address challenges in the interests of the chain as a whole, it can be expected that relationships between the members should be strong. This expectation is considered in the next section.

Before considering the relationships that exist between firms in a chain, and in order to further understand the strategies that can be employed by individual firms, it is useful to consider some of the strategic management disciplines employed in value chain management, such as operations and logistics, information systems management and quality management (Dunne, 2001).

\textsuperscript{15} As discussed in section 2.3.4 (d), ‘systems theory’ assists in the understanding of the complex and dynamic environments in which value chains operate.
(i) Operations Management and Logistics

Any review of value chain management must include an understanding of the efficient management of logistics. Logistics is that part of the supply chain’s process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point-of-origin to the point-of-consumption in order to meet customers’ requirements (Lambert et al. 1998).

Continued advancements in efficient operational and logistics management provide more and more tools and concepts to optimise both firm and value chain performance. Such approaches include distribution management, vendor managed inventory and lean manufacturing techniques. Cox (1999) reviews these developments (from the perspective of power in relationships) including ‘lean thinking’ and its characteristics of just-in-time production, waste elimination, value-adding focus, long term supplier network relationships, and demand driven logistics. He concludes that whilst lean thinking is a dominant part of literature on supply chains, its contribution is from an operational perspective only rather than that of overall business strategy. Whilst the efficiency benefits of such thinking, provided they are shared\(^{16}\), may be of advantage to the entire chain, it is more relevant to the business strategy of an individual firm rather than the overall chain.

Sheffi (2005) discusses logistical and operational tools for encouraging what he calls ‘demand-responsive supply chains’ – evidence that logistics management literature is keeping pace with other supply chain management disciplines in terms of responding to contemporary management challenges. He provides a framework for companies to ‘mitigate the risks inherent in forecasting – by building supply chains that assume demand will change and that have in-built capabilities to quickly respond to those changes’ (Sheffi, 2005, p.1). His framework includes range forecasting, risk pooling and sharing, test batching and, in a similar vein to concepts used throughout value chain management, collaboration with trading partners.

In more traditional operations management literature, the concept of outsourcing, usually driven by a financial or economic interest in pursuing lowest cost manufacture, is often quoted as a supply chain management strategy. The danger here is the loss of a focus on the whole supply chain. A strategy of low cost manufacture in isolation does not necessarily

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\(^{16}\) The concept of sharing benefits in the chain is discussed in section 2.3.4 (c).
benefit the supply chain in terms of partnering such initiatives so that they are advantageous to all members of the supply chain and most importantly the whole supply chain itself. In dealing with a case study of outsourced manufacturing in China (an often-suggested approach to cost reduction), Cohen (2005) outlines a strategy based on single firm cost advantages through outsourcing in the face of a contract manufacturing option. Whilst making financial sense for that firm, there appear to be no identifiable benefits for the supply chain in this case study. This provides a classic example of the contribution that one discipline can make to business management strategy, but in isolation, and in the absence of other management disciplines, it makes little contribution to the development of more effective value chain management strategies.

(ii) Information Systems Management
Developments in information technology and information systems continue to improve value chain management. In terms of the communication, relationships, co-innovation, trust and commitment sought between members of effective value chains (AFFA, 2002), the efficient and timely management and analysis of vast amounts of complex data can provide the information necessary to underpin more effective chain partnerships.

Often a tool to assist logistics management, information management systems provide other supply chain benefits in terms of sharing transparent information between supply chain members. Wisner (2003, p. 5) observes that:

‘where improving customer service once meant increasing warehouse inventories along the supply chain, today, integrated logistics systems seek to manage inventories through close relationships with suppliers of transportation, distribution, and delivery services. A goal is to replace inventory with frequent communication and sophisticated information systems to provide visibility and coordination...’.

Such information flows between chain members are essential for the maintenance of chain relationships. Walters and Lancaster (2000, p. 178) comment that:

*Two functions manage the value chain: information management and relationship management. It is these that determine the effective organisational structure of the value chain and its efficient operations management.*

Cox (1999, p. 168) suggests that it is particularly relevant to focus on logistics and operational aspects of supply chain management due to the fact that we are ‘*in the midst of a*
major technological revolution associated with information processing and the Internet’…which ‘is offering opportunities to fundamentally transform existing supply chains through the erosion of dis-intermediation and the speeding up of the information linkage between ultimate consumers and all stages of the supply chain’.

(iii) Quality Management – consumer demand, efficiency, continuous improvement, traceability, food safety
As outlined above, logistics management has seen the development of a broad range of efficiency improvement tools and concepts which have largely focused on engineering or physical interventions in traditional manufacturing and associated logistics functions. These developments continue with the aid of computer-based abilities to plan and monitor ever more complex logistical functions.

In recent years attempts to improve logistical and operational efficiency have been complimented by quality management initiatives wherein a soft systems approach\(^\text{17}\) to supply chain management efficiency and effectiveness through regular measurement and a commitment to continued improvement is applied. Whilst these quality management initiatives, including the concept of Total Quality Management, have focused on consistency in quality of product and service offerings, increased consumer demands and legislative requirements have encouraged further development in the areas of food security and safety, as well as identity preservation and traceability along the chain.

In reviewing quality management literature, a correlation can be noted between value chain management strategy and the view of quality management from a systems perspective\(^\text{18}\). For example, Cusins (1994, p. 23) suggests that ‘organisations may be thought of as complex systems, with varying degrees of process flexibility and varying feedback loops’. This approach of considering an organisation as a system, and then understanding its component processes and feedback loops so as to assist the implementation of continuous improvement in quality management, is akin to the value chain approach to organisational and chain improvements pursued in order to provide value as measured by consumers (Walters and Lancaster, 2001). Karapetrovic and Willborn (1998) take this approach further by applying a systems view to quality terminology. Whilst their objective is to ‘deconfuse’ quality management terminology (by way of a supply-chain-like graphical model

\(^{17}\) Systems theory is discussed in section 2.3.4 (d).

\(^{18}\) Systems theory is discussed in section 2.3.4 (d).
incorporating required outputs, system design, allocation, deployment, system implementation and actual output) for management practitioners charged with the responsibility of implementing quality, it again provides a systems view of organisational performance that is akin to that of the value chain management approach.

As well as the general economic pressures that have led to the development of value chain management strategies, such as globalisation and consumer demand, there are references in the literature to specific dependencies in modern agriculture on various quality management driven technologies and management systems including intensive production systems, irrigation and genetically modified organisms. Opara (2003) suggests that whilst such technologies and systems are employed in modern agriculture to assist in meeting consumer demand, at the same time they provide extra challenges in terms of consumer demands for product origin information.

With reference to food safety and quality management programs such as HACCP\(^\text{19}\), Opara (2003, p. 102) cites the importance of establishing traceability in supply chains. He outlines the six important elements of food supply chain traceability systems as: (i) product traceability; (ii) process traceability; (iii) genetic traceability; (iv) inputs traceability; (v) disease and pest traceability; and (vi) measurement traceability. Opara (2003) suggests that traceability within supply chains has become a focus of those promoting product qualities. While reference is also made to consumer interest in sustainable production practices and the environmental impacts of the goods they purchase and consume, there appears to be a dominant focus on product quality, food safety and animal welfare aspects. Such an approach to quality management and assurance, and the recognition of the system as a whole, provides a chain-based view of processes and products.

The employment of system wide, or value chain wide management strategy approaches to improved competitiveness (such as the operations, logistics, information and quality management techniques outlined above) can provide the basis of coordination both within the firm and between firms in the same value chain.

\(^{19}\) A HACCP (Hazard and Critical Control Point) program is a food safety and quality management tool.
(c) Relationships

Having considered the contributions from economics and competitive strategy to value chain management, this section examines the contributions of the fields of marketing, relationship management and sociology in the context of co-ordination and co-operation among chain members.

Dunne (2001, p2) states that:

’in a strategic sense, the adoption of SCM requires managers of firms servicing a consumer market segment to re-evaluate their business relationships with input suppliers and buyers of their products. This re-evaluation usually involves a shift in their focus from an adversarial to a co-operative relationship. As a result, the competitive focus shifts from that between firms within one supply chain to that between different supply chains which service a common market segment’.

Dunne’s description echoes that of Gifford et al (1988, p.1.), which apply specifically to agribusiness:

... ‘against the background of rapid changes in the world food and fibre markets and the enormous implications these developments have for Australian agribusiness and support industries’... ‘the key message is that it is smarter to cooperate rather than compete with other supply chain members, with the aim of becoming competitive against other chains’.

As discussed in section 2.3.3, this focus on the need for co-operative relationships between firms throughout the chain (in the interests of chain competitiveness) is also reflected in the criticism of Porter’s concentration on the individual firm and the resource based view that he and others (such as Wernerfeldt, 1984) take of the firm in strategic management (Dunne, 2001; Grant 1996).

Literature relating to marketing channels, relationships and alliances further explains the need for co-ordination and co-operation in value chains.

(i) Marketing Channels

Lambert et al (1998) note that while early authors writing about marketing channels identified key features not unlike those of supply chains, their focus on elements of power and conflict within the marketing channel ignored suppliers at the beginning of the chain (i.e. supply to the manufacturer) and concentrated on marketing activities only at the expense of the other key business processes and disciplines required for effective chain management. Whilst acknowledging this limited focus in marketing channels literature,
these authors do however suggest that the marketing channel management process of identifying all members of the channel, and what processes are required to manage the channel effectively, is not something that is often replicated in the supply chain literature.

From their review of logistics and particularly marketing channel literature Lambert et al (1998, p. 4) develop the following statement:

*The objective of SCM is to maximise competitiveness and profitability for the company as well as the whole supply chain network including the end customer. Consequently, supply chain process integration and redesign initiatives should be aimed at boosting total process efficiency and effectiveness across members of the supply chain.*

(ii) Relationship Marketing

Morgan and Hunt (1994, p. 22) contribute to the discussion of successful value chain management in their analysis of commitment and trust in ‘establishing, developing, and maintaining successful relational exchanges’. They suggest that successful relationship marketing requires relationship commitment and trust – elements recognised by other authors (Wilson, 1995; Cann, 1998) as necessary for successful value chain management. Wilson (1995) suggested that relationships in business markets are becoming increasingly important. He proposed four stages of relationship development: partner selection, defining purpose, setting relationship value, and relationship maintenance. Cann (1998) goes as far as developing a specific ‘relationship-building process’ for business-to-business interactions. In doing so it is suggested that whilst it is recognised that a long term relationship between a firm and the customer is in the best interests of the selling firm, this is not always the case due in part to the fact that some firms simply don’t know how to build relationships.

Relationship marketing research and theory, such as that of Morgan and Hunt (1994), Wilson (1995) and Cann (1998), is not only of assistance to the study of value chain management from a chain culture and communication point of view, but also in terms of the functional aspects of day-to-day relationship management within the chain. Often such relationships begin at the sales level in an organisation and similar departments of the firms with which it interacts. These ‘through-firms’ sales relationships obviously incorporate sourcing and supply departments of various firms but are built on a need for a firm’s sales
representatives to understand and communicate the broad details of the firm’s sourced inputs, internal processes and value added for the immediate customer (Cann, 1998).

The sales example shows that relationships across the chain are typically built up at different levels – from the coalface of sales to sales communication and relationship building between firms through to formalisation of relations at the CEO-to-CEO or board-to-board level. Cann (1998) proposes that once this level of relationship is reached and successfully maintained in the interests of both parties, this relationship marketing and management strategy has become not one of an individual firm in isolation, but rather one of the whole value chain itself.

(iii) Power
Much has been written about the way in which power is exerted within supply chains over the control and use of resources and key inputs. Cox (1999) relates this issue to the strategic planning of a company wishing to position itself in a supply chain. He argues, through a review of management strategy literature, that companies must decide how they will control and manage the supply chain itself and the way in which they will individually relate to other chain members. He further suggests that companies should ideally own those supply chain resources that are difficult for others to duplicate and ‘must only outsource those supply chain resources that are highly contested and which have low barriers to market entry’ (Cox, 1999, p. 170). Cox’s suggestion of how the firm should strategically position itself within the chain reflects elements of competitive strategy developed by Porter (1985) and the transaction cost theory discussed in section 2.3.4.1.

Cox’s (1999, p. 173) frank observation is that ‘only by understanding the power struggle over value appropriation between buyers and suppliers around particular supply chain resources, as well as the horizontal contestation between direct competitors, is it possible to understand the real strategic and operational environment within which companies and entrepreneurs have to operate’. Whilst this appears to be a hard-nosed position supporting the power exerted by one chain member over another, and therefore not necessarily in the best interests of the chain as a whole, Cox does note that the competitive position of each chain member should be protected by them (i.e. maintaining their position power) and that for this ‘to occur there must be an innovatively benign power structure operating within the supply chain’ (Cox, 1999, p. 173).
These observations therefore suggest that the development of a power structure within the chain is a feature of value chain management and influences the way in which chain relationships develop.

(iv) Alliances
Lambert et al (1998) state that competent integration of a firm’s relationships within the networks in which it operates is necessary for it to effectively compete. They suggest that such relationships require an identification of critical or primary value chain members (autonomous members that perform activities with the intent of providing a specific output for another member of the chain) and collaboration so as to ensure superior performance. Communication and negotiation with potential value chain partners regarding collaboration and integration is therefore an important consideration, as is ongoing feedback to and from that partner.

In relation to negotiation, Susskind (2005) refers to the delicacy required when negotiating commercial terms with valued partners in a supply chain. He proposes a number of negotiating tactics that can help achieve commercial objectives (e.g. lowest cost) at the same time as maintaining and enhancing the alliance. These include:

- pay close attention to your partner’s unique needs;
- focus more on creating value;
- emphasise the relationship’s long-term importance;
- give strategic partners the benefit of the doubt; and
- avoid surprising partners you care about.

Susskind (2005) also includes a statement regarding successful value creation in a chain and the way it which it should be shared between chain participants (allies):

*The challenge for strategic allies is to move effortlessly to the outer frontier of value creation and only then fall back on value distribution, with an emphasis on fairness and trust.* (Susskind, 2005, p. 11).

Susskind (2005) emphasises the delicacy required in establishing and maintaining alliances. This emphasis, together with the need to sustain relationships in the interests of the whole chain (Gifford et al. 1988), provides a basis for the comparison of relationship concepts reviewed in the literature.
This is summarised in Table 2.2 below using Wilson’s (1995) model of relationship development as a reference.

**Table 2.2 Relationship development summary: comparison of relationship concepts with Wilson’s (1995) relationship development model of buyer-seller relationships**

|---------------------------------------------|------------------------------------------------------------------------------------------|
| Stages 1 & 2: Partner selection & defining purpose | • Determining congruence between vendor’s culture and strategy (Cann, 1998).  
• Commitment and trust (Morgan and Hunt, 1994).  
• Negotiation tactics for establishing and maintaining commercial terms with valued partners in the chain (Susskind, 2005). |
| Stage 2: Setting relationship value | • Activating a service-oriented culture and bonding socially (Cann, 1998).  
• Commitment and trust (Morgan and Hunt, 1994).  
• Collaboration, communication, negotiation, integration with (Lambert et al, 1998).  
• Negotiation tactics for establishing and maintaining commercial terms with valued partners in the chain (Susskind, 2005).  
• Fairness and trust (Susskind, 2005).  
• Innovatively benign power structure (Cox, 1999). |
| Stage 3: Relationship maintenance | • Adding value to the relationship (Cann, 1998).  
• Commitment and trust (Morgan and Hunt, 1994).  
• Negotiation tactics for establishing and maintaining commercial terms with valued partners in the chain (Susskind, 2005). |

Having considered the economic, competitive strategy and relationship underpinnings of value chain management, we can now draw this discussion together with a focus on the value chain as a whole and further consider how systems theory can assist in understanding the complex, dynamic nature of value chain management.

(d) **Value chain management: drawing the theory together with a systems perspective**

In studying the various precedents and components of value chain management it is clear that whilst various perspectives have evolved from a range of different management disciplines, it is the
concepts of integration, coordination and cooperation, and their management, that draw the value chain management system together. It is clear that in a successful value chain, member firms are encouraged and rewarded to be competitive so that the firm drives the chain’s competitiveness and the chain drives the firm’s competitiveness. Value chain management, and the integration of the various disciplines it draws on, is therefore ultimately focused on the competitiveness of the chain (chain versus chain) rather than the individual firm (firm versus firm) (AFFA, 2002).

Power (2005) refers to supply chain integration as being based on co-operation, collaboration, information sharing, trust, partnerships, shared technology, and a focus on managing integrated chains of processes rather than individual processes in isolation. Clearly the management of such elements is complex and challenging, particularly within agribusiness value chains that must deal with change relating to globalisation, technological advances, and the increased influence of community members and other stakeholders (Dunne, 2001). Systems theory provides assistance in understanding this complexity and the need for chain responsiveness to rapidly changing circumstances.

In quoting Rechtin and Maier (1997), Harrington et al (1999, p 54) define a system as ‘a set of different elements so connected or related as to perform a unique function not performable by the elements alone’. McNamara (2005, p. 1) suggests that ‘very simply, a system is a collection of parts (or subsystems) integrated to accomplish an overall goal (a system of people is an organisation). Systems have input, processes, outputs and outcomes, with on-going feedback among these various parts. If one part of the system is removed, the nature of the system has changed’.

However Prussia (2005, p. 2) argues that supply chains cannot be viewed as systems ‘because all of the links do not have a single owner that has the authority to make changes or allocate resources’. Even vertically integrated supply chains he suggests are not a system ‘because they do not include retailers, restaurants, and consumers under common ownership’ Prussia (2005, p.2). It would appear though that Prussia has adopted a hard versus soft systems approach as defined by Kirk (1995).
Kirk (1995, p. 14) explains that hard systems represent a ‘model which has precise objectives which can be expressed in quantitative terms... and used to predict the response of the system to changes in the environment’. Soft systems on the other hand allow for the involvement of human activity and, as outlined by Kirk (1995), are characterised by:

- no agreement about the precise objectives of the system;
- qualitative rather than quantitative objectives;
- no single solution, but a range of equally valid alternative solutions; and
- a need for involvement of all those affected by the system.

From a chain management perspective Wisner (2003) provides an informative review of the complexity of external and internal issues for a firm engaged in a value chain – from consumer demand and service management challenges to cost management, natural resource access issues and the myriad of relationships with suppliers and other chain partners. In line with Kirk’s (1995) observations about soft systems and the consideration of human activity, Midgley (2000, p. 113) defines soft systems methodology as ‘a process that facilitates collective learning by stakeholders so that collective interventions can be undertaken’. Jackson (2003) similarly sees soft systems methodology as an approach that accommodates human activity in a system.

Given these observations, and the inherent complexity of the agribusiness irrigation chains considered in this thesis, it can be concluded that a value chain may be seen as a soft system. From a strategic management point of view, the question becomes: how can chains as systems remain dynamic and responsive to change?

**(e) Change management**

‘People change their customs, habits, and institutions when they become dissatisfied with the status quo or when there is a more desirable substitute’ (Chung and Megginson 1981, p. 487). The process and management of change are regularly noted as key issues in organisational management and value chain management literature. Bedeian and Glueck (1983) note that movement in both external forces (such as community values, government regulation and policy, customer behaviour, suppliers and competitors) and internal forces (organisational objectives and policies, employee behaviour and product offerings) can influence an organisation to consider appropriate responses. Such responses can include adaptation, avoidance or control (Chung and Megginson 1981) although few organisations are in a position to ignore the need to adapt to change resulting from movements in the environment in which they operate.
Kotter (1996) observes that the pressure to change will continue in future decades. He explains that methods used to improve competitiveness in the face of change, including total quality management, reengineering, right sizing, restructuring, cultural change and corporate turnarounds, are all useful in this regard but will ultimately fail without the key ingredients of leadership and coordination. Chung and Megginson’s (1981) model for planned organisational change similarly depends on the role of coordination and management to ensure involvement and cooperation in the process. In terms of value chain management, the concepts of entrepreneurship, learning chains and agility provide further perspectives in understanding change management.

(i) Entrepreneurship

Entrepreneurship and the role of the entrepreneur are widely recognised in value chain management in the context of initiation and innovation. The entrepreneur can be instrumental in leading successful chain innovation and change, which in turn can lead to value creation for the chain. Kuratko and Hodgetts (1998, p.48) suggest that: ‘Entrepreneurship is a process of innovation and new-venture creation through four major dimensions – individual, organisational, environmental, process – that is aided by collaborative networks in government, education and institutions.

The consistency of the practice of entrepreneurship (and its instrumental role in change processes) with elements of effective value chain management explored earlier in this Chapter, is evidenced by Kuratko and Hogett’s references to the dimension of the organisation as well as the broader environment in which it operates, and the need for collaboration.

(ii) Learning chains

Another area of debate is that of supply chain competency or the unique capabilities that are inherent in a chain. Spekman et al (2002) tie together the issues of competency and learning in the pursuit of effective supply chain management. In arguing that learning is a core component of ensuring competency in supply chain management, and that this is impacted by partner-like behaviour, they suggest that ‘learning appears to have a positive impact on performance measures relating to end-customer satisfaction and being a more market-focused supply chain’, and has a positive impact on supply chain performance without affecting ‘supply chain performance related cost’ (Spekman et al, 2002, p. 48). It can be concluded therefore that the ability of the chain to learn about consumer satisfaction and hence improve performance is an example of a managed response to changes in the environment.

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(iii) Agility

The need for chains to be responsive to market conditions and consumer sentiment is often referred to as agility (Power, 2005). The Harvard Business Review (2005) reference to ‘velcro’ organisations (section 2.3.4.2), wherein relationships can be rearranged quickly, easily and effectively, also adds to the discussion in terms of the flexibility and responsiveness required for successful value chain management. Wolfenden extends such considerations to the concept of resilience in irrigation communities in terms of the “capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity and feedback mechanisms” (Wolfenden et al., 2006, p 118). It can be concluded therefore that the concepts of agility and resilience are relevant to value chains in responding and adapting to movements in the environments in which they operate.

This section has outlined that the management of change affecting organisations and value chains is viewed from a number of perspectives in the management literature. These include leadership and entrepreneurship; learning and competency development within in the supply chain in the interests of maintaining market responsiveness; the agility required to manage relationships in the face of dynamic markets; and the resilience necessary to absorb the impacts of change and respond to them whilst pursuing organisational objectives.

2.3.5 Conclusion

In this review of a wide range of literature relating to value chain management as an agribusiness strategy, the definition of value chain management and its theoretical underpinnings including economics, business strategy and relationships have been considered. When managed as a system, the value chain provides a basis for responsiveness and flexibility in terms of meeting consumer requirements while at the same time ensuring competitiveness of firms that make up the chain.

In the context of this thesis one of the most significant ongoing change processes that Australian irrigated agribusiness supply chains must respond to is that of the water reform agenda reviewed in section 2.2 and the sustainable environmental management expectations it places on irrigation value chains. These challenges are considered in the next section.
2.4 Sustainability, environmental issues and value chains

A review of value chain management, environmental management and agribusiness management literature suggests that there is increasing recognition of the need for environmental sustainability and custodianship throughout agribusiness value chains. Within the Australian dairy industry, for example, supermarkets are concentrating on waste management, recycling and efficient use of energy; processors are focused on environmentally friendly packaging; and milk producers are concerned with water and land use efficiency as well as animal welfare issues (Issar et al 2003).

Australian Government priorities for agricultural research and development include that of sustainable resource management. However, whilst research organisations have quite rightly reflected this in their own strategic planning processes (e.g. research priorities of R&D Corporations), and many of the same organisations include references to supply chain and value chain management programs, there is little evidence of attempts to secure the input of members of the supply chain beyond those charged with resource management.

This Chapter considers the way in which the concepts of environmental and sustainable value chain management have evolved and how they are responding to environmental pressures such as those in the agribusiness irrigation industry in Australia.

2.4.1 Environmental supply chains

Porter and van der Linde (1995) suggest that the pursuit of environmental sensitivity in value chain management could provide both environmental and corporate benefits in contrast to earlier business practices that suggested that these outcomes were usually mutually exclusive.

Pursuit of both environmental and corporate benefits are reflected in the case of Australian water markets under the water reform agenda and its range of environmental and sustainability objectives. It has been noted that significant benefits accrue from the use of irrigation water in higher value crops (McKay and Bjornlund, 2001) and that in general these markets are maturing and generating more efficient outcomes (Bjornlund, 2002).

Counsell (2003) notes that The New Zealand Resource Management Act 1991, with the stated aim of promoting the sustainable management of natural and physical resources, defines sustainable management as managing natural and physical resources to provide for current needs while:
• Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
• Safeguarding the life supporting capacity of air, water, soil, and ecosystems; and
• Avoiding,remedying or mitigating any adverse effects of activities on the environment.

Reference to sustainability and environmental requirements has therefore emerged in value chain management literature in way that places environmental needs on the same status as corporate objective.

2.4.2 Environmental management and policy background
Sustainable water use principles were discussed in section 2.2.1. It was noted in particular that market based pricing, clear allocation systems, water trading, reform that facilitated transparent water planning and information sharing and the encouragement of new investment, were widely agreed to be necessary for sustainable and efficient water management systems.

Counsell (2003) notes that the standard definition of economic efficiency as it applies to water resources has three different dimensions: allocative, technical and dynamic efficiency. Firstly, from a scarcity of supply perspective (i.e. how irrigation industries must respond to claims that their access rates are not sustainable), Counsell (2003) suggests the following economic efficiency reasoning behind allocation decisions:
• Pareto efficiency – pursuit of allocation efficiency to a point where there are no alternative allocation systems that would make anyone better off without making someone else worse off; and
• Kaldor-Hicks efficiency – wherein an allocation system is efficient if those who are made better off can compensate those who were made worst off in order to achieve a Pareto efficient outcome.

Both approaches to allocative efficiency are pursued in the interests of maximising value to the whole community. Secondly, in terms of technical efficiency the amount of water used for the outcome achieved becomes the concern with a focus on preventing wastage (Cai et al, 2001). Thirdly, dynamic efficiency refers to the efficiency of decisions in relation to their impact on future allocations and production opportunities.
These definitions of economic efficiency in terms of allocative, technical and dynamic efficiency over time, do provide a link, at least from an economics perspective (with which agribusiness industries have been historically familiar), to the concept of sustainable management.

- The linkage to allocative efficiency is based on the facts that much of the water reform debate, as outlined in section 2.2, is about (i) ensuring equitable allocation of water resources between users on the same water supply system, or between environmental and other uses; (ii) correcting inequitable allocations of the past; and (iii) the concept of compensation for those who are worse off than others.

- Technical efficiency reflects the transaction cost considerations in value chain management (Dunne, 2001). Addressing concerns about wastage of natural resources, such as irrigation water given agronomic or irrigation technology considerations, often involves seeking other locations or producers to fulfill that task.

- Dynamic efficiency, where decisions are made given emerging information about future scenarios, reflects the need for agile value chains (Power, 2005) able to respond to changing market conditions.

The Productivity Commission (2005, p. 119) notes that the original concept of ‘sustainable development’ emerged from the 1987 World Commission on Environment and Development, where it was defined as:

“... development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

The Productivity Commission (2005, p. 119) also explains that the concept of ‘ecologically sustainable development’ (ESD) was brought to the fore in Australia through the National Strategy for Ecologically Sustainable Development (NSESD), based on growing concern regarding the impacts of economic growth and development on the environment, by stating that ecologically sustainable development:

“... aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations”.

NSESD objectives and guidelines include economic development that enhances community wellbeing and welfare and protects that of future generations; provides equity between the generations; protects ecological diversity; and integrates these long and short-term economic, environmental and social considerations.
Lukacs (1999) found that there had been various discussions regarding how a vision for sustainable agriculture could apply in Australia. For example, a Queensland Department of Primary Industries (Lukacs, 1999, p.14) visioning process involving stakeholders from grain, livestock, cane, peanut, cotton, conservation and government found that conditions favouring a sustainable agricultural landscape included:

- well educated farmers/community/scientists/governments;
- profit in sustainable agriculture for producer and benefits for the consumer;
- land capability assessment and use;
- integrated pest management for all pest/crop systems;
- on and off-site degradation minimised;
- an environment that allows farmers to practice sustainable agriculture (markets, tenure and legal and social environments);
- whole-farm planning within integrated catchment management; and
- safe and healthy food.

Whilst Lukacs (1999) at the time noted that there was little discussion of the implementation of these conditions or evidence of outcomes from this particular workshop, it is apparent from the literature that similar goals have been identified by other stakeholder engagement processes (Wolfenden et al, 2001; Wolfenden, 2003). Such goals and processes have also been encouraged by various commentators from the fields of value chain management and Australian water reform (Gifford et al, 1998; Dunne, 2001; Corish and Garrett, 2003).

2.4.3 Measures and approaches that take into account sustainable management principles
As outlined in section 2.2.3 the language and interpretations of stakeholders in the Australian water reform process provide an interesting background to the concept of sustainable management in value chains.

As Wolfenden et al (2001) found in their study of social and environmental impacts of water reform in the Gwydir Valley in New South Wales, whilst numerous economic measures can assist in investigating appropriate decision making in an economic sense (for example input-output analysis, net revenue analysis, and gross margin analysis), triple bottom line assessments are more complex. They considered a net social benefit assessment that was similar in nature to Counsell’s (2003) Pareto and Kaldor-Hicks allocation efficiency considerations, and similar to the considerations
under transaction cost theory (Dunne, 2001). Wolfenden et al (2001) also conducted a simple flow on analysis based on model expenditure scenarios for irrigation operations in the area. Through all of these considerations and analyses they found that it was stakeholders who were exposed to all available information and directly involved in the analysis, who are best placed to resolve complex issues.

In later work Wolfenden (2003) noted among irrigators a desire to establish a common view with other stakeholders in the reform process regarding the value of water; an increased understanding of different water uses; and the desire to reduce conflict so as to pursue sustainability, a vibrant regional community and all that it entails.

Similarly Clift (2003) found that in terms of the techno-economic, ecological and social elements on which the principles of sustainable development are based, whilst there is a range of sound environmental and economic indicators of these dimensions that can be used, there are more problems with social impacts in terms of the social value of products and services. Such indicators, Clift suggests, are best developed through public participation.

These conclusions regarding an appropriate approach to sustainable and efficient water management issues are clearly based on common principles of information sharing, communication and collaboration – the same principles that apply to value chain management, as outlined in section 2.3.

2.4.4 Environmental value chains

In section 2.3.3 it was noted that Wisner (2003) included the rising cost of natural resources as one of the factors encouraging the formation of cooperative relationships in the firm or value chain. This section considers how both businesses and value chains can respond to environmental pressures.

(a) Corporate responses to environmental pressure

The literature regarding environmental management in value chains considers a range of individual firm and value chain member responses to environmental management, typically involving scenarios associated with logistical efficiency. For example, the environmental impacts of transport elements of dessert apple supply chains in the UK have been considered (Jones, 2002) and it is claimed that these impacts exceed those of the production and processing elements, traditionally
regarded as the largest contributors to environmental impacts (Jones, 2002). In terms of products themselves, Wells and Seitz (2005) suggest that reverse logistics, wherein a product can be recovered post consumption to re-enter the original supply chain for re-manufacturing, may be a way for firms to manage waste in a closed loop process, thereby displaying greater corporate social responsibility.

Reeve et al (2003) take a somewhat broader supply chain approach to the consideration of responses to environmental pressures. In their study of responses to water use efficiency pressures in the cotton industry, and the resulting socio-economic impacts, they consider that the part of the cotton supply chain that has the greatest impact in rural areas is that from cotton growing through to lint production. They suggest that the use of a supply chain map, together with traditional input output analysis to understand the economic linkages in the chain in any particular area, is the best way to consider such impacts. Van Hoek (1999) also takes a broader view and whilst recognising the reverse logistics literature, suggests that it is not enough to look at processes in one part of the supply chain for proper environmental considerations. Rather this should be from a whole supply chain point of view. As Wu and Dunn (1995, p.130) state:

“...to minimise the total environmental impact of a business it must be evaluated from a total system perspective. The supply chain represents this holistic system perspective and represents the focus for far-reaching greening initiatives”.

In terms of the motivations for environmental management a firm can be reactive (i.e. react to legislative requirements), proactive (pre-empt legislative requirements) or value seeking, wherein environmental management initiatives are a fully integrated component of competitive business strategy (Kopicki et al, 1993). Following Porter and van der Linde’s (1995) contention that supply chain investments in environmental consideration provide both resource saving and efficiency benefits thus providing the basis for competitive advantage, van Hoek (1999) recommends that this is where green supply chains must operate – from a value-seeking perspective, not just from a logistics or legislative requirement perspective.

The challenge to develop whole of value chain approaches to environmental management remains. For example, in terms of managing a range of environmental impacts, the Australian Food and Grocery Council provides information regarding the water consumed in the production of consumer goods marketed by some of the nation’s leading food and grocery manufacturers (AFCG, 2005). Whilst acknowledging that water resources are among the key inputs for the production and processing of food and grocery products, and maintaining a specific Supply Chain Management program within its charter of activities, the Council’s Environment Report (AFCG, 2005) considers
efforts within member firms’ processing sites to limit water usage without considering what could be achieved throughout the whole value chain. Simpson and Power (2005) suggest that environmental management can be achieved through the supply chain. They draw a correlation between environmental management and supply chain management literature in that both areas consider business needs for “faster, more flexible, more efficient and more socially responsible supply chains.” (Simpson and Power 2005 p. 60). Like Kopicki (1993) and Porter and van der Linde (1995), Simpson and Power recognise the broad range of benefits of encouraging environmental management processes in the supply chain such as the reduction of environmental impact risks, together with improved recognition of corporate social responsibility, more efficient processes, encouragement of innovation and ultimately providing the basis for improved competitiveness.

It is from the operations management perspective of lean manufacturing that Simpson and Power (2005) suggest that a suitable linkage between supply chain management and environmental management can be found. They describe lean manufacturing (p. 63) as:

- *an integrated approach to the management of a manufacturing organisation, that encompasses a wide variety of practices, including just-in-time, quality systems, work teams, cellular manufacturing and supplier management*.

Lean manufacturing is necessarily based on information sharing and it is under such conditions that a supply chain member is, as a customer, able to become involved in the environmental management decision-making processes of suppliers upstream. This is similar to the total quality management approach espoused by Hamprech et al (2005) where cooperative customer-supplier relationships are encouraged. Such relationships can go far beyond a reactive approach (Kopicki et al, 1993) in ensuring that legislative requirements are met, to one in which competitiveness benefits may be realised. Simpson and Power (2005, p. 61) suggest that:

- *“Supply relationships may provide a key avenue for business to influence the environmental performance of their key products and services”*.

Accordingly, value chain management principles can be applied to environmental management requirements in order to achieve improved sustainability outcomes. Simpson and Power (2005) comment that integration in the chain and the sharing of improvements resulting from mutual investment also lead back to core economic principles on which value chain management is based. The dedication required for such supply chain relationships, and the investment decisions regarding collaborative supplier development are akin to transaction cost theory (Dunne, 2001), wherein the most efficient balance between activities being conducted within the firm versus in the external market is pursued.
The commitment required for supplier development is significant. Changing suppliers involves high transaction costs in terms of not just finances but also relationships with the lost suppliers. Focusing on improving the performance of existing suppliers through collaborative effort is therefore a lower cost option in the interests of maintaining competitiveness of the chain members and the chain itself. Such collaborative development can include formal assessment and reviews, incentives, training and encouraging competition among suppliers (Simpson & Power 2005).

In order to secure on-going supplier performance, and to institutionalise environmental management procedures, Hamprecht et al (2005) recommend that the application of environmental as well as social controls in the value chain have to be linked to other control mechanisms such as costs, quality and safety. Their study of Nestle milk supply chains indicates that it is comparatively straightforward to implement such controls as ‘Total Quality Management’; and these processes are already in place in most food factories where the primary producer sells their entire production to one processor/buyer. However where the producer is involved in multiple chains (e.g. the grain industry) more industry collaboration is required for successful implementation. Hamprecht et al (2005) suggest such industry collaboration requirements were behind the establishment of the Sustainable Agriculture Platform (SAI) by Danone, Unilever and Nestle in 2002. Now with the participation of McDonalds, Sara Lee and Kraft, this program jointly develops triple bottom line standards that can be communicated through supply chains.

This discussion has indicated that whilst essential to building an understanding of the whole chain’s environmental impact and how that can be managed in a sustainable way, the focus on specific elements of the chain, such as Jones’ (2002) study of the environmental impacts of transport, is mostly limited to dyadic (i.e. dealing with two factors only) considerations (Duffy, 2005). Such considerations provide little towards a comprehensive response to environmental pressures if addressed in isolation to the rest of the chain. Similarly, a too narrow view of operational tools that can be employed in value chain management, such as lean manufacturing and total quality management, can lead to a firm based or dyadic analysis, thus missing the competitive advantages of collaborative value chain management.

Whilst much of the literature on environmental management in supply chains refers to case studies that are firm based, they are quite useful in indicating how environmental awareness and responsiveness can be incorporated into value chain management. Paquette (2005) for example, uses a number of individual firm references but provides a compelling argument about whole of
supply chain responses to environmental pressures. Jones (2002) also indicates the need for research in terms of a whole of value chain approach to environmental assessment.

(b) Value chain responses to environmental pressure
The previous section illustrated that whilst there are many initiatives that individual firms can pursue, and management tools they can employ to improve environmental performance, the most effective response to environmental pressure is through management of the whole value chain.

It is suggested that “supply chains have operationalised a linear production path that extracts resources, uses energy, releases emissions, and produces wastes at volumes and rates that place increasing burdens on the natural environment” (Paquette, 2005, p.1.) and that they must respond to regulatory requirements for environmental performance. Paquette (2005) continues the theme of the broad range of benefits from environmental performance in the supply chain (similar to the work of Porter and van der Lind, 1995) by suggesting that together with regulatory requirements three other factors are equally relevant:

- resource availability, such as dwindling fresh water supplies;
- consumer demands for environmentally-advanced products and services (which has often been a challenge given that consumers are often unwilling to pay a premium for such features); and
- ethical responsibility and corporate social responsibility (CSR).

So whilst value chain responses to environmental pressures may be reactive, they can also be proactive and value seeking if they reflect a strategic and competitive approach to satisfying consumer demand and corporate social responsibility expectations (Kopicki et al, 1993; Paquette, 2005). The challenge for CSR, as it is for sustainable management, is how such performance can be measured. Whilst it may be relatively easy for a company to promote its own corporate social responsibility, it is more difficult to prove such claims and measure CSR performance.

Commentary on value chain management in respect of ensuring environmental performance therefore encompasses the three themes of value seeking strategies; the pursuit of competitive advantage; and collaborative decision making, all in the context of a whole of value chain approach.

20The measurement of corporate social responsibility, in terms of environmental management, is further explored in Chapter 3.
With reference to broader MIT Supply Chain 2020 research activities, Paquette (2005) outlines that an excellent supply chain (that responds to environmental pressures) should:

- be integral to a firm’s business and environmental strategy;
- respond to environmental pressures in a way that develops competitive advantage;
- measure the environmental performance of the entire supply chain; and
- use best supply chain management processes and functions to assist decision making that constantly responds to environmental pressures.

As outlined above, the literature on sustainable management in agribusiness also recommends a coordinated whole of chain approach. McMaster and McMaster (2002, p.1), state that the “challenge to achieve sustainable land use systems is one that requires an interdisciplinary ‘systems’ approach.” Like Hemprecht et al (2005), McMaster and McMaster refer to Unilever’s Sustainable Agriculture Initiative, and their consultation since the mid-1990’s with experts and members of their value chains in order to find a sustainable future for agriculture as a case in point. As McMaster and McMaster (2002, p.4) point out, the SAI definition of sustainable agriculture is:

“……… productive, competitive and efficient while at the same time protecting and improving the natural environment and conditions of local communities.”

Because this thesis seeks to consider the elements of value chain management that can assist in the challenges of managing the supply and sustainable use of water for Australian irrigated agriculture, specific strategies in all value chains cannot be canvassed. Such strategies could be pursued in subsequent research. It is clear though, that each value chain is unique and beset with its own challenges. McMaster and McMaster (2005), for example, suggest that in the Australian processing tomato industry the future challenge may be to encourage processors to pay growers according to sustainability criteria. Similarly, leaders in environmental and logistical efficiency motivated projects within Australian domestic supermarket chains suggest that the Australian chains are not as focused on collaborative supply chain management as the international chains from which they seek guidance (Haggett, 2006).

21 Supply Chain 2020 is a Massachusetts Institute of Technology research initiative investigating the critical factors affecting current and future supply chains.
2.4.5 Responsibility for environmental performance and sustainable management in the value chain

Having considered individual firm responses to environmental pressures, and more importantly whole of value chain responses, it is useful to consider where responsibility in the value chain lies for implementing environmentally sustainable management practices. This section considers this issue from the perspective of consumers, who are the target of value-seeking competitive strategies in environmental value chain management (Kopicki et al, 1993), and then in the context of Australian agribusiness irrigation value chains.

(a) Influence of consumers

Paquette (2005) suggests that consumer demand for environmentally advanced products and processes is one of the key environmental pressures that a value chain should respond to, even if those consumers do not wish to pay a premium for such features. Hemprecht et al (2005) suggested that environmental controls in a value chain to meet consumer demand can be implemented along with other control mechanisms in a total quality management format. In considering fruit export chains from Africa, Trienekens (2004) finds that particularly Western retailers can transfer consumer demand for product quality and safety through the supply chain – thus suggesting that market demand can encourage innovation ‘upstream’ in international food supply chains. Whilst changes in production systems and the use of technology are observed due to such demands, Trienekens (2004) suggests that environmental factors are also being integrated with quality demands.

The demand-pull potential of western consumers, particularly in the United States, is well documented in the literature. Martinez and Stewart (2003) provide a range of examples of food marketers and retailers driving a range of environmentally conscious practices throughout their supply chains. They provide examples of the dominant US retailer Wal-Mart’s supply chain management processes designed largely from a logistical and efficiency perspective to handle large volumes of products in a cost effective manner all based on satisfying consumer preferences. More specifically in relation to environmental and welfare issues they suggest consumer preferences do drive supply chain processes, with McDonalds for example driving animal welfare requirements through its chain in response to consumer demand. However, in suggesting that “a growing consumer segment cares not only about what’s produced, but how it’s produced”, Martinez and Stewart (2003, p. 28) lead on to another case study in explaining that McCain Foods (fast food french fries) employs agronomists to assist potato growers in improving the yield and quality of their crops which can require more chemicals, fertiliser and irrigation than other crops. This then
provides an example of a supply chain dealing with consumer demands for product quality but not yet reconciling those demands with environmental demands.

Whilst there are examples from Australia of consumer influence being exerted similar to the United States examples outlined above, it would appear that there remain opportunities to express preferences for environmental performance through Australian value chains. In the case of the Australian Food and Grocery Council (AFGC), outlined in section 2.4.4.1, it would appear that there are significant opportunities for the Council to extend its environmental management initiatives to a consideration of the whole value chain. Whilst members of AFGC have enacted environmental management initiatives within their firms (AFGC, 2005), they are in a position, given their chain power and understanding of consumer requirements, to influence chain behaviour in this regard.

(b) Responsibility
For those value chains that have not yet embraced strategies for environmental sustainability, and have not yet recognised the value-seeking reasons for doing so (Kopicki et al, 1993), it is apparent that government has decided to take a lead role. The Australian Department of Environment and Heritage (DEH) promotes the improvement of corporate environmental performance, through initiatives such as environmental management systems, triple bottom line reporting, and supply chain management. DEH defines corporate sustainability as encompassing “strategies and practices that aim to meet the needs of stakeholders today while seeking to protect, support and enhance the human and natural resources that will be needed in the future”. (DEH, 2005, p.1).

In a specific tomato industry example, in 2001 DEH commissioned a supply chain partnership program to develop EMS for tomato sauce supply chains through a consultant working with the Australian processing tomato research council, Heinz-Watties Australasia, Safeway, ACI Plastics, and Visy Industries, thus encompassing the chain from growing, processing, and packaging to retailing and consumption. Whilst it adopted a collaborative chain approach, this project was clearly driven by an Australian Government program in the interests of considering environmental impacts in terms of product wastage, packaging waste, energy and water usage. DEH (2002) report that by working with irrigation companies and growers in this project, they were able to reduce water consumption in growing, through drip irrigation technology, to one third of its previous level, with a range of cost savings also enjoyed across the chain. The project identified that for every 1600 litre
batch of sauce produced, 18,406 litres of water were consumed through the chain (equating to 11.5 litres of water for every 1 litre bottle of sauce) by the following activities:

- growing: 11,120 litres or 60.4%;
- paste production: 1,000 litres or 5.4%;
- formulation: 5,341 litres or 29%;
- retail: 5 litres or 0.03%; and
- consumption: (washing) 940 litres or 5.1%.

In a Queensland example of government facilitation of environmental management in irrigation value chains, a partnership approach between the Environment Protection Agency (EPA) and Nursery and Garden Industry of Queensland, based on an EPA ‘Waterwise’ industry grant, investigated the management of more efficient irrigation systems in the nursery industry (Environment Protection Agency, 2005). The reported objectives and outcomes of these EPA and the DEH driven projects therefore support the contention that a collaborative approach from a whole of chain perspective can provide for more sustainable environmental management outcomes; and that the environmental impacts of chain activities are not solely the responsibility of the grower.

However DEH (2002) notes that barriers to these sorts of projects lie in a number of factors. Whilst partnerships have to be based on trust, as was the basis of their tomato sauce study, DEH suggests that Australian businesses often approach competitive negotiations based on price and cost savings. Similarly the question of how to share cost savings, they suggest, is difficult. In the DEH case study the sharing of cost savings was driven by a facilitator but they suggest that in other chains driven by large organisations at the consumption end, which often don’t consider the good of the whole supply chain and the environment, this is far more difficult. This suggestion contrasts with the conclusions from the Nestle, Danone and Unilever examples provided in section 2.4.4 (a). Nevertheless the DEH comments about potential barriers to environmental management efforts in value chains, together with the observations from these other case studies, provide further evidence of relationship concepts underpinning value chain management as outlined in section 2.3.4 (c) of this thesis.

To complete a review of the influence of the consumer and CSR in value chains wishing to respond to environmental pressures, the position and role of the consumer, beyond that of an influencer in a demand-pull sense, should be considered. For example, Postel (2001) suggests North American animal products based diets are responsible for far greater water consumption in their supply chains than those of the less meat intensive diets of the Asian and some European countries. Lenzen and
Foran (2001) draw similar conclusions about Australian food consumers and the responsibility they should bear for environmental management practices in Australian irrigation industries. Lenzen and Foran’s (2001) analysis of water usage in Australia provides conclusions of relevance not only to Australian agribusiness supply chains in terms of drivers of environmental practices throughout the chain, but to the Australian economy as a whole. Despite the water reform process and the fact that Australia’s population and economy are growing, and as a result net water demand is increasing in an environment of increasingly variable water supply, Lenzen and Foran suggest there has been little effort to consider the demand factors and drivers for water usage in the future. Their approach was to extrapolate previous economic ‘embodiment’ research (Lenzen & Murray, 2001; Lenzen, 1998; Lenzen, 2001) to consider the embodied water, land, energy and labour consumed in the production of economic output and value adding in Australia. They explain the concept of ‘embodied water’ as that which is embodied in all products and services accessed by the ultimate consumer and the ‘trade in virtual water’ as the water embodied in goods and services that are imported and exported.

From a national perspective, Lenzen and Foran’s conclusions suggest that it is in the interest of Australia, given the environmental stress on the nation’s resources, to consider whether the nation earns enough for its net outflow of water resource and whether an alternative approach is more cost effective and efficient from a national water accounting perspective. They suggest that consumers, who directly consume products and services that contain embodied water, and the community as a whole, that benefits indirectly from the economic activity generated by the virtual trade in water, should acknowledge the production and water use their demand drives, and be accepting of prices for goods and services that reflect the real cost of the water embodied. Such considerations of Australia’s trading position, in line with Porter’s work on national competitive advantage (Porter, 1990), are not unlike transaction cost theory as applied to value chain management (Dunne, 2001), wherein alternative market transactions to existing internal transactions are considered in the interests of improved firm, and as a result whole of value chain, efficiency.

Of more direct relevance to this thesis is Lenzen and Foran’s reference to water consumption or demand drivers in the Australian economy, and their suggestion from their economic input output analysis that “expenditure is a better proxy for water use than income” and that “within consumer activities spending money rather than earning money exerts environmental pressure” (Lenzen and Foran, p.333). While they found that domestic food production and export trade activities each require about 30% of the nation’s water account and households only 7%, it is metropolitan households who use, or are responsible for, more water than regional or rural households. They
state that the “attribution of blame to the nation’s farmers and exporters for potential water problems is seemingly indefensible for urban dwellers who consume food and require export income to pay for imports of capital equipment and consumer merchandise” (Lenzen and Foran, 2001, p. 334).

In reference to the Australian water reform agenda, as outlined in section 2.2, Lenzen and Foran (2001) suggest that despite achievements and future plans for water reform, including caps in the Murray Darling Basin and water use efficiency programs, agricultural development driven by demand is unlikely to slow, and as such environmental pressures will remain. They suggest that with sectorial reactions to the water reform agenda already including a shift in focus to Australia’s northern rivers and resources for future development, the lessons learnt in Southern Australian irrigation since settlement will encourage strict environmental guidelines governing such initiatives. This, together with the higher requirement for water per unit of production in the more tropical northern climate, may simply transfer environmental pressure to those seeking to develop northern water resources. Lenzen and Foran’s (2001) proposition that environmental pressure would be transferred if northern water resources are developed, suggests that such moves may therefore simply delay the inevitable that the whole population, and whole supply chains, have to take responsibility for sustainable water supplies in Australia.

2.4.6 Conclusion
In considering sustainability and environmental management issues in value chains, this section has addressed both individual firm and value chain responses to environmental pressure. It is noted that what are regarded as appropriate approaches to these responses in the literature embody a range of value chain management principles such as:

- sharing of benefits throughout the chain (e.g. environmental);
- ensuring supply chain efficiency (transaction costs theory);
- supply chain agility;
- information sharing and transparency;
- shared objectives;
- communication and collaboration;
- whole of chain approaches and responses (systems perspective);
- performance standards and partner commitment; and
- trust and responsibility.
The positions of all relevant stakeholders on environmental issues need to be considered by the value chain and the growing influence and hence responsibility of these stakeholders, particularly the consumer, has to be understood. In this regard the concept of corporate social responsibility has been introduced and this together with corporate reputation and branding will be further considered in the next section.

2.5 Value chain member reputations and brand charter

In the last section, value chain responses to environmental pressure, the drivers of these responses, increasing consumer involvement and influence in environmental management decision making in value chains, and the responsibilities surrounding such issues, were considered. This section considers innovative responses to environmental pressures and the motivations for such responses from a corporate reputation and brand perspective.

A well recognised Australian agribusiness entrepreneur, Rob Robson (pers. comm., October, 2005), suggests that the key success factors identified by Fearne and Hughes (1999) in fresh produce supply chains in the United Kingdom can be applied in the Australian context. These factors include focusing on:

- continuous investment (in the face of strong competition and increasingly tight margins);
- good staff (to manage innovation and relationships with the market);
- volume growth (or expansion to engender confidence and justify investments);
- improving cost control (in the interests of efficiency); and
- innovation (in products, services and customer relationships).

Factors such as these that focus on competitiveness and efficiency are well noted in the literature (see section 2.3). The concept of innovation, lends itself well to a consideration of the value chain responses required in value-seeking approaches to environmental pressures (Kopicki, 1993).

2.5.1 Innovative environmental response examples

Innovative responses to environmental pressure in Australia largely relate to the management of natural resources in production activities. In terms of responding to environmental pressure the following examples include sustainable wildlife production (as a means of managing resources that are otherwise a hindrance to agricultural production) and a range of water management initiatives. Each is focused on sustainability of the natural resource as well as the industry and community in question.
(a) Sustainable Wildlife Production.
A recent example of an innovative response to environmental pressures in modern Australian agribusiness is that of the Rural Industry Research and Development Corporation strategies for sustainable wildlife conservation based enterprises in order to encourage restoration of habitats. This activity includes:

- partnerships in wildlife management conservatories (WMC) such that “processors engaged in agreements with WMCs could derive benefits through increased access to produce and from the marketing advantage which could come from ‘conservation friendly’ produce.” (RIRDC, 2005, p. 18);
- chain management and quality responsibility, where “trials will seek to connect improvements in sustainable utilisation of natural resources in both conventional and innovative agriculture using wildlife with marketing and branding of the process as conservation friendly.” (RIRDC, 2005, p. 35); and
- the development of ecosystem services\(^\text{22}\) including branding and labeling strategies.

This response encompasses many of the environmental value chain management principles canvassed in this thesis, such as partnerships to address environmental challenges as well as commercial objectives, quality management and responsibility in the value chain, and the concept of branding strategies to claim corporate social responsibility for such activities.

(b) Horticulture Australia Water Initiative.
Another example is that of the Horticulture Water Initiative, established by Horticulture Australia Limited, to secure on-going access to irrigation water supplies for the horticulture industry by displaying its economic and social contribution to the Australian economy together with its environmentally responsible use of water. It is suggested that “Horticulture is working hard at positioning itself to demonstrate that it is a responsible user of water resource” and that the initiative presents a significant marketing opportunity for the industry “By implementing environmental performance improvements and reporting this to the wider community it will help develop markets for our produce and ensure support for our industry” (Thompson, 2005, p. 42).

Horticulture Australia has also established a national program, funded under the Australian Government’s National Heritage Trust, entitled “Horticulture for Tomorrow” and designed to develop a monitoring program for horticultural producers to measure their environmental performance and have such measures recognised under existing quality management programs.

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\(^{22}\)Ecosystem services are defined as the benefits people obtain from natural and cultural elements of ecosystems including provisioning services; regulating services; cultural services, and supporting services (Williams et al, 2010).
Again, the pursuit of environmental and commercial objectives is evident in this example, as are the value chain management concepts of performance monitoring and quality management frameworks.

(c) Putting Irrigation in Perspective in the Murray and Murrumbidgee.

In a detailed study of the nature of the irrigation industry in one of Australia’s largest irrigation regions – the Murray and Murrumbidgee basins, Meyer et al (2005) lay claim to the industry’s responsibility for sustainable management of water resources in the region. “The irrigation industry is Australia’s most significant water user and is contributing to the long term wellbeing of the river systems. But rights of access to water bring an obligation to use the water responsibly – an obligation that is being embraced and acted on through the many land and water management plans of the region” (Meyer et al, 2005, p.5). In particular the report found that the irrigation industry had begun to explore opportunities for balancing the use of water for agricultural and environmental purposes. The report notes that the encouragement of more economic activity from the use of limited water supplies is a clear motivator for water reform in Australia, “however, generation of greater profit, especially if this is accompanied by lower risk from production and market volatility is a greater motivator” (Meyer et al, 2005, p. 14).

Whilst this study, along with many other examples cited in this thesis, is based on government and industry organisation encouragement of sustainable management practices within value chains, it does make reference to one interesting example of a corporate entity investing directly in environmental management processes that are reflected and communicated throughout the value chain. This example is that of Banrock Station Wines (a BRL Hardy Brand) and its ‘cause-marketing program’ for its wines wherein part of the proceeds of products sold is donated to Land Care Australia and Wetland Care Australia. Originally starting with a project on their own farm, this initiative of Banrock Wines has been now extended to support similar wetland preservation initiatives in countries around the world where their products are sold. The characteristics of the value chain, wherein the brand owner manages production, processing and many of the marketing functions, are clearly an advantage for coordinating such an initiative. These value chain characteristics are discussed in further detail in the next section. Of interest is some of the supportive commentary this study has received from the irrigation industry: “irrigators apply a much more complex assessment protocol to crop selection than simple measures of gross return per ML [megalitre] often quoted in policy documents. This leads to resilient, adaptive and increasingly sustainable irrigated agriculture” (Durack, 2005).
(d) An Australian business and investment approach to water reform.

According to Pratt Water (2004), the Australian water crisis is more about an inability to make better use of existing water supplies, rather than a shortage of supply. Pratt Water, established by one of Australia’s wealthiest businesspeople, Richard Pratt, completed a ‘Business of Saving Water’ report in 2004 as a model, based in the Murrumbidgee Valley, for a national approach to water savings.

There has been some criticism that Pratt is solely motivated by self-interest based on the suggestion that Pratt has a commercial interest in securing the touted water savings given his Visy Industries plantations in the Murrumbidgee area, and his interest in irrigation pipe manufacturing through his privately held Thornley Holdings (Kirby, 2004). Regardless, the Pratt Water report mirrors a number of the objectives and proposed national strategies of the National Water Initiative. The report identified water use and potential water saving targets and initiatives (as well as some information gaps), and made the point that water investment savings and water efficient production could produce significant benefits for various supply chains in the valley.

In terms of being a response to environmental pressures, the Pratt project was a result of community concern and a call for business and investment solutions to the national water management needs. It notes that the Murrumbidgee irrigation area was made up of successful agricultural, horticultural and value-adding activities that have been faced with dual environmental and international competitiveness pressures. As such the Pratt report reflects the win-win thinking of Porter and van der Linde (1995) as evidenced by the following comments:

“For too long the water debate in Australia has focused on making a choice between agricultural development and the environment. I have never believed this is required. Provided we take the right approach, there is more than enough water available to satisfy the needs of our environment as well as the demands of our growing agricultural economy”; and

“…sustainable agricultural growth and environmental health are not mutually exclusive. Indeed they go hand in hand” (Pratt R, in Pratt Water 2004, p. 1).

The authors claim that the Pratt report is not a policy document but rather a deliberate action plan developed from a business and investment perspective. The action plan includes 17 steps to world-class water management (Pratt Water, 2004, p.4) covering a range of water accounting, monitoring, delivery, refurbishment and investment initiatives. Of particular interest to the irrigation supply
chains in the valley, were references to just-in-time water delivery capacity, to allow producers to respond to market changes, whilst still achieving water savings objectives; and the use of market-based instruments, such as those used presently in renewable energy, because “at present there is virtually no encouragement or reward for private parties undertaking water efficiency and water savings initiatives” (Pratt Water, 2004, p.5); and a suggested national water efficiency compliance scheme to be administered by the Federal Government (thereby increasing their dominance in national water issues in contrast to the traditional state based approach).

Suggestions about such schemes reflect those of others in the literature proposing that compliance and quality schemes provide useful value chain management tools where sustainable management is being encouraged (Roberts, 2003). Some of these schemes have been referred to in this thesis, with other local and international examples including:

- WELS, Water Efficiency Labeling and Standards Scheme. Guide to choosing water efficient appliances (www.waterrating.gov.au);
- Smart approved water mark scheme. Developed by Water Services Association of Australia (WSAA), Irrigation Association of Australia (IAA), and the Nursery and Garden Industry of Australia (NGIA), to provide a labeling system for appropriate water using/saving products and related services and organisations. (www.smartapprovedwatermark.info); and
- EUREPGAP (European Retail Parties Standards for Good Agricultural Practices) requirements for proper management of all pre and post-harvest activities to ensure food safety without degrading the environment, with third party certification processes to ensure compliance.

2.5.2 Implications for corporate reputations and brands
The examples of value chain, as well as industry and regional responses to environmental pressures outlined above, to varying degrees relate to corporate social responsibility, branding and corporate reputation. This section considers literature that addresses implications of firm or corporate level considerations such as these. The previous section noted that the drivers for such responses included government, industry organisation and corporate initiatives, the latter of which are driven by value-seeking approaches to satisfying consumer demands, thus instilling competitive advantage.

Paquette (2005, p. 11) states that “Since branding efforts essentially encourage consumers to develop an emotional attachment to a company’s image and reputation, consumers in turn expect a relatively higher level of social and environmental performance.” Others (Morrison and Gleick, 2004; Roberts 2003) have noted that managing relationships with consumers and in particular the
reputation and brand of the corporation that they identify with, is one of the key areas of risk management that corporations should be concerned with.

In terms of water policy issues that businesses should be vigilant about, Morrison and Gleick (2004) suggest that key themes facing the global business community in terms of water supply risks include:

- water resource economics and changing valuations of water – the growing recognition of the economic, social, ecological, cultural and geopolitics value of water given increasing scarcity of the resource;
- increasing demand – potable, agricultural and industrial demand is growing given population increases;
- environmental impacts – impacts of water developments and usage on various ecosystems and the resulting threat to the future sustainability of agricultural and industrial usage;
- climate change impacts on water supply (rainfall) and quality;
- emerging role of the public in water policy which leads to community expectations of water managers and users; and
- privatisation of water management schemes.

They recommend that corporations should keep themselves abreast of these issues and note in particular, given the increasing involvement of the public in water policy and planning, that “This increased attention has direct consequences for businesses, and the stakes, in terms of brand image and reputational capital, are growing. This phenomenon will likely have increased relevance in terms of companies’ long-term strategic plans, markets, and public affairs.” (Morrison and Gleik, 2004, p. 4).

Similarly, Roberts (2003) asks two fundamental questions: to what extent is there a business case for being concerned with such issues (or corporate social responsibility); and should companies be held responsible for environmental and social impacts from their supply chains?

“As increasing numbers of companies have found to their cost, poor environmental and social conditions in corporate supply networks can pose significant reputational risks to big name brands.” (Roberts, 2003, p. 160).

Companies therefore have to both understand and influence the sustainability of their supply chains. Morrison and Gleick (2004) note that in terms of specific water risks for business, there are supply, quality, competing human survival needs and the associated corporate responsibility considerations,
as well as potential production interruptions in the supply chain. In terms of the supply chain, their recommended strategies to respond to these risks include:

- measurement of current water use internally and throughout the supply chain;
- assessment of water risks including hydrological, social, economic and political - again throughout the supply chain;
- continual consultation with stakeholders throughout the community;
- active risk management in the supply chain to address water risks (examples, not unlike that of the SAI, include corporations with significant brand names including Unilever, Levi Strauss, Gap and Nike providing assistance to supply chains to ensure water management standards are met);
- set a water policy with measurable goals and targets;
- implement best technology;
- factor water risk into all relevant business decisions;
- measure and report on performance;
- form strategic partnerships throughout and across supply chains; and
- commit to continuous improvement as can be managed in quality management programs such as ISO 14000.

In order to manage social and environmental risks such as those in the supply chain, Roberts (2003) discusses ethical sourcing codes of conduct. In considering the various corporate stakeholders that companies need to be aware of, including authorisers, business partners, customer groups and external influencers (Dowling, 2001), Roberts (2003) notes that those who are concerned about the environment, whether it be for reactive, proactive or value-seeking reasons (Kopicki et al, 1993), have become skilled in encouraging sustainable management through their supply chain relationships. Further, “consumers generally want to feel good about the products that they buy and be confident that they will not cause them harm and that their production did not harm the environment or the people producing it” (Roberts, 2003, p. 163).

To Roberts, reputation is a key means by which competitive advantage can be created and is accordingly seen by many corporate leaders as a way to deliver value for the business. “The future of branded goods companies requires their stakeholders to maintain trust in the brand, which requires on-going confidence in the reputation of the company. ….consequently effective management of social and environmental issues is a key component of maintaining a good reputation.” (Roberts, 2003, p. 163).
As was noted in the Banrock Wines example in 2.5.1 above, Roberts (2003) shows that there are significant differences between different supply chains and how these conditions can be implemented, and identified four chain characteristics that influence the ability to implement such codes of conduct. These are:

- the number of links between the supply chain member seeking to implement the code of conduct, and the target chain member;
- diffuseness of the target stage of the supply chain (e.g. number of producers);
- reputational vulnerability of various supply chain members; and
- power of different supply chain members.

This section has considered that branding is based on a firm’s image and reputation, and that reputational damage can result if firms are not wary of their water supply and use risks. It is important for firms to keep abreast of water policy and planning from a sustainability perspective therefore and firms should maintain an awareness of the sustainability of their supply chains. These reputational and brand realities should provide the basis for responsible sourcing decisions.

### 2.5.3 Conclusion

This section has built on the corporate social responsibility concept introduced earlier by considering corporate reputations and branding strategies as issues that reflect the relationships firms, and industries, wish to have with their customers. From the examples of environmental responsiveness outlined, it is clear that reputation and branding issues are becoming important in relationships with consumers in terms of environmental management in the value chain. The interest in reputation and branding issues is evidence of a growing recognition of the need for risk management in value chains that addresses both environmental and corporate outcomes, and hence indicates a willingness to share the responsibility for environmental management across the chain.

### 2.6 Summary of key themes from the literature and the research questions

In relation to the research problem, questions and objectives outlined in sections 1.2, 1.3 and 1.4, the literature studied in this Chapter is most informative in terms of:

(i) supply chain management and value chain management issues for agribusinesses moving into value chain relationships - and the management principles employed in such relationships as observed and identified by various authors;
(ii) supply chain and value chain management in the environmental or sustainability context
and implications for corporate social responsibility and reputations; and

(iii) the Australian water reform debate and community pressure and expectations regarding
the way in which irrigated agribusiness producers manage their access to and use of
water resources.

What the literature has not revealed though is how irrigated agribusiness producers can best
approach the key challenge of sustainable access to irrigation water supplies when community
expectations and pressure is so high. Water reform literature suggests an increasing level of
community involvement in the Australian water reform debate, but presents little in the way of
conclusions regarding the most effective way for irrigators to engage in that debate, other than
through some reference to political and at times confrontational debate. In times of severe water
shortage, as has been the case in Australia as indicated in the literature, the challenge for the
irrigation industry has to been to find an appropriate platform on which to argue their case for
access to water supplies in the face of increasing scrutiny from government, community and other
water users.

At the same time, from a commercial perspective, value chain management literature presents a
great deal of conclusions for the way in which agribusiness producers can engage with other
members of the supply chains in which they operate. It is concluded that such value chain
management principles may present a constructive opportunity for irrigated agribusiness producers
to engage with the broader community through their value chain relationships and value chain
management practices.

Therefore to consider the research problem posed in this thesis it has been necessary to bridge the
gap that has been identified in this literature review – that between water reform debate themes of
water access and supply and water use efficiency on one hand, and value chain management
principles on the other. This gap in the literature accords with the genesis of this thesis and the
research problem being considered - “what role can value chain management principles play in
assisting Australian irrigated agriculture producers to secure access to irrigation water and
maintain sustainable irrigation management practices?” (see section 1.2).

This gap is diagrammatically represented as follows in Figure 2.1.
In order to address the research problem, and given the identified gap in the literature, the following rationale for the research questions underlying the research problem, as presented in Chapter 1, is presented.

The water reform literature confirms the complexity of community debate regarding appropriate allocations of limited water resources given the demands of urban, industrial, environmental and irrigation users. It is clear from the literature that the Australian irrigation industry has attempted to embrace this complexity by arguing its’ focus on sustainability through the efforts of various entities including the CRCIF and various industry representative bodies in Australia and the practices that individual irrigators have therefore implemented in their own operations. However before studying the challenge of securing appropriate access to water supplies, the significance and priority of maintaining sustainable irrigation management practices should be considered in the light of the many other management challenges facing irrigators. It is for this reason that the first research question to address the research problem is stated as: ‘how do sustainable irrigation management practices compare against other strategic management issues facing managers of irrigation firms within Australian food value chains?’

The value chain management literature reviewed in this Chapter confirms a range of management strategies that can be employed in coordination with other members of a value chain in order to find the most optimal solution to a challenge for that chain. In the case of an Australian irrigator who seeks the cooperation of other members of the value chain in which they operate to recognise the
value of focusing on sustainable irrigation management practices, it is important to consider the
degree to which, and the ways in which, other members of that chain can influence such practices.
It is therefore appropriate that the second research question to address the research problem is
presented as: ‘can members other than the irrigator-producer in Australian food value chains
influence sustainable irrigation water use practices, and if so, how?’

Given the water reform debate, and the need for irrigators to engage with other community
members in pursuing the objective of securing access to a sustainable water supply and maintain
sustainable irrigation management practices, the research problem that this thesis addresses, raises
the issue of what role value chain management principles can play in that regard. In order to
confirm the significance of sustainable irrigation management practices the first research question
addresses how they compare to other strategic management issues. As outlined above the second
research question then considers if other members of a value chain can influence sustainable
management practices.

If value chain management principles are being employed with a view to the chain sharing a
recognition of the value of maintaining sustainable irrigation management practices in order to
assist in securing access to irrigation water supplies, it is ultimately important to consider if that the
implementation of those principles also brings about a shared responsibility for those principles. It
is for this reason that the third research question is posed thus: ‘does the presence of value chain
management principles ensure that responsibility for sustainable irrigation water management can
be shared throughout the food value chain, and if so, how?’

Based on this literature review, and the research problem and questions as outlined above and in
Chapter 1, a single case study research methodology employed for this thesis is presented in the
next Chapter, with analysis of the results considered in Chapter 4.
3 Research methodology

3.1 Research context
This Chapter outlines the research methodology adopted for this study, which is designed to consider the research problem as outlined in section 1.2: “what role can value chain management principles play in assisting Australian irrigated agriculture producers to secure access to irrigation water and maintain sustainable irrigation management practices?” In so doing this research methodology Chapter addresses the gap in the literature identified in previous Chapter (section 2.6) – i.e. the literature gap between water reform management and value chain management. The ontology, epistemology and methodology for this research are outlined and a summary of the research plan provided in Table 3.1.

As outlined in section 2.3.4, this thesis considers value chains as systems in which a particular issue is considered to be a constituent part of a system or sum of activities. It is concluded in that section that value chains, based on characteristics outlined by Kirk (1995), may be defined as soft or social systems involving human activity and associated relationship management issues. Accordingly, literature regarding the Australian water reform process, value chain management principles, and sustainability management challenges for value chains, can be considered from a social systems perspective.

Understanding Australian agribusiness irrigation value chains as social systems, requires a study of the chain’s people, their behaviours and the environment and context in which they operate (Babie, 2005). Section 2.2 explained that the water reform process is placing environmental pressure on these chains, in terms of access to and use of natural water supplies, and that this entails a range of complex opinions and community expectations. As such a research design that facilitates consideration of the management of complex and dynamic value chains has to allow appreciation of the day to day management realities in a chain that attempts to respond to water reform pressure and community expectations.

From a research methodology point of view, it is proposed therefore that such an appreciation of these complex, dynamic chains might be achieved through direct involvement in the chains in preference to uninvolved observation. Consistent with this need, and the fact that a range of opinions in water reform will be encountered in this social systems research, a research methodology that accommodates evolving constructs and is able to properly consider the likelihood that managers have to be flexible in the application of those constructs. The study of systems or
chains that are dynamic in nature is informed by Keilar (2004), who addresses the application of a social systems approach to researching agricultural systems, and identifies the need to recognise the existence of multiple subsystems; and by Easterby-Smith et al (1999, p. 45) who contend, it is necessary to consider how “management research may be shaped by contextual factors and by different people who feel they have a right to exert their influence.”

In this sense it is important to reiterate that this thesis represents management research dealing with dynamic systems. Whilst the Australian agribusiness irrigation value chains studied have been responding to the water reform process, that process in itself is in a state of flux given the evolving political, scientific and economic debate surrounding sustainable use of the nation’s water resources to meet changing economic, social and environmental criteria. If management, as Easterby-Smith et al (1995) suggest, is a process with the intention of providing direction and coordination in organisations, and this involves resource allocation and use decisions as per the water reform context of this thesis, those organisations and systems are by their very nature dynamic.

It also has to be recognised that in such an environment of competing views and objectives, the management issues considered can be quite sensitive given the power relationships and politics involved. Such sensitivities have other implications for researchers in terms of the way in which they interact with research subjects such as key opinion leaders and case study participants. Appropriate observation of these sensitivities is not only important from a research ethics point of view (Pettigrew, 1997), but their proper consideration is also consistent with a constructivist research paradigm\(^{23}\) wherein an appreciation of all points of view is emphasised (Guba and Lincoln, 1994).

Therefore, based on a review of management research literature, and the fact that this thesis’ consideration of complex dynamic systems requires a research approach that accommodates flexibility and sensitivity, the following research design was developed.

### 3.2 Research philosophy

The philosophic bases on which research methods are selected by an inquirer are commonly referred to as the research paradigm or the “set of basic beliefs (or metaphysics) that deals with ultimate or first principles” (Guba and Lincoln 1994 p. 107). Guba and Lincoln (1994) categorise research paradigms as basic belief systems based on ontological, epistemological and

\(^{23}\)Research paradigms are explored in the next section under research philosophy.
methodological considerations. They explain that these considerations scope out the basic beliefs (or research paradigm) of the inquirer in terms of:

- **ontology**: what is the form of reality and what can be known about it – i.e. the nature of reality;
- **epistemology**: the relationship between the inquirer and what can be known – i.e. how the reality should be understood; and
- **methodology**: how to go about finding out what the inquirer believes can be found – i.e. how the reality should be studied.

Given the research context outlined in the previous section, of complex social systems involving human activity and behaviours (Kirk, 1995 and Babie, 2005), the following section addresses the need for a research paradigm that accommodates this context and the interactions between it and the researcher. This need for an appropriate research paradigm or philosophical orientation for the research can be posed as “what do I believe about the nature of reality, about knowledge and about the production of knowledge?” (Merriam, 1998, p. 3).

### 3.2.1 Ontology

Guba and Lincoln (2005) explain that the range of research paradigms, based on consideration of ontology, epistemology and methodology, can be described as:

- positivism (naïve realism);
- post-positivism (critical realism);
- critical theory (historical realism);
- constructivism (relativism); and
- participatory inquiry.

Easterby-Smith et al. (1991) contend that paradigms such as positivism, post-positivism and critical theory are realist in nature seeing that the world is independent of how it is perceived, and those that are relativist (constructivism) see the world are being socially constructed and based on the interaction of people. Others summarise research paradigms in different ways. Burns (1997), for example, simply identifies two competing modes of research in the field of education management: the scientific empirical tradition, also known as positivism (which assumes social reality is objective and external to the individual); and the naturalistic phenomenological mode (which assumes social reality is a subjective construction with a focus on understanding the experience of individuals). Patton (1990) suggests a pragmatic approach to specific research problems and situations, as opposed to strict adherence to one of the accepted research paradigms and its related
methodologies. Patton’s suggestion does not so much alter the distinction between research paradigms outlined by others, but rather accommodates a mix of research approaches in addressing a research problem.

In order to address the complex and dynamic nature of the social systems to be considered in this research, Guba and Lincoln’s broad research paradigm distinctions between positivism and constructivism are further considered. Burns (1997) outlines that the key strengths of a positivist approach include control and reliable, quantifiable data. These strengths coincide with the view that the world is independent of how it is perceived and should therefore be measured in an objective manner. This in turn implies a deductive approach and objective testing of hypotheses without recognising social systems or potential influence from the researcher. In the field of management research there are a number of shortcomings of a strictly positivist paradigm. Herron (1981) for example advises that such an approach is not sufficient for the research of people and their behaviour. Burns (1997, p.10) suggests that this is “because the human is not only acted on by a plethora of environmental forces, but can interpret and respond to these forces in an active way”.

As outlined in the introduction to this Chapter, and based on the literature reviewed, media commentary and preliminary discussions with irrigation value chain participants, it was concluded that there are multiple realities in Australian agribusiness irrigation value chains about sustainable supply and management of water resources. Given this existence of multiple realities or constructs, a constructivist rather than positivist approach is ontologically more appropriate in the research of Australian agribusiness irrigation value chains, wherein the human behaviour of chain members includes variable responses to the dynamic external and environmental pressures on their day-to-day operations.

### 3.2.2 Epistemology

The constructivist ontology outlined above sets the background for the epistemological approach to this research. This epistemology, or the relationship between the inquirer and what can be known (Guba and Lincoln, 1994), is one in which the inquirer and the topic being considered are interactively linked. As such, issues are considered subjectively given that the researcher is directly engaged with the subject under study so as to understand the human behaviours and social systems in operation. In order to understand the multiple realities the researcher has to become “interactively linked so that the findings are literally created as the investigation proceeds” (Guba and Lincoln, 1994, p. 111). This implies a subjective, creative involvement (Guba and Lincoln,
2005; MacIntosh and MacLean, 2001) which cannot be achieved from afar as would be the case under a positivist research process.

In relation to this thesis and the consideration of the impacts of value chain management on the chain in terms of its response to environmental pressure, it is instructive to consider the contention of Easterby-Smith et al (1995) that it is important for the researcher to interact with the subject of study. There is a need to directly engage with the dynamic social systems that exist in Australian irrigated agribusiness value chains so as to understand their reactions to water reform. As outlined in the review of water reform literature in section 2.2, the value chains to be studied in this research are in the midst of quite a dynamic period given the progress of water reform, continuing drought if not immediate post drought considerations, and the continued ramp up of activities under the National Water Initiative. Participatory research in such a context will therefore require a significant degree of flexibility, especially given that I will in effect become a member of the case study value chain for the period of study^24.

As a contributor, therefore, the researcher’s input has the potential to influence activity and, from a management perspective, make contributions regarding practices that the value chains may wish to implement. Observations of that involvement in the process are therefore important. For example, if my involvement leads to an increased awareness within the chain regarding sustainable water use, that in itself may be an observable issue suggesting that chains which are open to information and input are of interest for industry or government policy. In understanding this role of the researcher in the research process it can be seen that flexibility remains the key given that “the focus of management research will usually emerge from a process of negotiation between these three elements – researchers, stakeholders and subject – all within the constraints of the wider context” (Easterby-Smith, 1995, p. 49).

From an epistemological perspective, in this research I as the inquirer will be interactively linked with the research topic and directly involved with research participants in the creation of the research findings which is in line with the constructivist ontology outlined in section 3.2.1. As is discussed in the following sections, this approach has implications for the research methodology and the way in which results will be interpreted. From an epistemological perspective, this research design requires that I be linked to the subject and the social system that has to be studied as an

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^24 A single case study methodology, and its implications for methods used in this research, is addressed in the following sections: 3.2.3. and 3.2.4
engaged participant who wishes to understand that whole system. This results in a research methodology that is qualitative and inductive in nature.

3.2.3 Methodology
As outlined above, the constructivist paradigm leads to an inductive research process (Burns 1997). This is in contrast to the positivist paradigm, where research is based on deduction typically in a physical science setting under controlled conditions that need to be independent of the researcher. Positivism assumes that reality is stable, observable and measurable such that information that can be gained through research is objective and quantifiable (Merriam, 1998).

As outlined in section 3.2, the social science setting of complex human behaviour does not allow for the research control afforded under a positivist paradigm. In contrast to positivistic, deductive reasoning, Burns (1997, p. 9) explains that “the converse approach is induction in which individual facts are pulled together in clusters to form manageable sets of generalisations which act as theories.” This presents a number of process challenges for the qualitative researcher. Pettigrew (1985) explains that social complexities have to be studied through participation, and Guba and Lincoln (1994) suggest that multiple individual constructions can only be understood through interaction between the inquirer and those being studied. Qualitative research concerned with social systems must meet the challenge of being based on a sound methodology despite unpredictable and complex human behaviour involved. Such methodology should be designed to ensure valid and reliable results and as Silverman (2000, p. 822) points out, qualitative researchers must avoid the “temptation to gloss their methodology as ‘empathetic understanding’.”

In line with the comments above regarding complex social settings, and the challenges to be met by qualitative researchers, the research to be conducted for this thesis is designed to capture both the social processes taking place in the value chains being studied, and the social interactions in the research process itself, including issues associated with the role of the researcher or ethnographer. Vidich and Lyman (2000, p. 40) describe ethnography as “a social scientific description of a people and the cultural basis of their peoplehood.” Based on Marcus’ (1997, p.92) contention that ethnographic research “is never reducible to a form of knowledge that can be packaged in the monologic voice of the ethnographer alone”, Angrosino and Mays de Perez (2000) explain that the role, interactions, relationships and emotions of the ethnographer are a key part of qualitative research.
In relation to this thesis, as explained above, interpretation of existing constructs with research participants played a significant role in mapping out the structure and performance of the value chains being studied in terms of their response to water reform. Consistent with a constructivist approach these constructs were best understood through interaction with the research participants within the case study considered in this thesis. Stake (2000, p. 436) points out that “a case study is both a process of enquiring about the case and the product of that enquiry”. Whilst this view is evidence of the fact that the term case study is used variously in the literature as both a research methodology, as outlined in this section, and a research method (see next section), it is important to recognise from a methodological perspective that it provides a sound basis for understanding the reality of multiple constructs being studied.

Within the case study these constructs can then be jointly analysed and contrasted in explanatory discussions with research participants, or as Guba and Lincoln (1997, p. 111) put it, “dialectical interchange”, so as to identify constructs regarding value chain structure and performance characteristics. The research findings from this study, and conclusions drawn in Chapter 5, were developed inductively by me, as the researcher, and then in what was be a more removed, positivist process, posed as a basis for further research.

3.2.4 Research methods
Merriam (1998) explains that qualitative research works to understand how parts come together to form a whole and in this respect qualitative researchers are typically interested in understanding what people understand reality to be. Qualitative research is usually associated with constructivist research paradigms with quantitative research usually associated with positivism. However both qualitative and quantitative research can be employed in positivistic as well as constructivist paradigms as is suggested by Pettigrew’s (1997) discussion of the interplay between deductive and inductive reasoning. Merriam (1998) points out that terms used interchangeably with qualitative research include naturalistic inquiry, interpretive research, field study, participant observation, inductive research, case study, and ethnography.

Consistent with a constructivist inductive approach, qualitative research involves the inquirer as both a data collection and a data analysis tool, through direct involvement with the subject or situation being studied. Again the requirement for flexibility, and as Merriam (1998) suggests, an ability to tolerate ambiguity and be sensitive to the context, is evident.
The methods employed in this research involved participant observation, interviews, case study, document analysis, data management and interpretation, in what Janesick (2000) likens to the role of a choreographer.

(a) **In-depth, semi-structured interviews and observations**
As outlined in the research plan summarised in section 3.5, in this research the first key method employed was that of in-depth interviewing which is defined by Minichiello (1990, p.87) as “a conversation between researcher and informant focusing on the informant’s perception of self, life and experience.” These interviews were conducted with a range of irrigated agribusiness value chain opinion leaders in order to not only set context from other agribusiness industries for the horticulture case study, but to also provide reference for triangulation (see section 3.4) following completion of case study research.

These interviews were semi-structured, or as Whyte (1979, p.57) puts it, ‘flexibly structured’, to allow existing and developing constructs to emerge without being totally open-ended. Issues relating to the topic of this thesis, and the literature that was reviewed, were considered in those interviews and included the following.

- Value chain management practice in agribusiness, including the success factors identified by Fearne and Hughes (1999).
- How environmental performance and water use efficiency rate compared to other success factors and other value chain strategic management issues?
- Should and how can environmental responsibility be shared throughout the value chain?
- Is environmental performance a basis for product differentiation?
- Is environmental performance an element of Corporate Social Responsibility and if so how is that best marketed or branded?

These interviews also provided perspectives on:

- agribusiness industry comparisons between leading water using activities of wine, cotton, dairy, and horticulture;
- topics with which I as the inquirer am familiar in relation to the dairy industry, and those with which I have no experience, namely wine production;
- international markets and value chain activities (i.e. wine and dairy) which will be in contrast to the largely domestic context of the case study (i.e. horticulture); and
• a geographical spread across irrigation areas (wine in South Australia and dairy in Victoria, both in contrast to the case study setting in Southern Queensland/Northern New South Wales).

It was expected that there would be a number of interview issues that might apply to this stage of the research as well as the methods employed within the case study data collection process itself (see section 3.2.4.4). As Fontana and Frey (2000, p. 647) point out, “each interview context is one of interaction and relation; the result is as much a product of this social dynamic as it is a product of accurate accounts and replies”. It was therefore important to understand that this process is in itself often the creation of knowledge on the part of the research participant. Fontana and Frey (2000) make the point that some of the pitfalls of a strictly structured interview method, including respondent behaviour, questionnaire design and interviewer shortcomings, can be overcome to some extent through semi structured interviewing where the flexibility to explore and understand such issues is afforded.

(b) Consensus construction
It was envisaged that the result of the semi-structured interviews to be conducted at the outset of this research would be a compilation of consensus constructions regarding the nature of the value chains to be studied, the role of the irrigator in the water debate, water use efficiency issues, water allocation principles, environmental responsiveness and corporate social responsibility. These interactions did therefore result in negotiated conclusions, between the research participants and me as the researcher, on the study topic (Fontana and Frey, 2000). The data analysis methods used in this and other processes in this research are addressed in section 3.2.4 (e).

(c) Case study
The bulk of the field research associated with this project was a case study with Matilda Pty Ltd25, a Queensland based producer, packer and marketer of broccoli for both domestic and export markets. Matilda Fresh, the packaging and processing company within the Matilda group, and Matilda Farms, the irrigation and farming company, have become a member of a number of value chains associated with irrigated vegetables. The focus on this single case study allowed a detailed analysis of the water reform and environmental responsibility issues being considered in this study in a specific commercial setting which will allow

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25 See case study organisation background and description in Chapter 4
consideration of the issues raised in the aforementioned exploratory interviews and questionnaires.

There are a number of reasons that Matilda had been selected for this case study. It should be acknowledged that these reasons or criteria have been determined subjectively by me as the researcher (Stake 2000). The criteria used include:

- proximity – Matilda Fresh is headquartered in Toowoomba, where I reside;
- familiarity – my previous experience with Matilda proves a sound basis on which to conduct this research;
- the Jauncey family’s (proprietors) familiarity with other irrigated agribusiness value chains (e.g. cotton production and marketing);
- variety in terms of domestic and international marketing activities and membership of value chains with wholesale and retail marketing partners;
- a food based value chain rather than fibre based which is far more difficult to research given that virtually all fibre produced in Australia is exported to numerous international markets in a semi-processed state;
- Matilda’s empathy with irrigated production challenges (it originated from an irrigated farming operation); and
- the fact that Matilda Fresh is, in its value chain, the member closest to, and therefore most likely to be influential on, the irrigators.

It was my role to participate with key stakeholders in the case study to observe value chain management principles in the pursuit of increased corporate social responsibility in terms of irrigation water resource management. This involved iterative communication and reflection with these stakeholders and through them to other key stakeholders in the value chain. This iterative process of interpretation was a key feature of the case study method for this research. Gubrium and Holstein (2000, p. 488), outline interpretive practice as “the constellation of procedures, conditions and resources through which reality is apprehended, understood, organized, and conveyed in everyday life. Interpretive practice engages both the hows and whats of social reality; it is centered both in how people methodologically construct their experiences and their worlds and in the configurations of meaning an institutional life that inform and shape their reality-constituting activity”. By alternately focusing on the hows and whats of interpretive practice, Gubrium and Holstein (2000) argue that a picture of social activity and the broad context in which it develops can be developed.
Similarly, and consistent with Patton’s (1990) pragmatic approach to research methodology decisions, Pettigrew (1997, p.343) explains that processual research^26 is “best characterised in terms of cycles of deduction and induction.” In discussing qualitative research Pettigrew (1997) suggests that some form of deductive reasoning is required to initially scope the research problem and questions and this provides a prelude to further inductive reasoning and from there further iterations of deductive and inductive reasoning.

The intent throughout this process was to encourage and prompt stakeholders to employ value chain management principles and then participate with them to monitor the impact of these principles during the period of the study. This stage of the research therefore involved a participatory approach wherein I as the inquirer was directly linked with gathering and interpreting the developing knowledge regarding the topic of this thesis.

As an extension of descriptions of pure observation in research, Angrosino and Mays de Perez (2000) refer to Adler and Adler’s (1987) description of varying levels of the observer’s membership roles in research including peripheral-member, active-member and complete-member researchers; together with Werner and Schoepfle’s (1987) explanation of description observation, focused observation and selective observation. It was my intention to operate as an active member allowing me to participate and move through the phases of observation suggested above.

(i) A single case study

One of the criticisms of using case studies as a qualitative data collection method is that the results are specific and often not useful for broad generalisations (Patton, 1990). However it is also considered (Patton, 1990; Stake, 2000) that case studies, particularly a single case study as in this thesis, allows the researcher to understand a specific social system (in this case Matilda Fresh and the value chain of which it is a member) in great detail. The single case study approach in this thesis therefore assisted in developing an understanding of the detail and complexity of the realities of the social system, from the position of those involved in it (Yin, 1994; Merriam, 1998; Burns, 1997). As outlined previously, the research methodology for this thesis allowed for broader interviewing in Australian water reform and irrigated agribusiness value chain social systems so as to both inform and critique the conclusions of the Matilda Fresh case study.

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^26 Pettigrew (1997) explains that processual research aims to capture the reality of human conduct in action.
Another criticism of the case study as a methodology is that it can be too subjective and therefore not provide objective results (Yin, 1994). However as Berg (2001) points out, the researcher should consider the need for objectivity in the methods they use so that they could be reproducible.

(ii) Interaction
It is important to establish a relationship and a sound basis for communication with research participants, particularly for the purposes of interpreting their experience of the study (Janesick, 2000). Given my existing relationships and communication channels with Matilda Fresh Foods, I was already familiar with the background of the research participants and this will be of great assistance in understanding the constructs.

Janesick (2000) suggests that most often qualitative researchers use some combination of participant observation, interviews and document analysis. She further points out that qualitative researchers will formulate questions to guide their study, “*but those questions are under constant revision and are continually taking new shapes*” (Janesick, 2000, p.384). As Fontana and Frey (2000) point out, in-depth interviewing and participant observation often go hand in hand. They go on to explain that in unstructured interviewing it is important to: gain access to the setting; understand the language and culture of the respondents; decide how to present one’s self; find an informant; gain trust; establish rapport and go about collecting the data (Fontana and Frey, 2000, p.654).

In terms of the Matilda Fresh case study, regular meetings and open-ended interviews were held with project informants. Whilst these meetings were recorded by me in writing and transcripts of the discourse subsequently analysed, the following were points relevant to Fontana and Frey’s (2000) interviewing suggestions.

- Gaining access, understanding culture and language, and securing trust
  Matilda is a company that I was quite familiar with based on previous consulting assignments. The company is also run by the Jauncey family with whom I have been a personal friend for some years. Whilst this association had implications for the objectivity of my role as a participant observer in this research, as is addressed elsewhere in this Chapter, it did provide me with ready access to key company personnel, and other value chain members if necessary, for this research. The required access was negotiated with Matilda Fresh based on formal fortnightly
meetings with supply chain management staff together with contact with them and other relevant personnel on an as-needed basis.

- **Presentation as the researcher**
  Matilda Fresh had agreed to my role as an objective academic in this research but at the same time a committed participant observer. It is important to note that we had deliberately delineated the research role such that I would not move into the role of more intense participation or as described by Werner and Schoepfle (1987), become a ‘complete-member researcher’.

- **Informant**
  My key informant in the organisation was Mr. Antony McConville whose role of ‘Supply Chain Manager’ entailed the sourcing of raw material from a range of irrigated broccoli producers across Australia. He was acutely aware of the need to ensure suppliers have access to sustainable water supplies so that Matilda Fresh could in turn confidently contract to supply its customer with consistent quality and quantity of processed and packaged broccoli products.

- **Rapport**
  An effective rapport with the organisation is essential for understanding multiple constructions. In the Matilda Fresh setting though it was important for me, given my familiarity with the group and my participant observer research role, to maintain a sufficient degree of objectivity (Angrosino and Mays de Perez, 2000).

- **Data collection**
  Regular note taking on my part was important in order to recognise and record the research setting and the prevailing conditions that shape interviews and interactions (e.g. relationships, family business, gender bias) and my position and reflections on the research process. Formal interaction with case study participants included fortnightly meetings with the key informant, Mr. Antony McConville. These meetings included discussions with other value chain management staff from Matilda, and other value chain members, as required. Each meeting was chaired by me based on an open-ended interview format. This and associated discussion was recorded in writing for later analysis. Issues considered at each meeting were influenced by prevailing strategic management issues in the value chain, the progression of the water reform debate, together with those issues identified in the next section. Consideration of such issues proceeded on an iterative basis with progressive development of constructs relating to the subject of this study. At the same time I maintained a reflective diary to consider the research topic together with
the research process. Originally the timing of this case study was intended to continue until June 2007 at which time Matilda Fresh would have moved through a full season of supply from Southern Queensland, through Northern and Southern New South Wales, Victoria and back to South Queensland again. As outlined in later Chapters of this thesis this time frame was extended to include subsequent developments in the Matilda Group.

(iii) Issues addressed in the case study
Whilst the case content and presentation evolved during the course of the study and was ultimately determined by me as the researcher (Stake 2000), it was envisaged that this case would consider the following key issues that relate to the research questions (see section 1.3) and those that would emerge from the research outlined in the preceding sections.

- In relation to the first research question:
  - Matilda’s value chain management processes and principles compared with theory and agribusiness case studies;
  - Matilda’s position on water reform process and impacts on its VCM; and
  - Matilda’s position on the research problem, questions and objectives.

- In relation to the second research question:
  - the nature of the value chain structure, the power and influence held within the chain;
  - the propensity of the chain to respond to environmental pressures; and
  - the proximity of chain members most interested in corporate social responsibility to final domestic and international consumers.

- In relation to the third research question:
  - definition of the value chain that Matilda Fresh is a member of together with the functions that Matilda Fresh manages within that chain (raw material supply, processing, domestic and export marketing);
  - the existing relationships and processes, if any, which focus on sustainable water use, will be outlined; and
  - Matilda’s own responses to, and interpretation of, consensus construction and case study outcomes.

(iv) My role in the case study
The importance of recognising my role in this research as a participant observer is considered in detail throughout this Chapter. This included my influence on the research design, the conduct of that research, and the subsequent data analysis and conclusions. As Stake (2000, p. 442) points out “the case researcher emerges from one social experience, the observation, to choreograph another, the report”. It is acknowledged that I was required to be reflective in order to continually revise meanings as the researcher, and ensure the observations of all participants and issues were observed in the context of the whole study. It is also acknowledged that there was a degree of flexibility required of me as the researcher to communicate findings (as well as the flexibility of the reader to understand them) – particularly under a constructivist paradigm in which multiple realities are involved (Stake, 2000). Hence the validity of my conclusions, as discussed in section 3.2.6, is an important consideration.

(d) Data analysis, external validation and write-up
Following the collection of largely qualitative data as outlined above, the focus both during and after the data collection phase, moved to analysis. Silverman (2000) suggests that in analysing interview, text and transcript data, researchers should consider the value of qualitative data and its ability to focus on social interaction in situ from a narrative perspective, especially if it is used in association with quantitative analysis methods. Silverman (2000) explains the realist (considering responses as reality) and narrative (considering the multiple constructs and the broader culture and issues they may relate to) approaches to the analysis of interview data and suggests that such approaches greatly assist in understanding the complexity of the social interaction being reviewed. Similarly, Ryan and Bernard (2000, p. 769) explain that the analysis of text can be based on the linguistic tradition, where the text itself is the object of study, or the sociological tradition in which the text is considered to be a “window to the human experience”.

Ryan and Bernard (2000) outline the analysis process as usually involving the steps of sampling data, theme identification, and coding of text so as to build concepts and models. In relation to transcripts Silverman (2000) makes the point that such data based on recordings provides a record of nuances of social interaction and as such can provide a valuable starting point for qualitative analysis.
(e) Other research instruments
A review of the value chain management literature has revealed various value chain analysis and management research instruments, including a limited number of models and inquiry instruments that seek to investigate both competitiveness and environmental management effectiveness and performance of value chains. Whilst decisions regarding the appropriate instruments that could be employed were made with case study participants at the commencement of these studies, the following were canvassed in discussions with case study participants:

- influence diagrams to assist in initial discussions regarding chain structure and relationships (Wolfenden, 2003);
- value chain structure mapping, (Lambert et al, 1998);
- value chain business processes (Lambert et al, 1998);
- management components and behaviour in value chains (Lambert et al, 1998);
- relationship formation and management (Cann, 1998; O’Keefe, 1998; and Whipple and Frankel, 1998);
- competitiveness and Environmental performance (Wisner, 2003; Brewer and Speh, 2000; van Hoek, 1998; Jones, 2002; McIntyre et al, 1998; van Berkel, 2002); and
- industry assistance approaches (McEvily, G., 2005).

3.3 Research risks
As outlined in section 3.2.2, this “involved” process of research meant that I as the inquirer was embedded within the process and effectively became a member of the case study value chain for the period of the research. As has also been indicated throughout this document, Australian agribusiness irrigation value chains were responding to significant change – both in terms of competitiveness and environmental pressures. As such the research process itself had to be flexible as well as robust. My direct involvement in the research process, the flexibility required in these dynamic chains, my personal history in the water reform debate and my familiarity with the case study participants, all gave rise to a range of issues that required consideration in terms of the validity and reliability of this research.

3.3.1 Background to participant observation
As outlined in Chapter 3 the qualitative design for this research focuses largely on participative observation in the case study organisation (see section 3.2.4). My direct engagement in the case study in this manner was greatly facilitated by my familiarity with
both the case study organisation, Matilda Pty Ltd, and its management – members of the Jauncey family. Before considering the data gathered in this case study it is important to outline the nature of this familiarity and the access it allowed, as well as the context it added to my observations as the researcher.

3.3.2 My understanding of the case study organisation
Although unknown to me during my childhood in the 1970’s, the Jauncey family including the late Bill Jauncey (first generation involved in this case study organisation) and his son Phil were both well known to my father as fellow farmers on the Darling Downs broad-acre cropping region west of the regional city of Toowoomba. As such I was aware that the Jaunceys were among the pioneering irrigators (unlike my own family who remained dry-land farmers throughout their career) in our region.

By the time I had been employed as a Market Development Officer with the then Queensland Department of Primary Industries (QDPI) Marketing Services Branch in Toowoomba in the late 1980’s, I had come to know Phillip Jauncey as a local agribusiness entrepreneur, and QDPI client, establishing new cropping enterprises on his family’s irrigation properties at Brookstead on the central Darling Downs. I was able to assist Phillip in securing a number of Federal Government grants under the Innovative Agricultural Marketing Program (IAMP), and by providing assistance in securing support from Austrade and Queensland Trade Office for his export market development activities with horticultural produce. Through further roles with QDPI, including the Brisbane-based International Food Institute of Queensland (IFIQ) in the early 1990’s, I maintained irregular professional contact with Phillip Jauncey as he periodically sought professional assistance from me and other departmental colleagues in the areas of market research, food product development and government assistance applications.

In 1994 I began a management consulting career and was again called upon by Phillip periodically over the following 15 years to assist him in a professional capacity with water industry communication and government consultation activities related to his industry involvement activities (see Appendix 1) as well as market research and development projects in relation to the Matilda business.

27 Dry-land farmers is a recognised Australian agricultural term for non-irrigators – i.e. those who produce crops based solely on rainfall and not with the input of underground or surface irrigation water supplies.
3.3.3 Organisational awareness
My understanding of the case study as outlined above in section 4.2.1 resulted in the following access to organisational information utilised in this research:

- unfettered access to previous board meeting minutes;
- appreciation of all of Matilda’s attempts to develop other broad acre crops other than the traditional grains and cotton crops, including herbs, and a range of horticultural produce (including daikon, radish, broccoli, lettuce, cauliflower, onions);
- knowledge of their marketing staff and consultants;
- awareness of domestic and export market development activities and contacts;
- knowledge of sales and marketing staff (internal as well as contracted);
- Farm and packing facility infrastructure development phases and challenges;
- knowledge of family members, other consultants, succession planning issues; corporate structure changes and evolution;
- awareness of the extent of both supply chain management and financial pressures; and
- ultimately an understanding of the organisation’s inability to secure supply chain support for managing these pressures, nor new equity, leading to receivership (see Appendix 1).

3.3.4 Industry awareness
As well as developing a significant awareness of the history and commercial realities of the case study organisation, my exposure to Matilda as well as other professional experience, placed me in the position of having a relatively high awareness of the irrigation industry in which it operates.

These factors, which also provided significant context for my involvement in the case study as a participant observer, include the following.

- My professional background in strategic management and marketing in Australian agribusiness, particularly irrigated horticultural production.
- My understanding of competitive water uses: urban, industrial, environmental; and the nature of industry debates and relevant literature (as outlined in Chapter 2), including:
  - should farmers bear the pressure of water reform on their own?
  - should farmers be the only beneficiary to invest in WUE efforts?
  - ‘attribution of blame’ concerns (Lenzen & Foran, 2001);
  - global competition, consumer demand, cost control, shrinking supply bases, rising cost of natural resources and the resultant increasing focus on cooperation, partnerships and alliances in developing value chains (Wisner, 2003); and
• value chain management is the management of the chain as a whole competitive unit so as to optimise the benefits for all chain participants.

• My professional background in irrigation industry communication and lobbying with government including through “City to Soil” (C2S) and “Darling Downs Vision 2000” (DDV2000).  

• Membership of Irrigation Association of Australia and the receipt of a scholarship from the Commonwealth Research Centre for Irrigation Futures for the purposes of this thesis.

3.3.5 Participant observation summary
As outlined above, my personal and professional background has provided me with a significant awareness of the irrigation industry in Australia and in particular the inner workings of the case study organisation. This experience enabled me to develop the diagrammatic representation of the nature of water reform pressure on Agribusiness irrigation value chains outlined in Figures 1.1 and 1.2 in section 1.6.

Whilst this background and experience has afforded a unique access to the case study organisation, it also presented research challenges in terms of objectivity. These risks, together with those associated with research based on a single case study, have been addressed in sections 3.2.4 and 3.4.

3.4 Ethics, validity and reliability
The challenge of ensuring objectivity in qualitative research, particularly where the researcher’s epistemological status is that of a participant observer, is well discussed by Angrosino and Mays de Perez (2000). They suggest that observation, in the context of complex qualitative study, is based on the constant of the researcher’s knowledge and judgment and therefore should be recognised as an important basis for validation.

3.4.1 Validity
In qualitative research, the validity of results interpreted by the inquirer in terms of their relationship to reality is a critical issue. In considering research validity, internal validity issues, as well as those of external validity, should be examined (Merriam, 1998). As Janesick (2000) points out, validity in qualitative research is all about whether or not the explanation fits the description, recognising that there are a number of ways of explaining a situation.

28 C2S and DDV2000 were irrigation lobby groups based respectively in the Lockyer Valley and Darling Downs regions of south east Queensland.
“Internal validity deals with the question of how research findings match reality” (Merriam, 1998, p. 201). In terms of internal validity, the research methods to be adopted for this study were based on exploratory in-depth interviews and a participatory approach to on-going case study communication processes. These activities facilitated on-going feedback from research respondents and consultation in the interests of consensus construction, and therefore ensured data and research findings reflect the multiple realities being studied. The process of iterative communication and reflection with the case study participants in this study assisted in ensuring this validity. As Reason (1994, p. 327) explains, “cycling and recycling between action and reflection so that issues are examined several times in different ways” helps address validity concerns in cooperative inquiry.

External validity represents the degree to which findings from one research exercise can be generalised to other settings. This research’s consideration of a case study, as well as the interviews with agribusiness and water reform opinion leaders in the background (stage 1) and post case study (stage 3) stages of the research plan (as summarised in Table 3.1) allowed for contrasting and comparing of the case study findings.

### 3.4.2 Reliability

Research reliability refers to the degree to which findings of research can be replicated in other research. A challenge in social systems research is that of comparing the findings of research of human activity and behaviour in different dynamic situations. As Merriam (1998) suggests it can be difficult to consider research reliability in qualitative research. Merriam (1998) proposes that this reliability issue can be addressed though through a clear description of the researcher’s role, theoretical underpinnings, assumptions made, and research processes employed, as well as the use of multiple research methods (triangulation).

In this research, the application of a range of research methods, and the description provided regarding theory to be tested and developed in the case studies, as outlined in the research plan (Table 3.1), were all intended to emphasise the reliability of the study and its findings. Fox-Wolfgramm (1997) contends that issues of transferability, credibility, confirmability and dependability are all useful in determining both the validity and reliability of dynamic-comparative case studies. Accordingly, by addressing validity of the research data as outlined in the previous section, and using methods that are transferable and replicable in other settings, the intent was to ensure the reliability of the findings from this research.
3.4.3 Ethics
There is a range of important ethical considerations in qualitative research. Merriam (1998) suggests that these relate to the interests of the people being studied in terms of the collection of data and the way in which it is disseminated. Pettigrew (1997) recognises that respect for the research subjects, their confidentiality, anonymity and attrition are paramount, and that such issues should be negotiated at the commencement of the research. Ultimately it is a matter of ensuring no harm comes to the human beings being studied in either the data collection process or the way in which it is reported (Fontana and Frey, 1994).

In this research, each phase began with a process of explanation and negotiation with all research participants in relation to the intent and objectives of the study, the way in which they will be engaged, and how results and findings are intended to communicated and reported. Confirmation of these conditions from the research participants was sought before the research begins, with a particular emphasis on the commercial-in-confidence or career or community related issues those respondents in the value chains being studied may have.

Ethical considerations of informed consent; right to privacy; protection from harm of any kind and a recognition of other human issues and dilemmas that may require a common sense approach were addressed in this research (Fontana and Frey, 2000). In accordance with University of Queensland procedures, official ethical clearance was sought and received before the research began.

3.5 Summary of research plan
This section summarises the research plan for this thesis based on the literature review presented in Chapter 2, the philosophical considerations raised earlier in this Chapter regarding research methodology, and the research questions outlined in Chapter 1.

This study began with a review of the status of Australian agribusiness irrigated value chains in terms of their on-going response to the water reform agenda. This included a discussion of the literature reviewed, as well as contemporary management challenges in irrigation value chains, in semi – structured interviews with a selection of irrigated agribusiness value chain opinion leaders and influencers. The objective was to create an overall picture of the various opinions and perceptions regarding the nature of water reform response from a range of irrigation industries.
Secondly a detailed case study in horticulture was undertaken as described in sections 3.2.3 and 3.2.4. Stake (2000) refers to a case study as an integrated system and the process of a case study as a holistic study of various complexities afforded through qualitative study. Whilst describing three forms of case studies; namely intrinsic (in which the particular detail of the case itself is the research focus), instrumental (in which the insights into a case are important as the basis for drawing generalisations), and collective (wherein an insightful study of a number of cases is conducted); Stake (2000) suggests that there is a need for a balanced approach to the intrinsic features of a case study and its instrumental value for generalisations in the interests of a holistic study.

The third stage involved collation of data from the case study. This was followed by a review with some of the original irrigated agribusiness opinion leaders, and case study supply chain members, so as to elicit their views of the findings from the case study. This approach to triangulation, which included a review of case study progress in terms of commercial outcomes – or commercial validation (as further detailed in section 3.4.1) was also consistent with the desire to understand multiple realities. As Stake (2000, p. 443) points out, “triangulation has been generally considered a process of using multiple perception to clarify meaning, verifying the repeatability of an observation or interpretation”.

Finally this data and the findings formed the basis of an analysis of the research findings and how they address the research problem, questions and objectives outlined in this thesis. The research plan is thus summarised in Table 3.1.
Table 3.1 Research Plan

- Stage 1. Background – a review of a selection of irrigated agribusiness value chains in respect of their attitudes towards the water reform process.
  - Continue review of secondary data on an on-going basis (environment, policy, industry and agribusiness media).
  - In-depth, semi-structured interviews and questionnaires with irrigated agribusiness value chain opinion leaders including:
    - Wine – Peter Hayes, Hardy’s Group, Adelaide;
    - Horticulture – members of the Australian Vegetable Industry Development Group’s (AVIDG) Vegetable Industry Exporters Network (VIEN);
    - Dairy – Bernard Kavanagh, Warrnambool Cheese and Butter Factory, Victoria;
    - Cotton – Graham Clapham, Darling Downs.
  - Collate a history of the case study organisation through in-depth interviews with family members of the case study organisation.
  - Compilation of consensus constructions with opinion leaders regarding the nature of the value chains to be studied, the role of the irrigator in the water debate, water use efficiency issues, water allocation principles, environmental responsiveness and corporate social responsibility.

- Stage 2. Establish and Scope Case Study. Use a three phase approach amended from Reason’s (1994) approach to a method of cooperative inquiry:
  - Phase 1: Case study background (prior to Case Study Participation) – 2005/2006.
    - Scope out the research to be conducted and procedures to be followed.
    - Begin iterative consideration of value chain management principles in relation to water reform commencing with in-depth interviews with key informant and other stakeholders in the Matilda Fresh case study.
    - Monitor involvement and progress as participants become immersed in the project.
    - Commence analysis between participants with a focus on consensus construction and internal validation.
    - Research throughout the value chains regarding value chain management practices and principles as well as perceptions of environmental performance.

- Stage 3. Data analysis and external validation of conceptual frameworks and new constructs with previously interviewed and surveyed irrigated agribusiness value chain and water reform opinion leaders.
3.6 Conclusion
This Chapter presents the methodology for this research into Australian irrigated agribusiness value chains.

My philosophical approach to this research, based on how I view reality, is that of a constructivist – I recognise the existence of more than one construct of reality. Ontologically this allows the research to consider the multiple realities held by those who will be studied. This facilitated the consideration of a range of differing opinions in the competitive context of Australian irrigated agribusiness value chains.

From an epistemological basis, this constructivist orientation required that I be interactively linked with the research process such that I would be a direct participant in the gaining or development of knowledge about the research problem. Methodologically this implied an inductive approach in which qualitative research principles were applied to the case study and other research stages as outlined in Table 3.1. Consistent with a constructivist approach, this was undertaken with a view to reaching a consensus construction regarding the value chains and their responsiveness to environmental pressures.

A range of methods, or data collection strategies, particularly in-depth interviews, and the case study itself, has been outlined in the research plan for this study. The key research methodology of this thesis was focused on the Matilda Fresh case study, and it is here that much of the conclusions from the literature review, my own experience and opinions, and the constructs of water reform and irrigated agribusiness value chain opinion leaders was focused. As Stake (2000, p. 444) concludes: “the conceptions of most naturalistic, holistic, ethnographic, phenomenological case studies need accurate description and subjective yet disciplined, interpretation; a respect and curiosity for culturally different perceptions of phenomena; and empathetic representation of local settings – all blending (perhaps clumped) within a constructivist epistemology”.

Based on the research methodology outlined in this Chapter, the next Chapters (Chapter 4 Matilda Case Study and Chapter 5 Thesis Conclusions), address the literature gap between water reform management and value chain management that was identified in the literature review included in Chapter 2 and depicted in Figure 2.1.
4 Matilda Group case study

4.1 Introduction

Based on the research methodology outlined in the previous Chapter, this Chapter provides a detailed description and background of the organisation that forms the case study for this project – Matilda Pty Ltd.

This Chapter presents data collated in the case study and other research as outlined in Chapter 3 – Research Methodology, and those data are in turn analysed in Chapter 5, Thesis Conclusions.

In particular, this Chapter outlines:

- a description of the case study organisation, its structure and management based on in-depth interviews with key Matilda personnel and members of the supply chains in which Matilda was engaged;
- the historical context, for the purposes of this research, of the case study organisation since the 1950’s (again based on in-depth semi-structured interviews with key Matilda personnel and members of the supply chains in which Matilda was engaged), including:
  - the irrigation industry and agribusiness development activities of three generations during that period, including some of the supply chain and other pressures encountered in the transition from management by the second generation to the third generation;
  - industry views on the water reform process and its implications for irrigated agribusiness in Australia;
  - a summary of involvement in regional water politics and on-farm water initiatives, and some of the value chain management issues encountered therein; and
- a synthesis of the case study and other data in relation to the research questions posed in this thesis.

The relationship between the research plan (Chapter 3), the analysis of the data outlined in this Chapter, and the research questions (introduced in Chapter 1 with supporting rationale in the literature review covered in Chapter 2), is depicted in Figure 4.1 as follows.

- Stage 1 of the research plan, including secondary data review, opinion leader interviews and an account of the history of the Matilda organisation based on interviews with family and executive members has informed the description and background to the case study organisation in sections 4.2 and 4.3 of this thesis.
Stage 2 of the research plan which scoped the case study and involved informant and stakeholder interviews together with a significant degree of participant observation further detailed the description of the case study organisation and provided the bulk of the data relating to sustainable water management issues and value chain engagement activities as required by the research questions and outlined in sections 4.4 and 4.5 (synthesis and validation of data).

Stage 3 of the research plan which involved post case study analysis and observations of the eventual demise of the Matilda organisation further assisted the validation of the case study data outlined in section 4.5.

By describing the case study organisation, and collating and analysing the data collected through the research methodology outlined in Chapter 3, conclusions are drawn in Chapter 5 in relation to the research problem, such that implications from this thesis can be outlined. In this way, objectivity of this research is preserved by separating the results from the discussion of their significance (Perry 1998, p. 26).

4.2 Description of the case study organisation

The Matilda Group of companies, under the banner of Matilda Pty Ltd as the parent company, includes Matilda Fresh Foods Pty Ltd and Matilda Farms Pty Ltd. Matilda Fresh Foods is also referred to as MFF or the ‘processing’ business in this thesis, with Matilda Farms also referred to as MF or the ‘farming’ business.

4.2.1 Matilda Fresh Foods Pty Ltd

Matilda Fresh Foods Pty Ltd (MFF) is a processor and marketer of a range of fresh and packaged vegetable products to Australian and international markets. At the time of the case study the company was based at a modern factory at Charlton on the western outskirts of Toowoomba Queensland (see Plate 4.1), and employed approximately 30 people across a range of administrative, marketing, client service, processing packing and logistics functions.

MFF’s product range included:

- fresh chilled broccoli for the wholesale market in Australia, generally sold to Murray Brothers in Brisbane and a selection of other domestic agents in Sydney, Melbourne and Adelaide;
• fresh chilled broccoli for international markets including Japan, Taiwan, and Singapore (although the relatively high Australian dollar in recent years has reduced this trade significantly by 2008);
• fresh broccoli florets in tubs (see Plate 4.2) for domestic retail trade sold to the Coles Group, and other retailers through wholesale market (e.g. via Murray Brothers to IGA), and local regional retail trade on a direct basis;
• fresh broccoli in larger ‘catering packs’ sold to the local catering trade and elsewhere through the likes of Golden State Foods Australia (GSF);
• fresh cauliflower florets in tubs for domestic retail trade sold to the Coles Group, and other retailers through wholesale market, and local retail trade on a direct basis;
• mixed cauliflower / broccoli florets in tubs (sold the same way as broccoli and cauliflower tubs outlined above);
• cut & wrap cauliflower (see Plate 4.3) and cabbage products for Coles Group;
• onions in bags and returnable plastic crates (RPCs); and
• during the later stage of the case study MFF was establishing a new supply agreement with Woolworths through which a similar product range to that distributed to the Coles Group was to be supplied.

Plate 4.1: Matilda processing facility and packing shed, Charlton Toowoomba, June 2008
4.2.2 Matilda Farms Pty Ltd

Matilda Farm’s (MF) head office is located in Toowoomba Queensland from which company properties in three different farming locations are coordinated: the “Wando” aggregation on the Darling Downs west of Toowoomba (see Plate 4.4); “Gunalda” via Gympie Queensland and a property east of Armidale in New South Wales. The business operates with approximately twenty staff and is engaged in grain growing, cotton growing and horticultural production.

MF’s horticultural product range included broccoli for MFF, cauliflower for MFF, onions for MFF and lettuce grown for GSF.
4.2.3 Management and activities
Both companies are managed by members of the Jauncey family with a family based board of directors coordinating activities across the group. Various consultants are used in the areas of agricultural production, finance, marketing and management. The predominant supply chains that the Matilda group has become involved in during recent years include that supplying broccoli and cauliflower to Coles and that supplying lettuce and other products to GSF Australia.

4.3 Case study organisation background
The Matilda organisation has a rich history of farm and organisational development that provides an important backdrop for this thesis and the case study on which it is based. It is useful to consider that broad context in relation to the research questions before addressing the case study data in more detail.

This section addresses that history together with the organisation’s responses to external and internal factors concerning sustainable irrigation management practices. Those factors include water politics (external) and on farm initiatives (internal).

4.3.1 Historical background
The history of the Matilda Group can be traced back to the farming development activities of the late Bill Jauncey in the 1940’s, through the farm and business management pursuits of his
grandchildren James Jauncey and Sonya McConville some 70 years later. A brief record of that history, from the irrigation establishment and customer orientation activities of the first generation, through to the significant business expansion activities of the third generation, is included in Appendix 1. This record of the Matilda history is based on numerous semi structured in-depth interviews with members of the second and third generations of the Jauncey family that were conducted in the first phase of this project prior to the commencement of the case study research. That record also outlines the range of strategic management challenges that were being faced by the third generation at this time of this case study.

4.3.2 Water politics

As outlined in Appendix 1, the Jauncey family has a long association with irrigation industry developments and politics on the Darling Downs. From irrigation establishment on the Wando farming aggregation in the 1950’s, through to this case study, Bill Jauncey, and later his son Phil and his family were instrumental in the Condamine River Basin Irrigators Association (CRBIA), the irrigation water supply lobby group Darling Downs Vision 2000 (DDV2000), the recycled water lobby group NUWater, and various State Ministerial Taskforces and Federal Interdepartmental Water Committees. This involvement, similar to the experience of industry organisations and community groups seen to be involved in the national water debate across the country (Wolfenden et al., 2001 and Reeve et al., 2003), covered a range of topics including irrigation scheme development, water access rights, and promotion of new irrigation water supply schemes. This period was witness to an increasing recognition by the local irrigation community as to the challenges they faced in relation to securing long term economically and environmentally sustainable water supplies.

Throughout this entire period, the irrigator representative bodies have been successful in gaining the attention of governments at all levels with varying degrees of success. The most successful activities in this regard have been those where wider community involvement and support has been evident – particularly where the entire supply chain has been involved in not only expressing support for initiatives proposed but actually contributed financially to the research and development required to professionally prepare such submissions for government consideration. Such an approach is in line with the importance place by the Institution of Engineers Australia on local community involvement in water and environmental management (IEA, 2003).
4.3.3 Farm enterprise level water initiatives

A review of the historical background of Matilda, as outlined in Appendix 1, reveals a number of enterprise based initiatives to improve both water use efficiency (i.e. maximising the commercial return of every megalitre of irrigation water available), and access to new water supplies.

- Temporary transfers
  Managers in the organisation sought extra irrigation water as required for crop establishment and/or completion on an as needed basis from the local water trading market. This involved advertising publicly and directly that the organisation wished to purchase a temporary transfer from other irrigators with a licence on the same regulated system, or responding to notices that such temporary transfers were available. Such transactions were conducted on an as needed basis and were therefore only of value in addressing immediate crop needs.

- Agronomic strategies
  As is common practice among irrigators, farm design and management in the Matilda organisation involved a number of agronomic strategies being employed (such as crop and variety selection, water management reporting, and transplanting) in order to ensure the most efficient use of water available to a crop.

  **Crop and variety selection**, whilst based on marketing strategies, was also dependent on soil moisture profile, the utilisation of that moisture by various crops, rotations between various crops, and the degree to which this affected required irrigation water supply to individual paddocks.

  The decisions surrounding such strategies required the maintenance of a water budget designed by Matilda management around the concept of water management reporting. **Water management reporting** provided data in terms of predicted soil moisture profiles, required water supply to establish, maintain and finish a crop, and thus extra water supply that may be required for that purpose. Specific personnel, commonly and affectionately referred to as ‘irrigologists’ in the Matilda organisation, were required to implement and manage those budgets in terms of water flow pumping and management around the farms, irrigation tasks (syphon management, head ditch and paddock maintenance or sprinkler and piping maintenance depending on the irrigation methods employed on different farms).
The shift from direct seeding of horticultural crops (which Matilda had conducted based on similar planting methodologies for cotton, grain and other broad acre crops more traditional on the Darling Downs) to the more expensive planting method of transplanting (which was more in line with the use of seedlings for planting into the field in the more traditional horticultural production areas such as the Lockyer Valley), was based on a decision to avoid the use of Matilda’s own irrigation water supplies for the purpose of crop establishment. Matilda had concluded through discussions with Withcott Seedlings that the use of seedlings rather than direct seeding would reduce the amount of irrigation water used in the important establishment phase of a direct seeded crop. It was further concluded by Matilda that Withcott Seedling’s production system in greenhouses was water efficient and in terms of Matilda’s farming activities was occurring in a different catchment area.

- Development strategies
  A review of the history of the Matilda organisation (see Appendix 1) covers a range of succession, organisation restructuring and business development activities designed to spread the risk of water access and at the same time reduce the entire organisation’s exposure to such risks.

  Succession planning for the third generation in particular involved the separation of an earthmoving business from the parent company so that one of the third generation members could pursue a non-agricultural career, and the organisational restructuring in the remaining business into farming activities and produce marketing activities – each of which were to be managed by the two other members of the third generation.

  Appendix 1 also covers the business expansion activities of the third generation, through new farm development in differing regions and new irrigation infrastructure development on new and existing farms, which were deliberate enterprise level strategies to address water access and water use efficiency.

- Supply chain relationships
  Matilda’s market and business development activities involved a gradually increasing level of supply chain consultation, with new customers and markets, as well as new supply chain partners. Many of the relationship development features identified in Wilson’s (1995) model of

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30 Withcott Seedlings is a commercial seedling business based at Withcott Queensland and supplying vegetable growers throughout Queensland and New South Wales.
relationship development (see section 2.3.4(c)) including partner selection and setting relationship value, were recorded in this phase of the research. Partners included a range of fuel, fertiliser and machinery input suppliers, bankers and especially Withcott Seedlings (who not only provided seedlings for the new crops Matilda moved into such as lettuce, but were also instrumental in introducing Matilda into the GSF/McDonalds supply chain).

### 4.3.4 Supply chain engagement

The historical context of Matilda included in Appendix 1 indicates a rich history of supply chain relationships from the first generation of Jaunceys involved in irrigation in the 1950’s. By the time of third generation management of the enterprise, Matilda was a member of a number of supply chains in the horticulture, grain and cotton industries. As the third generation began to significantly expand the business, it was apparent that other members of these supply chains were becoming increasingly interested in Matilda’s irrigation water management practices.

### 4.3.5 Industry perspectives

As outlined in Chapter 3, Research Methodology (see section 3.5), the first stage of the research plan for this project (prior to commencing the phases of the case study) included research about and consultation with irrigated agribusiness value chain and water reform opinion leaders for the purposes of investigating prevailing attitudes towards water reform in Australia.

Interviews were conducted with the following:

- **wine industry** – Mr. Peter Hayes, Chairman Commonwealth Research Centre for Irrigation Futures and former Senior Executive with the Hardy’s Group, Adelaide;
- **dairy industry** – Mr. Bernard Kavanagh, Business Development Manager, Warrnambool Cheese and Butter Factory (then Australia’s largest manufacturer of cheese products), Victoria; and
- **cotton industry** – Graham Clapham, Cotton grower and Board Member of Darling Downs Cotton Growers Association.

Key conclusions from these interviews included the following.

(i) Irrigated agribusiness value chains in each of these industries share a high level of knowledge of the water reform process. Wine grape and dairy producers are most acutely aware of water uses efficiency principles in their industries given the direct correlation between yield of product and water input availability.
The predominant irrigation technologies used in each industry are: cotton – flood irrigation in furrows; dairy – overhead sprinkler application to pastures; and wine – drip irrigation to vines. Of these the flood irrigation practices in the cotton industry have come under most public scrutiny.

The expertise and technology developments in irrigation technology are most advanced in the wine and cotton industries due to relative value of the crop being irrigated (i.e. high value cotton and wine as opposed to the lower value pasture used as an input to dairy production).

The cotton irrigator has typically become more involved in the water reform debate than his or her wine and dairy counterparts. This was concluded to be due to the higher public scrutiny on the cotton industry’s use of irrigation water; the relatively higher volume of water used in cotton production and hence the higher capital outlay required for water licences, and storage and pumping infrastructure necessary for cotton production.

Each believed the end consumer was not well informed of water used in the production of their products, and hence typically did not see a link between their demand and irrigation water used to satisfy it.

Value chain management principles were being implemented in chains in each industry. The focus of such chains was primarily on productivity and input cost management. Industry wide promotional activities were observed in the cotton industry, to a lesser extent in dairy, but were virtually non-existent in wine where many producers either had, or held strong chain relationships with wine brand owners.

Environmental and sustainability principles were being pursued in each industry at an industry level, through various irrigation efficiency research and development programs, but there were few examples of non-irrigator value chain members in either industry wishing to influence irrigation practices.

4.3.6 Case study background and the research questions

The history and background of Matilda considered in the sections above, and in Appendix 1, provide some initial information in relation to the research questions in this thesis.

In relation to the first question –

*How do sustainable irrigation management practices compare against other strategic management issues facing managers of irrigation firms within Australian food value chains?*
it is apparent that as an agribusiness organisation Matilda had a wide range of strategic management issues to deal with, from agronomic and asset management issues through to personnel management and succession planning. The Matilda background further suggests that sustainable irrigation management issues were among the most critical of strategic management issues facing the organisation given the extent of enterprise level and broader industry level irrigation initiative that the organisation pursued.

In relation to the second research question –

*Can members other than the irrigator-producer in Australian food value chains influence sustainable irrigation water use practices, and if so, how;*

the case study background suggests that value chain members other than the irrigator-producer could possibly influence sustainable irrigation management practices as indicated through the various interactions between Matilda, its bankers and customers in relation to farm management and planning.

In terms of the third research question –

*Does the presence of value chain management principles ensure that responsibility for sustainable irrigation water management can be shared throughout the food value chain, and if so, how;*

the case study background and history provides little information, other than to suggest that value chain management features such as information sharing and transparency, shared objectives, communication and collaboration were being implemented in the supply chains of which Matilda was a member.

These broad observations from the historical context of the case study organisation in relation to the research questions will be considered in further detail in the synthesis of case study data in the next section (4.4) and the thesis conclusions (Chapter 5).

### 4.4 Synthesis of case study data: addressing the research questions

In this section data gathered in this case study and other background research, based on the research methodology outlined in Chapter 3, has been analysed with regard to the research questions.
For the purposes of this analysis the key phases in the case study, including:

- Organisational background perspectives;
- Phase 1: Case study background (prior to Case Study Participation) – 2005/2006;
- Phase 2: Case study participation – 2006/2007;
- Phase 3: Post case study data synthesis and validation – 2007/early 2008;

are considered along with other data collected in relation to each of the three research questions. The relationship between the original research design, as summarised in section 3.5, the structure of this analysis of case study and other research data, and the relationship with the research questions is represented in Figure 4.1 below.

It should be noted in this Chapter that reference to the research methodology and methods employed in each of the key research phases outlined above, as referenced in section 4.4.1 dealing with the first research question, apply equally to analysis of the same phases described in the following sections 4.4.2 and 4.4.3 relating to the second and third research questions respectively. The same applies for literature references relating to observations in these phases.
Figure 4.1 Relationship between research plan, analysis of data, and research questions

Summary of research plan (see section 3.5)

Structure of analysis of case study and other data to address research questions

Research questions

1. How do sustainable irrigation management practices compare against other strategic management issues facing managers of irrigation firms within Australian food value chains?

2. Can members other than the irrigator-producers in Australian food value chains influence sustainable irrigation water use practices, and if so, how?

3. Does the presence of value chain management principles ensure that responsibility for sustainable irrigation water management can be shared throughout the food value chain, and if so, how?
4.4.1 Research Question 1 issues - comparison of irrigation management practices and other strategic management issues

(a) Organisational background perspectives

By mid-2005 the Matilda organisation had begun in earnest the process of separating the farming business from the processing activity. The company has previously engaged the services of Dr Allan Twomey of Excel Consulting Pty Ltd a Queensland based management consultant with experience in agribusiness planning and development. Dr Twomey was instrumental in assisting Matilda in gaining industry funding assistance and grants through Horticulture Australia Limited, and the Federal Government’s Food Innovation Grant and Commercial Ready programs.

Inherent in the business and project plans that underpinned the successful applications for these funding programs was the separation of the farming business from the processing entity. Analysis of records of meetings between Dr Twomey and Matilda executives that were collated for the purposes of this research in line with the research plan (see Table 3.1), together with funding application documentation, confirmed that the project funding awarded under these programs was allotted to three key research and development areas:

- the development of a mechanical broccoli harvesting prototype (farm business based project);
- Varietal and agronomic research intended to develop broccoli crops more suitable for mechanical harvesting incorporating a higher head and less waxy leaf material (another farm business based project); and
- the use of robotic equipment in the processing and packaging of harvested broccoli (a processing business based project).

These projects and the concurrent formal separation of the farming and processing businesses also heralded the appointment of new senior staff including Mr Andrew Waddell, an experienced Sales Manager with international experience in the mining equipment industry, whose role it was to manage these projects and ensure their transition into sustainable project development and new business activities for the Matilda Group.

The analysis of results of the individual in depth interviews with Jauncey family members and key staff confirmed that the motivations for this separation of the business activities included the following.
• Recognition of the need to pursue an increased margin from the products and activities that Matilda was involved in by vertical integration into processing and packaging of the products produced on their farms.
• A desire to secure better access to a consistent packaging labour pool (for all planned processing and packaging activities including the primary packaging activities traditionally carried out in farm packaging sheds in close proximity to the production fields) by shifting these activities to a more populated area.
• A desire to create an independent ‘off farm’ asset (land and buildings) in the form of stand-alone packing facilities rather than more ‘sheds on the farm’.
• Succession planning in order to accommodate varying career and investment aspirations of the next generation.
• Separate the risks associated with the two facets of the business (farming risks vs. marketing risks).
• Improve relationships and hence supply chain knowledge beyond those clients traditionally serviced from the farming activities.
• A need to focus on the requirements of the domestic market.
• An objective of facilitating sourcing of product from other farmers and production regions in order to meet anticipated demand forecasts and objectives.

The motivations outlined above culminated in the planning and construction of a new processing, packing and dispatch facility in Toowoomba. The analysis of these interview results, involving consensus construction methods (see section 3.2.4) was quite straightforward given the consistency of responses and involved discussion around the grouping of issues raised under similar headings. These groupings were subsequently confirmed as appropriate in follow-up interviews with Phillip Jauncey.

It is clear from the background research conducted prior to the case study phase as per the research plan, that access to sustainable supplies of irrigation water was a fundamental risk being addressed by Matilda through the efforts of the third generation in their business development activities. Be it the spreading of financial risk of water access on the original Wando farming aggregation, or the seeking of produce from other growers in other horticultural production regions of Australia, as outlined in Appendix 1, the separation of farming from processing business assets represented the culmination of water risk assessments conducted over many years. This played out in various iterations of both on-farm, regional and industry level attempts to secure more reliable water supplies for the organisation (pers. comm., Phillip Jauncey, February, 2006).
This risk management approach was also inherent in Matilda’s broader recognition of community concerns regarding water use by irrigators. From a national water reform perspective this accorded with what McKay (2003) referred to as an increased community recognition of environmental and sustainability issues (see section 2.2.1). As an organisation Matilda had a history of engaging in water reform debates based on this recognition.  

Following completion of the case study and data validation stage of this project, it became clear that the Matilda organisation was under increasing production performance and hence financial pressure. Whilst analysis of this period of the organisation’s history was outside the scope of this thesis, I was afforded further access to Matilda executives and Jauncey family members during the final stages of my data validation activities. This exposure confirmed that the organisation was indeed under critical pressure and the Matilda companies were placed in receivership in October 2008. Whilst this presented an unexpected development for me as the researcher, and heightened the imperative to remain objective in my observations despite the obvious emotional turmoil those that I had come to work with closely in the case study found themselves in, it did not impact on the research plan itself and provided further perspectives that have been referred to, and incorporated in, the analysis and conclusions from the entire study.

One of the key perspectives drawn from discussions regarding the demise of the business was that of the changing climatic conditions during the course of the case study which saw drought conditions in a range of alternative horticultural production regions abate. This had the effect of providing the retailer and food service company in the case study value chain with alternative supply arrangements. At the commencement of the case study phase, when most of the horticultural production regions of Australia were in the midst of a prolonged drought, the water use efficiency principles and risk management strategies presented by Matilda were of significant attraction to the retailer and food service company. Whilst those organisations had alternative supply arrangements re-emerge in other areas as the drought abated elsewhere, Matilda had no such supply chain alternative and competitiveness with other regions therefore began to put pressure on the developed value chain relationships.

As drought conditions abated the community pressure on irrigators in terms of water use rights and water use efficiency also began to reduce. With a change in federal government allocation pressure nevertheless increased and further government water reform programs began to be implemented (e.g. water buy back in the Murray Darling system, and reductions in annual announced allocations)

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31 Appendix 1 provides a historical context to Matilda’s engagement in the water reform process.
in various irrigation regions). It is envisaged that the nature of such programs and government policies on which they are based could alter again in the future as relatively higher rainfalls and water flows return to many Australian irrigations regions.

(b) Case study phase 1 perspectives

As outlined at the beginning of this Chapter, Phase 1 of the case study involved research of the expansion activities immediately prior to my engagement as a participant observer. This stage is best summarised as a period of strategic planning and business development activities in the 2005 and 2006 calendar years.

The process and outcomes of a strategic planning workshop in early 2005; a change management workshop in mid-2005; background discussions with key stakeholders in the organisation; and the record of other significant events is summarised and analysed below.

- Strategic Planning Workshop, 20th April, 2005
  I was invited as an observer to a Matilda management team workshop as an introduction to this PhD project in order to be introduced to team members and to gain a preliminary understanding of development in the organisation. Whilst it was clearly recognised that the project’s research design was yet to be developed and that my involvement in a potential Matilda Case Study for the purposes of the project was unlikely to begin for another twelve months, the Chairman of Matilda Phillip Jauncey was keen to ensure I was exposed to a background of the organisation. The fact that he was also the industry sponsor of my scholarship with the CRC for Irrigation Futures was further confirmation of my early exposure to the Matilda organisation as a PhD scholar, an exposure that would develop into the participant observer status as outlined in section 3.3.

  The workshop grappled with the following key issues.

  o Developing a cooperative interdependent yet independent relationship between Matilda Farms and Matilda Fresh Foods. The new organisations began to recognise the need to be arm’s length in terms of transfer pricing and yet continue to be supportive of one another. It was clear they were beginning the process of transitioning from a relationship based on being divisions of the same company to that of supply chain partners, sharing similar corporate values.

  o Matilda Farms fundamental approach to managing water risk was confirmed as including:
    - the optimisation of Wando water supplies;
• continued development of agronomic practices and tools that would facilitate more efficient water use;
• pursuit of alternative crops representing a higher return per mega litre; and
• investigation of farming opportunities in other regions rather than ‘extra acres in the same neighbourhood’ (pers. comm. James Jauncey 20 April 2005).

Despite the intent of this agreed approach to managing water risk, it was ironically to present an increased exposure to supply chain management risks at a later time.32

• Matilda Fresh Foods would focus on market development and new product development opportunities, with Matilda Farms to remain focussed on irrigated horticulture production (in order to supply Matilda Fresh Foods) as well as other crops (which not only included the traditional non-horticultural crops of cotton as grains as originally envisaged, but later was to include horticultural crops such as lettuce sold direct to clients including as GSF and not handled through the Fresh Foods business).

• Matilda Fresh Food’s fundamental approach to managing water risk would be to develop its own supply chain in terms of new growers from diverse regions (thereby spreading the access risk) who were judged by Matilda to be professional producers or willing to adopting farming practices as developed by Matilda Farms systems (based on the Matilda group’s own experience in water management and water use efficiency).

• Matilda Fresh Foods would develop its own supply chain management functions and systems in order to sustain supply, and that this would be supported by:
  • the establishment of a new Supply Chain Manager position, the appointee to which would require horticulture farming and agronomic experience in order to source product for larger volumes that could be handled (and were required for economic reasons) in the new shed, as well as supply budgeting and management; and
  • the establishment of a new Business Development Manager position with the responsibility of developing and managing demand for the developing processed and packaged product line.

• Both organisations would review administrative efficiencies, and all possible operational initiatives that could potentially result in improvements in financial returns.

32 The two separate but related organisations became “doubly” exposed to supply chain management risks by the time that MFF’s differentiation was seen at least in part by its clients and supply chain partners as being based the innovative and world’s best practice horticultural production activities of the related Matilda Farms business – see Appendix 1).
• The group agreed that it should formally change to a domestic market orientation given challenges in export markets given the increasing exchange rate value of the Australian dollar together with lower cost (particularly Chinese) competition. It was later confirmed that 2007 was the first year in which the company did not conduct a marketing trip to Japan and other export markets in almost 20 years.

• Change Management Workshop, 13th July 2005
The Matilda management team decided to hold a further workshop in July 2005 and again I was invited to observe as a part of the backgrounding exercise for the Matilda case study.

This ‘Change Management Workshop’ was intended to follow up the strategic planning workshop held three months earlier with a particular focus on the challenges being faced by the management team in terms of separating management activities in the farming and processing businesses at the same time as needing to remain integrated in some key functional areas such as finance. The workshop, facilitated by Dr Alan Twomey of Excel Consulting, primarily considered the impacts on the roles and responsibilities of key management personnel during the preceding period. Key impacts and challenges noted included:

- a range of current farm, supply chain, processing, marketing and administration management concerns;
- a lack of up to date management information;
- a perceived blurring of the group’s vision; and
- an agreed need to refocus on required operational and administrative systems and processes in each business, between each business, and through the developing supply chain.

During the workshop it was agreed that access to water supplies was recognised as a significant risk being managed in the planned evolution of the original Matilda operation into Matilda Fresh Foods and Matilda Farms. Actual sustainable irrigation practices though were seen to be something that Matilda could handle during what was recognised as the then current start-up phase – i.e. “we need to make sure we can get water and then we will worry about how we most sustainably use it because we know how to do that.”

The example addressed in the literature review (see section 2.3.4 (b)) of the Harvard Business Review’s annual survey, HBR List of Breakthrough Ideas for 2005 (HBR 2005) is indicative of the range of strategic considerations that Matilda faced at this time. The ‘start-up’ phase was

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very definitely one in which sustainable water use was recognised as important, but one that
would be addressed in Matilda’s normal course of agronomic and farm management. This
significant expansion phase, as measured by the proposed key performance indicators this
workshop, placed business fundamentals and supply chain realities to the fore.

- **Background discussions with key stakeholders**
  During Phase 1 of the case study research, semi structured background interviews were also
held with a range of key Matilda personnel, key supply chain members and company contacts,
and neighbouring irrigation enterprises in the Darling Downs region in which the Matilda
operations were based. An example of the research guide used for such interviews, in line with
the methodology and methods described in section 3.2.4 is included in Appendix 2. Those
interviewed included:
  - Phillip Jauncey, Managing Director (later Matilda Chairman as the farming and processing
    entities were separated);
  - Dianne Jauncey, Phillip’s wife and part-time member of the management team in the area of
    human resource management;
  - Sonya McConville, Phillip and Dianne’s daughter and soon to be appointed Managing
    Director of Matilda Fresh Foods Pty Ltd;
  - Antony McConville, Sonya’s husband, Matilda Agronomist and soon to be appointed
    Supply Chain Manager of Matilda Fresh Foods Pty Ltd;
  - James Jauncey, Phillip and Dianne’s youngest son and soon to be appointed Managing
    Director of Matilda Farms Pty Ltd;
  - Sherah Jauncey, James’ wife (not involved in the management or operations of the Matilda
    Companies in any capacity);
  - Dan and Renee Jauncey, Phillip and Dianne’s eldest son and his wife, who took on and
    developed the ultimately very financially successful Matilda Earthmoving and Matilda
    Equipment businesses as totally separate entities to the Matilda Farming and Fresh Foods
    businesses;
  - Andrew Waddell, Sales Manager and soon to be appointed Sales and Marketing Manager of
    Matilda Fresh Foods Pty Ltd;
  - Dr Allan Twomey, Excel Consulting, Matilda management consultant;
  - Steve Edwards, Murray Brothers Brisbane (Matilda’s wholesale market agent in the Rocklea
    Markets Brisbane);
  - Royce Brown, Regional Manager State Development Toowoomba (assisted Matilda to
    secure a number of Government funded market development grants); and
neighbouring and local Darling Downs region irrigators including Graham Clapham and David Armstrong of Nangwee, David Thompson of Mt Maria and Paul McVeigh of Nandi.

Consensus construction based on the data gathered in these interviews, a method used in line with that described in the research methodology Chapter (see section 3.2.4) enabled me to collate responses and comments made during these interviews in relation the strategic management issues being addressed by the organisation’s personnel and observers.

Throughout these interviews it became clear that there were among other strategic management issues certain succession planning and family relationship tensions. These were evidenced by responses and comments covering a number of factors including Dan and Renee’s very strong desire to separate their business activities totally from other family enterprises; James and Sherah’s desire to manage the farming operations but live some 75km away in Toowoomba; conflicting farm management and agronomic management priorities of James and Antony; and the competing financial demands of second and third generation families at different stages (e.g. impending second generation retirement planning vs. newly marrieds requiring funds for overseas travel vs. the childcare and schooling expenses faced by the family of an older third generation sibling).

From an executive and management team perspective it was clear that there was an overriding desire to continue the organisation’s history of developing strong supply chain relationships with produce, grain and cotton clients through investment in direct marketing activities wherever possible, rather than a perceived dependence on agents. In terms of irrigated horticulture product lines though, this desire was accompanied by concern based on previous experience suggesting that Australian supermarket businesses were unpredictable in such relationships.

It was made clear during these interviews that Matilda had implemented a number of strategic initiatives to underpin their performance in relation to consistency in volume and quality of produce for their customers. Evidence of this was included in documentation (e.g. funding applications, project contracts, project milestone reports and irrigation development design plans), provided for the purposes of this research, that was related to:

- a Horticulture Australia Limited (HAL) funded project (#AHR VG06033) to focus on crop uniformity to facilitate mechanical harvesting;
• a Food Innovation Grant (FIG) funded research and development project focused on a mechanical broccoli harvester prototype; and
• irrigation development trials with the assistance of David Lobwein of the irrigation design and equipment supply firm South West Water Services.

The interviews also revealed a shared belief among the organisation’s management consultants and advisers that whilst the management team was recognised as entrepreneurial, innovative and astute in business dealings, the Matilda Farms and Matilda Fresh Foods businesses were undercapitalised. Nevertheless these consultants and advisers saw the Matilda operation as a proven and successful export and domestic supplier of a consistent quality of produce;

Neighbouring and district irrigators shared a similar level of admiration for the crop and farming innovation being pioneered by Matilda and the level of risk and marketing challenges that the organisation was therefore embracing. At the same time though many expressed the view that the Matilda operation had insufficient irrigation water supplies to support neither the farming area being developed nor the number of families apparently earning an income from it.

Based on the above observations and findings from the first phase of the case study research, it was ultimately clear, through the strategic planning exercises outlined above, and cognisant of the views of consultants, advisers and other stakeholder and industry peers, the Matilda management team had agreed that planned new farm developments in other production areas were necessary. This was despite a growing reluctance from the then Matilda bankers to continue supporting further expansion. Nevertheless such expansion was seen as be necessary, given the Darling Downs climate and its inherent water supply challenges, in order to complement and expand the original Wando aggregation’s production capacity.

(c) Case study phase 2 perspectives
Phase 2 of the case study research involved participant observation in the case study itself, and engagement that continued throughout most of the 2006 calendar year. This included participant observation through:
• attendance at weekly management meetings for both companies;
• attendance at all board meetings;
• accompanying the managers of both Matilda Farms and Matilda Fresh Foods on marketing visits to the Rocklea Markets, Coles Group (Supermarkets) head office in Melbourne, Woolworths in Sydney, GSF in Sydney and return visits from the same clients to the Matilda
Fresh Foods processing facility in Toowoomba, and the Matilda Farming operations on the
Darling Downs;
• accompanying Directors in meetings with existing and prospective bankers, accountants and lawyers; and
• accompanying the Matilda Fresh Foods Supply Chain Manager on visits with external suppliers on the Darling Downs, Granite Belt, and Canowindra NSW areas.

It was through the iterative interpretation (Gubrium and Holstein, 2000; Pettigrew, 1997) with organisational members regarding the results and outcomes of these internal meetings and external supply chain interactions, that I, as a participant observer, was able to both assist in gathering and interpret the following observations.34

There was an apparent level of confidence both within the Matilda organisation and throughout the supply chain, that despite the fact that prevailing drought conditions that had continued since the early 2000’s, that the drought would break at some stage and that all community uses, not just irrigation, would need to be justified in the future. This observation was in line with the literature suggesting that the national water reform debate was well accepted and supported by the broader community (Productivity Commission, 2005) and that there was a need to consider the status of all river systems in the future (Productivity Commission, 2005) together with the competing demands of all consumptive uses (Turnbull, 2006).

It was clear during this second phase of the research there was a significant ramp up in business development activities under the management of the third generation. Their broadening range of strategic management responsibilities included:
• human resource management;
• cash flow, finance and bank relationship management;
• processing/packaging machinery and systems;
• agronomic factors across different farms and soil types; and
• the development of new mechanical harvesting equipment.

The engagement by the third generation in these developing responsibilities involved the continuing development of cooperative relationships outside of the firm in order to pursue productivity and profitability gains. This reflected to a great degree the various concepts in supply chain management, including customer demand for product range and quality together with efficiency and resource limitation drivers, identified by Wisner (2003). It also accorded with Dunne’s (2001)

34 See research methods in section 3.2.4
observation that internal firm considerations and the external considerations of relationship marketing are among the bases for value chain management.

Throughout this phase it was also abundantly clear that irrigation water access remained a key strategic issue as was further evidenced by the fact that Matilda Fresh Food’s external supplier recruitment was based on both the needs to meet seasonal production windows and spread water access risks across various production areas.

(d) Case study phase 3 perspectives
Phase 3 of the case study research involved the period of reviewing and validating the outcomes of the case study itself. This included:

- in-depth semi-structured interviews (in line with the research methods outlined in section 3.2.4) with key Matilda personnel given that I was no longer involved as a participant observer in weekly management meetings and period board meetings; and
- triangulation and validation of case study outcomes through semi-structured interviews with industry stakeholders and observers including members of the Australian Vegetable Industry Development Group’s (AVIDG) Vegetable Industry Exporters Network (VIEN).

Observations from this phase confirmed that irrigation water supply was among the most important strategic issues facing horticultural producers throughout Australia. AVIDG VIEN members in particular (as evidenced in their meetings that I attended as an independent adviser) recognised what they saw as the plight of Matilda, even though they saw them as one of their own members that they regarded as having expanded their product range and farming activities thus spreading their water access and supply risk. Matilda’s participation in the AVIDG VIEN was evidence of the organisation’s continuing interest in the potential to inform government policy in relation to the challenges facing Australian vegetable growers, including access to irrigation water supplies as was also prioritised by fellow VIEN members.

It was also clear that other VIEN members recognised Matilda had been quite successful in promoting its farm and irrigation management credentials to members of its existing and potential new value chains. This was particularly the case with GSF Australia who sourced lettuce direct from Matilda Farms for supply to McDonalds Restaurants and other leading food service firms.

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35 In response to vegetable industry lobbying regarding their ongoing viability, AVIDG was established in March 2006 and funded directly from the Australian Department of Agriculture Fisheries and Forestry. A key initiative of this group was to establish the VIEN to develop export marketing plans for the industry.
Despite Matilda’s interest in the VIEN, and the recognition it held among its peers, the need to attend to increasing management challenges within the Matilda companies soon prevented continued involvement in this industry activity. By this stage other business ventures were being urgently considered to address product throughout and cash flow concerns, including a proposal to commence direct distribution to independent vegetable retailers initially in the Darling Downs region, and the development of a business plan to commence direct distribution to food service businesses in the hospitality and mining services area.

Any interest in water use efficiency for environmental purposes, as was evidenced in Matilda’s previous interest in the GSF sponsored ‘Landscape Rehydration’36 project, gave way to a priority on water access security and use efficiency solely for the purposes of maximising much needed crop production. Key Matilda personnel were becoming stressed by the belief that increased production and processed product throughput would be the answer to the Matilda companies’ growing commercial challenges; and yet recognised that supply chain partner support was diminishing and irrigation water supply challenge, given an inability to secure required infrastructure and unfavourable weather conditions, were only going to increase.

(e) Post case study perspectives

As is outlined Chapter 5, further developments in the Matilda organisation after the completing of the research phase of this project, that became apparent given my familiarity with the case study organisation and the nature of public commentary on their progress in the local Darling Downs community in which I live, prompted me to conduct further investigations after the completion of the case study.

The desire to establish a cooperative interdependent yet independent relationship between Matilda Farms and Matilda Fresh Foods became a significant issue for the companies by early 2008 when the supply of broccoli, cauliflower and cabbage became short for the products MFF was supplying to the Coles Group (tubbed broccoli and cauliflower and cut and wrapped cabbage). MFF’s dependence on MF, and MF cropping program and hence cash flow, were tested due to seasonal issues, including higher than forecast rain falls prior to crop establishment. Similar difficulties were being experienced by MFF’s other external suppliers. This led to these two separate but related organisations being ‘doubly’ exposed to supply chain management risks to the extent that MFF’s relationship with its bank (Suncorp as for MF) was placed in some jeopardy.

36 ‘Landscape Rehydration’ was a concept promoted strongly by GSF Australia to encourage suppliers to adopt sustainable production and resource management principles.
During this phase it became clear to the organisations that traditional agricultural banking services (based on agricultural land as security) were no longer appropriate for the MFF business and the opportunity to discuss alternative arrangements with National Australia Bank’s (NAB) Food and Fibre Division\(^\text{37}\) was pursued. At the same time however, MF was happy to continue its relationship with Suncorp. Ultimately NAB advised that they would only be able to consider the Matilda Group as a whole and not just the MFF enterprise. Matilda management then realised that they had promoted the unique relationship between MFF and MF as one of MFF’s sustainable competitive advantages given the lauded benefits of a supply chain based on world’s best practice in horticultural production inherent in MF’s expertise and systems. Ironically the very basis of Matilda’s water and produce supply risk management strategies, being the planned separation of the farming and processing business, therefore presented a dilemma for NAB such that they could only revert to traditional agribusiness finance approaches using land as security.

During this phase I was also invited by Matilda to attend a Sustainable Food Supply Chains Forum in Sydney, and a Tasteback® Research Station visit to Gumlu and Giru North Queensland\(^\text{38}\). Both of these activities were sponsored by a fellow Matilda chain member GSF (see Appendix 1).

In summary these post case study observations reveal that the status of the case study organisation following completion of the research for this project was evidenced by significant growth pains including:

- continuing weather challenges in the form of drought conditions on the Darling Downs and unseasonably wet conditions in other production regions which, combined with being denied continued supply from irrigation equipment and advisory service providers due to overdue accounts, circumvented irrigation management throughout the whole Matilda Farms organisation;
- increasing working capital requirements together with the apparent need to continue to invest in new irrigation farming, processing and packaging technology if production and sales targets were to be met;
- crop production targets in terms of harvest scheduling and yields missed with increasing regularity;

\(^\text{37}\) NAB’s Food & Fibre Division was promoted at the time as targeting business between the farm and retail (i.e. post farm gate).

\(^\text{38}\) GSF strongly encouraged Matilda to attend both events in order to improve their sustainable irrigation water use practices. Tasteback® is a registered trademark of Best Results (Aust) Pty Ltd, management consultants to GSF.
previous interest in environmental drivers for water use efficiency, and industry sustainable management examples and discussions such as GSF’s Landscape Rehydration project, began to give way to a focus on simply maximising economic return from water used;

- cash flow challenges and steady increases in the value and number of creditor defaults;
- difficulty in finding and retaining management skills across the organisation;
- increasing stress levels among key staff; and
- increasingly acrimonious relationships with other supply members, particularly Suncorp.

(f) **Research outcomes regarding irrigation management practices and other strategic management issues**

Based on the preceding discussion regarding the first research question in this thesis and the relationship between it and the background research, case study phases and post case study information, the following summary of outcomes can be presented in Table 4.2.
### Table 4.1 Summary of research outcomes in relation to research question 1

<table>
<thead>
<tr>
<th>RESEARCH PERSPECTIVES</th>
<th>RESEARCH OUTCOMES IN RELATION TO RESEARCH QUESTION 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background research</strong> [see section 4.4.1 (a)]</td>
<td>This research presented strong indications are that sustainable irrigation management practices are very significant and among the most important strategic management issues that Matilda executives and management were dealing with. Both sustainable irrigation management practices and broader VCM issues were evident in the background research which was in line with the findings of many authors in both water reform and VCM literature.</td>
</tr>
<tr>
<td><strong>Case study phase 1</strong> [see section 4.4.1 (b)]</td>
<td>There was recognition in management’s strategic management planning, and among company advisers and other irrigators, that Matilda’s efforts in regard to sustainable irrigation management practices would be critical among the strategic management issues it had to deal with. This was in line with Wisner’s (2003) observations about the various management concepts embodied in SCM. In fact irrigation expansion into other areas became a preoccupation for Matilda management given their conclusion that sustainable irrigation management practices in the traditional growing area would not on their own ensure the required supply of irrigation water necessary to support the organisation’s production and market expansion plans.</td>
</tr>
<tr>
<td><strong>Case study phase 2</strong> [see section 4.4.1 (c)]</td>
<td>Participant observation confirmed that sustainable irrigation management practices were recognised by the Matilda management team as among the most important strategic management issues and growing business pressures that they needed to deal with.</td>
</tr>
<tr>
<td><strong>Case study phase 3</strong> [see section 4.4.1 (d)]</td>
<td>Validation with key Matilda personnel and industry representatives confirmed that sustainable irrigation management practices were among the most important strategic management issues facing the case study organisation. Nevertheless growing production and hence financial pressures began to prioritise attention towards short term initiatives that would assist with cash flow concerns.</td>
</tr>
<tr>
<td><strong>Post case study</strong> [see section 4.4.1 (e)]</td>
<td>Evidence suggests that mounting management challenges facing Matilda in the period after the case study research were predominated by the issue of sustainable irrigation management practices – in terms of both access and use.</td>
</tr>
</tbody>
</table>
4.4.2 Research question 2 issues - influence of non irrigator-producer members of the value chain on sustainable irrigation management practices

(a) Organisational background perspectives

Background data collated on the Matilda Group of companies, as outlined in Appendix 1 and section 4.2 of this thesis, indicates that the second generation’s foray into industry and water politics, and the business expansion and development activities undertaken by the third generation, revealed a growing influence by non-irrigator-producer members of Matilda’s value chain in respect of their sustainable irrigation management practices.

To the extent that an involvement in water industry politics was in part designed to lobby governments about maintaining access to irrigation water supplies in the face of a growing water reform debate in the broader community, and to increase that access if at all possible, supply chain members associated or involved with government agencies were seen to be exerting some influence on sustainable water use practices of Matilda and other irrigation organisations. Other supply chain members (e.g. input suppliers such as irrigation, fuel and finance providers) were actively supporting lobbying activities in relation to water access (given the potential benefits that increased crop production would bring to their own businesses) and in turn sustainable water use practices being encouraged by government agencies engaged in such communications.

Background research also revealed a propensity in the first, second and third generations to engage in supply chain management activities. From this background stage of the research though, the potential influence of other value chain members on Matilda’s sustainable irrigation water use practices was not evident. Whilst it appears that it was not clear to Matilda management prior to the commencement of participant observation engagement in the case study, other supply chain members with whom relationships were being developed, would later prove to exert influence on Matilda’s sustainable irrigation water use practices (see section 4.4.3 (c)).

(b) Case study phase 1 perspectives

The period covered by phase one of the case study research, as outlined in section 4.3, involved significant restructuring of the Matilda business and an emphasis on strategic planning activities for the future of the new entities.
The act of actively engaging in new supply chains by management of both of the newly formed farming and processing businesses, was a clear outcome of the overriding objective of addressing Matilda’s irrigation water access and supply risks.

Evidence gathered during this phase indicated that some members of the existing supply chains recognised Matilda’s agricultural production performance and entrepreneurial activities as a broad acre irrigation organisation. The organisation’s bankers in particular were always interested in water budgets as part of annual farm business planning. However during this phase of the research there was no evidence of any influence from other value chain members on Matilda’s sustainable irrigation management practices.

(c) Case study phase 2 perspectives
Participant observation in this case study allowed access to Matilda management’s weekly activities and their regular liaison with other value chain members.

A key observation from this phase in relation to the second research question in this thesis related to a ramp up in market research and development and new product development by Matilda in the area of processed and packaged broccoli, cauliflower as well as fresh lettuce. Promotion of these new products to members of existing and new value chains stressed Matilda’s focus on supply continuity based on comprehensive irrigation systems and management.

These communications from Matilda to other value chain members for the first time exposed Matilda’s irrigation management strategies including a focus on sustainable irrigation water use practices. Some value chain members saw fit to acknowledge those practices as evidenced by the following examples.

- The Coles Group supermarket chain made reference to the sustainable water use practices during a sales meeting with Matilda marketing staff at their Melbourne head office in March 2006. They specifically suggested that such practices were consistent with Coles’ principles of: ‘Trust’ (supported by regular food safety audits; ‘Quality’ (supported by their specifications and waste guidelines); and ‘Innovation’ (focussed on new products and development)\(^3^9\). Coles went on to encourage Matilda to continue its focus on sustainable irrigation water use practices given prevailing drought conditions throughout many of the Australian horticultural production regions, and the desire to maintain consistency of supply and quality.

\(^3^9\) Recorded in John McVeigh’s meeting notes from Coles-Matilda Sales Meeting, Melbourne, 2\(^{nd}\) March 2006.
A Horticulture Australia Limited (HAL) funded Matilda research project on crop uniformity for mechanical harvesting, and managed by consultants ‘Australian Horticultural Research’, referred to Matilda’s sustainable use of irrigation water and focus on preventing over-watering in flood irrigation.

Given these examples of other value chain members acknowledging and ultimately influencing Matilda’s sustainable irrigation water use principles, it was interesting to note that Matilda, in seeking produce from external growers in order to meet demand, reverted to what they saw as the traditional approach as other produce procurers – that water supply risk (based on access and sustainable use) lies with the particular grower.

It became quite clear therefore through the case study that other value chain members had embraced Matilda’s promotion of it sustainable irrigation water use practices and a number of them moved on to actively encourage Matilda to maintain and/or those efforts.

(d) Case study phase 3 perspectives
As outlined in section 4.4.1 (d), phase 3 of the case study research involved the period of reviewing and validating the outcomes of the case study, through interviews with key Matilda personnel, other industry stakeholders and observers and attendance at industry activities at Matilda’s invitation.

Data gathered in this phase indicated the following.

- Supply of fresh, processed and packaged products to Coles had significantly increased, with the potential for increased supply contracts across the eastern seaboard of Australia being actively discussed. Given growing concerns regarding water supply, production ability, external produce supplier commitment and cash flow challenges, this prospect was both exciting and daunting for Matilda management.

- Matilda had also been successful by this stage in attracting the attention of the Woolworths supermarket chain which had commenced the process of assisting Matilda to secure prequalification and accreditation as a Woolworths Fresh Food supplier. Again this was an exciting development for the Matilda companies, but one that was beginning to cause concern as to how future demand would be met from both a product and financing perspective.

- GSF became quite interested in Matilda’s farming and irrigation systems following an introduction by Withcott Seedlings (see Appendix 1). After a number of farm visits and strategic planning meetings, GSF agreed to provide part security for a new farm purchase by Matilda at Armidale in NSW; they invited Matilda to attend the ‘Sustainable Food Supply
Chains Forum’ in Sydney and to visit ‘Tasteback®’ showcase farms in Giru and Gumlu North Queensland; and introduced Matilda to promote their farming and irrigation systems direct to McDonald’s Australia Supply Chain Management Division with a specific focus on sustainable water use. Both GSF and McDonalds advised that they were considering a promotion on paper placemats provided with every McDonald’s eat-in meal that would promote those sustainable water use principles within the supply chain.

- Given the interest being expressed by Coles, Woolworths and GSF in Matilda’s product range and proposed production quality and consistency, together with increasing Matilda management concerns about their ability to fund and support production growth, Matilda began to consider the need for increased debt funding for the business or new capital.

(e) Post case study perspectives
As outlined in section 4.4.1 (e), research for this thesis has been further informed by information regarding the status of the Matilda companies after the case study research phases had been completed.

By early 2008 Matilda’s relationships with other value chain members were under increasing pressure. External produce suppliers began to refuse supply, which in turn led to Matilda having no options in meeting its own shortfalls in supply to Coles that were due to continued weather variability and failures to meet crop harvest schedule and volume forecasts. The anticipated Woolworths supply potential had not yet been confirmed.

Matilda pursued debt reduction and capital injection strategies but local media speculation at the time suggested the pending GFC prevented confirmed arrangements from proceeding. Matilda creditors advised they were made aware of the companies being placed in voluntary administration, and then receivership in October 2008.

Industry observers approached to discuss the status of the Matilda companies following the case study and after their demise generally concluded that Matilda had adopted a sound value chain management approach to its business activities. The general conclusion was that Matilda had been subject to significant weather vagaries together with expected new venture start up challenges that were amplified by the fact that Matilda was establishing new farms, new suppliers, new product ranges and new technology in unison.

It would appear based on these observations following the case study research phases that whilst Matilda had adopted value chain management principles, and given that it was seen to be a proven
and innovative irrigation organisation that had led industry, political and on-farm developments designed to improve sustainable irrigation management practices, the commercial realities of being undercapitalised in the face of weather and enterprise start-up challenges placed the organisation led to the failure of the organisation.

(f) **Research outcomes regarding the influence of non irrigator-producer members of the value chain on sustainable irrigation management practices**

Information gathered in background research and throughout the case study research phases indicated that influence on sustainable irrigation water use had evolved from an internal influence only (i.e. the newly formed Matilda processing entity interested in and influencing its sister organisation Matilda Farms) through to the active investment in and strong influencing of Matilda’s sustainable irrigation water use practices by other value chain members. Ultimately any such interest and influence though eventually gave way to fundamental challenges of the financial viability of the Matilda companies.

Research outcomes from the background research, case study phases and post case study information, in relation to the second research question in this thesis can therefore be summarised in Table 4.3.
<table>
<thead>
<tr>
<th>RESEARCH PERSPECTIVES</th>
<th>RESEARCH OUTCOMES IN RELATION TO RESEARCH QUESTION 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background research [see section 4.4.2 (a)]</strong></td>
<td>Background research revealed that for both political and commercial purposes non irrigator-producer members of the value chain showed a propensity to be interested in, and influence, sustainable irrigation water use practices.</td>
</tr>
<tr>
<td><strong>Case study phase 1 [see section 4.4.2 (b)]</strong></td>
<td>Whilst value chain members were actively interested in Matilda’s farming activities (including irrigation management), there was little if any evidence from the first phase of the case study of them influencing sustainable irrigation water use practices.</td>
</tr>
<tr>
<td><strong>Case study phase 2 [see section 4.4.2 (c)]</strong></td>
<td>Once promoted and explained by Matilda other members of the value chain enthusiastically embraced these principles with some actively influencing Matilda’s sustainable irrigation water use practices by the end of the case study participant observation phase.</td>
</tr>
<tr>
<td><strong>Case study phase 3 [see section 4.4.2 (d)]</strong></td>
<td>Validation with key Matilda personnel and industry representatives confirmed that Matilda’s promoted features of farming and irrigation expertise (with a focus on sustainable irrigation water use practices) had successfully secured it membership of new value chains, with the strong prospect for more. In some cases those members were by this stage directly investing in Matilda’s activities and actively influencing their sustainable irrigation water use practices.</td>
</tr>
<tr>
<td><strong>Post case study [see section 4.4.2 (e)]</strong></td>
<td>Information gathered in relation to the post case study phase revealed that continuing weather and enterprise start-up challenges led to significant commercial pressures and stressed value chain relationships. Under this scenario influence of other value chain members on sustainable irrigation water use practices disappeared in the face of failing value chain relationships, and ultimately the failure of the organisation.</td>
</tr>
</tbody>
</table>

**4.4.3 Research question 3 issues - value chain management principles and shared responsibility for sustainable irrigation water management**

(a) **Organisational background perspectives**

Section 4.4.2 (a) of this thesis confirms that the Matilda companies had a long history of engaging in supply chain management activities. The background research did not reveal information in relation to whether or not the presence of value chain management principles would ensure responsibility for sustainable irrigation water management could be shared through the value chain.
However key Matilda personnel and other industry observers agreed that such principles were necessary for the sharing of information about risk in irrigated horticulture value chains such as that that Matilda was a member of.

In Matilda’s case, other value chain members, including industry organisations such as HAL (see section 4.4.1 (b)) had shown a willingness to co-invest in irrigation research and development programs, and input suppliers had similarly co-invested in the cost of lobbying state and federal governments in relation to irrigation water access policy and conditions.

(b) Case study phase 1 perspectives
The business restructuring and strategic planning activities that were observed during phase 1 of the case study research indicated that Matilda management recognised sustainable irrigation water management as not only a sound principle for their own business, but also one that could be effectively promoted to potential supply chain partners with the aim of seeking commitment from those who recognised the supply continuity benefits of Matilda’s water access and supply risk management.

Whilst information gathered during this phase did little to confirm that the presence of value chain management principles would ensure responsibility for sustainable irrigation water management would be shared throughout the value chain, it did reveal that other district irrigators and industry observers were impressed by Matilda’s ability to secure value chain relationships that supported the expansion of their business activities and product lines.

(c) Case study phase 2 perspectives
Participant observation in the case study revealed a number of motivations of other members of the irrigated horticulture value chains in which Matilda was engaged. Data gathered during this phase indicates that the presence of value chain management principles, such as those outlined in section 2.3 facilitated the chain wide consideration of sustainable irrigation management. This was evidenced by the following observed actions and motivations of a number of the value chains’ other members.

- During the business expansion activities under the third generation, Matilda’s bankers, Suncorp with whom Matilda always strove to be fully transparent with as a recognised supply chain partner, were seen to be basing finance decisions in part on the sustainable irrigation management elements of Matilda’s business plan.
Based on the continuing drought conditions, Coles Group supermarket chain was keen to engage with Matilda given their concerns about the sustainability of irrigation water supply in the horticultural production areas they traditionally sourced produce from, and concerns regarding the water management practices of growers in those areas. According to Andrew Waddell, MFF’s Sales and Marketing Manager, Coles buyers had advised him that they believed there were ‘too many inefficient water users in the traditional horticulture production area of Werribee Victoria – and based on ‘supply risk rather than environmental decisions they had to bring down the axe on supply from Werribee’ (pers. comm., Andrew Waddell, March 2008). Coles’ buyers also informed Mr Waddell that their policy of rationalising their Australia broccoli supply chains had been relaxed in order to admit Matilda as a new supplier\(^40\).

In terms of its consideration of external produce suppliers, and following the restructure of the Matilda companies into the Matilda Fresh Foods processing business, and the Matilda Farms farming operation, MFF embraced the challenge of developing a supply chain including other growers to complement and supplement supply from Matilda Farms. Supply chain partner identification and selection was to a large degree based on climatic and irrigation water supply factors. MFF referred to such partners as ‘outsourse growers’. Whilst relationships were formed with outsource growers in Tasmania, Canowindra New South Wales, and the Lockyer, Southern Darling Downs and Granite Belt regions of Queensland, few of these supply arrangements continued beyond the first season. Whilst Matilda had invested in training activities with outsource growers in relation to crop management and produce requirements, the impact of climate and water availability on required harvest schedules caused Matilda to disband most of these relationships and to proceed to establish its own farming operations in other production regions of NSW and Queensland.

As a co-investor with Matilda in new farming property, GSF Australia who by this stage had developed a cooperative working relationship with Matilda, also saw the benefits of Matilda’s sustainable irrigation management practices, both in terms of on-farm water use efficiency, the concept of spreading water access and supply risk across a number of different growing regions and river catchment areas, and the on-going water supply lobbying activities of Matilda and its industry colleagues.

\(^{40}\) Andrew Waddell confirmed this position based on his notes of the Coles brassica supplier meeting he attended on 2\(^{nd}\) March 2006.
It was observed therefore during this phase of the case study research that value chain relationships had been developed and value chain management principles were being implemented. This was consistent with Wisner’s (2003, pp. 2-3) reasons for organisations to adopt ‘cooperative, mutually beneficial partnership strategies with suppliers, distributors, retailers, and other firms within their supply chains to maintain or improve profitability and overall firm performance’. The presence of value chain management principles also facilitated the chain wide consideration of sustainable irrigation management. In the case of GSF Australia the presence of such principles led to a financial co-investment with Matilda in the purchase and development of new irrigation farming property in order to address water access and supply risk for Matilda as the irrigator-producer, and in turn for the chain. Whilst this indicated GSF Australia was one member of the value chain who was willing to share this responsibility, data gathered during this phase did not indicate that the presence of value chain management principles would ensure that responsibility would be shared in all instances in all chains.

(d) Case study phase 3 perspectives
The process of reviewing and validating outcomes of the case study revealed the following information that assists in considering the third research question.

Other members of the value chains in which Matilda was engaged had shown significant interest in the farming systems and sustainable irrigation water management practices that Matilda promoted as its competitive advantages. The argument that Matilda’s systems would ensure a consistent year round supply and quality of produce was of great interest to these other members given the continuing drought conditions. It was on this basis that Coles had entered into agreed supply arrangements which, although not formal contracts, provided both parties with a schedule for sales budgeting purposes. It was also during this phase of the case study research that Woolworths had commenced discussions with Matilda in a similar vein.

Interviews with industry observers during this phase confirmed that Matilda’s success in securing supply arrangement with Coles for fresh, processed and packaged vegetable products had caught the attention and respect of many in the industry. This was evidenced by the invitation from AVIDG for Matilda to join the VIEN, commentary from members of theta network that Matilda was developed a sound model for business and agricultural sustainability, as well as coverage in industry publications such as ‘Vegetables Australia’ which featured the developing Matilda business in early 2008 (Acton, 2008). The front cover of that publication, which depicts Sonya
McConville CEO of Matilda Fresh Foods displaying broccoli and cauliflower florets packaged in tubs for Coles, is illustrated below in Plate 4.5.

Plate 4.5: Sonya McConville on front cover of Vegetables Australia with Matilda products

Despite this level of value chain and industry interest in the farming and irrigation systems that Matilda was promoting, and the fact that it was clearly evident that value chain management principles were being implemented in these chains, there was only one value chain member, GSF Australia, who was willing to share responsibility for sustainable irrigation water management. They did this by:

- actively encouraging Matilda in its pursuit of continuous improvement in irrigation water use efficiency;
- inviting Matilda to sustainable agriculture forums and field days;
- seeking feedback on Matilda’s performance in irrigation efficiency through regular visits to Matilda’s farms;
- engaging horticultural production consultants to assist and advise Matilda in this regard; and
- investing equity to assist Matilda in purchasing and developing new irrigation farming property.
(e) Post case study perspectives

The post case study review, completed due to significant changes in the Matilda businesses (and ultimately their demise), provides some important reflections for the third research question.

Data gathered this this review confirmed that after completion of the case study research phases, all value chain relationships that the Matilda companies were in, began to unravel. The information gathered indicates that the demise of these relationships was preceded by the organisational growth pains identified in section 4.4.1 (e). Those factors included an apparent cascade of agronomic and climatic challenges which led to crop and harvest scheduling difficulties, which in turn led to cash flow challenges. The organisation then invested significant time and resources into the pursuit of alternative debt and equity funding.

In terms of whether or not evidence from this consideration of the post case study status of the Matilda companies indicated that the presence of value chain management principles could ensure responsibility for sustainable irrigation water management could be shared through the chain, the following key observations are noted.

- **Value chain relationships**
  By mid-2008 most value chain relationships that Matilda had were under significant pressure. Input suppliers and outsource growers had either begun to stop supplying Matilda or had placed them on cash only terms. Even the organisations traditional wholesale market agents, with whom they had successful working relationships for some decades prior to the expansion activities of the third generation, had begun to actively source produce from other growers to satisfy their supply requirements given Matilda’s growing record of inconsistent supply. Most significantly, Matilda’s bank, Suncorp, was placing the organisation under increasing scrutiny given the increasing regularity of an inability to meet monthly interest and other debt covenant requirements. By this stage therefore there was little interest from these other chain members in Matilda’s promotion of sustainable irrigation water management.

- **Coles relationship**
  The Coles Group supermarket chain had by this stage actively engaged with other suppliers of produce in preference to Matilda. This was due to:
  - a growing number of rejections by Coles of Matilda product deliveries due to quality concerns;
  - Matilda’s growing record of not meeting agreed weekly supply volumes; and
the availability of produce from growers in other productions regions in Australia that were emerging from drought conditions.

It is also important to note that the Coles commitment to source a new ‘cut & wrap’ cauliflower product from Matilda, which prompted Matilda to develop a new automated ‘wash - cut – weigh and wrap’ processing line did not continue due to change in the supermarket chain’s merchandising strategies.

- **GSF Australia relationship**

  By April 2008 Matilda’s most engaged value chain partner in terms of sharing responsibility for sustainable irrigation water management, GSF Australia, also began to express strong concerns about Matilda’s performance in terms of consistency of quality and supply of produce. Whilst they were locked into a relationship with Matilda, given their joint equity investment in new irrigation property with Matilda, GSF began to actively source produce from other growers in regions that were emerging from drought. At this time GSF claimed they had been forced to source product from wholesale markets at great expense for some time to meet gaps in Matilda’s supply. GSF used this argument to force a reduction in the contracted price that they paid Matilda. GSF also stepped up the involvement of their own staff in influencing the production planning, scheduling and shipping decision making processes at Matilda. This growing concern on GSF’s part culminated in a formal demand for a progress report on Matilda’s business plan implementation by their Procurement Manager Michael Berman.

  There were clear signs in the information gathered during this review that the Matilda – GSF relationship deteriorated significantly from that point. During in-depth interviews conducted in this review Matilda management claim that in discussion about the progress of the business plan implementation, GSF confirmed they based their initial decision to support Matilda on market, financial and operational advice and recommendations from Michael Berman (GSF Procurement Manager), Mike Titley (AHR Consultants), and particularly Graham Erhart (Withcott Seedlings). Matilda management disputed this claim asserting that they were aware that Graham Erhart held concerns from the outset about Matilda’s ability to accomplish the task of developing new farms and beginning to grow crops such as lettuce with which they had no prior experience.

  An in-depth interview with GSF management during this phase revealed GSF’s attitudes at that time:
GSF was becoming concerned at the negative attitude of Matilda to what GSF saw as constructive input and advice on production scheduling, irrigation practices and shipping activities;

GSF was concerned that Matilda wouldn’t listen to independent expert advice funded by GSF; and

The quality and quantity of supply of produce from Matilda was becoming a concern which necessitated the sourcing of spot market priced produce from the central markets at costs well in excess of that budgeted with Matilda in the first place.

**Alternatives for value chain members**

Having reviewed the fact that value chain relationships had broken down, it is informative to consider where that left key members of the value chain in which Matilda operated.

Community and local media speculation on the Darling Downs indicated that many input suppliers and outsourced growers had by this stage commenced stringent account management processes on Matilda. It’s clear therefore that most of these suppliers had decided to end their relationships with Matilda and continue their business activities elsewhere.

GSF’s original motivation in establishing a relationship with Matilda was to secure produce supplies based on secure water availability. It was the reality of drought affected growing regions, and continued water access concerns particularly in the Murray Darling basin, led them to investigate both new suppliers and water conservation methods. By the end of the Matilda relationship, and given that a range of production regions were emerging from drought, GSF was able to source produce from other growers and although claimed to be an expensive source, from wholesale markets if necessary.

In the early stages of their relationship with Matilda, Coles, like GSF, was concerned about water availability across growing regions experiencing drought. As part of their supply chain rationalisation activities, Coles began to withdraw from regions known to have water access concerns (e.g. Werribee Victoria, Lockyer Valley Queensland). By the time their relationship with Matilda was breaking down, Coles had the option (given there were no formal contracted agreements with Matilda and other production regions were emerging from drought) to source produce elsewhere.
Matilda’s financiers, Suncorp, had originally supported the Matilda business plan with its focus on sustainable irrigation water management and risk management in terms of water access and supply, but ultimately lost patience with Matilda’s inability to service debt. From the post case study review it is clear that they exercised their ultimate option as mortgage holders of placing Matilda in receivership in order to redeem the debt.

As the various value chain relationships deteriorated and other members pursued their other supply and business options, Matilda had no option but to enter into voluntary administration.

(f) Conclusions regarding value chain management principles and shared responsibility for sustainable irrigation water management

The business expansion activities under the third generation of Jaunceys managing the Matilda companies had led to the development of a business plan that focussed on world’s best practice in farming and horticultural production, together with sustainable irrigation water management.

Commentary from informed observers collated from in-depth semi-structured interviews in the post case study phase provided important observations relating to the regard in which Matilda was held by industry peers. Each of these observers were asked about their views on the demise of Matilda, the strategies they had employed and any legacy their experience would leave for the horticulture industry and irrigation sector. Key among these observations were the following.

- Rob Robson, Founder of Harvest Fresh Cuts and Board Member of the Produce Marketing Association (PMA) Australia.
  As a well recognised Australian produce industry leader, Rob Robson expressed a view that the Matilda business model was a sound if not ambitious model, and his concern that Matilda’s expertise would be a loss to the Australian horticulture industry (pers.comm., Rob Robson).

- Ian Neeland, Former Senior Manager of Coles and Executive with international produce industry business development experience.
  Ian Neeland expressed a view that it would be a tragedy if the demise of Matilda sent a message to others in the industry to not engage in supply chain management initiatives as encouraged by potential chain partners such as Coles (pers. comm., Ian Neeland).

- Colin Hudgson, Former Woolworths Supply Chain Manager.
  Colin expressed a view that it was very sad that Matilda had failed in the process of implementing innovative product development strategies that were well suited to the requirements of Australian supermarkets and their clients (pers. comm., Colin Hudgson).
• Michael Berman, Former Supply Chain Manager, GSF. Michael acknowledged the pressure placed on Matilda to perform to GSF requirements despite the weather vagaries and challenges they faced in setting up new farming operations (pers. comm., Michael Berman).

• Russell Rankin, Director of Consulting company ‘Food Innovation Partners’ former Executive with Federal Government’s Food Industry Strategy, coordinating with Horticulture Australia Limited’s Food Innovation Grant program.
Russell expressed the view that he was surprised at Matilda’s failure given their professionalism displayed through a number of government and industry funded research and development projects (pers. comm., Russell Rankin).

Data gathered in background research, the phases of the case study, and in the post case study reviews, confirmed that value chain management principles had been implemented in the chains of which Matilda was a member. Whilst significant interest had been shown in Matilda’s activities, by both industry observers and fellow value chain members, findings of this research indicate there was just one instance of another value chain member being willing to share responsibility for sustainable irrigation management practices.

The fact that there was only one such instance, and the fact that ultimately all value chain relationships including that one broke down, suggest that the presence of value chain management principles do not necessarily ensure that the responsibility for sustainable irrigation water management can be shared throughout the value chain.

Research outcomes from the background research, case study phases and post case study information, in relation to the third research question in this thesis can therefore be summarised in Table 4.4.
Table 4.3 Summary of research outcomes in relation to research question 3

<table>
<thead>
<tr>
<th>RESEARCH PERSPECTIVES</th>
<th>RESEARCH OUTCOMES IN RELATION TO RESEARCH QUESTION 3:</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Does the presence of value chain management principles ensure that responsibility for sustainable irrigation water management can be shared throughout the food value chain, and if so, how?]</td>
<td></td>
</tr>
<tr>
<td>Background research [see section 4.4.3 (a)]</td>
<td>Background research data indicated that the presence of value chain management principles facilitated sharing of information about risk through the food value chain, and that member of chains were willing to co-invest in research and development activities and lobbying activities regarding water use, access and supply. There was no evidence though that the presence of these principles ensured responsibility for sustainable irrigation water management was shared through the chain.</td>
</tr>
<tr>
<td>Case study phase 1 [see section 4.4.3 (b)]</td>
<td>Other value chain members were impressed by the concept of sustainable irrigation water management that Matilda actively promoted, but the presence of value chain management principles didn’t ensure that responsibility for such management would be shared throughout the chain.</td>
</tr>
<tr>
<td>Case study phase 2 [see section 4.4.3 (c)]</td>
<td>The presence of value chain management principles did lead to one value chain member sharing responsibility for sustainable irrigation management by co-investing in new irrigation property development. This one instance though was not seen as evidence that presence of these principles would necessarily ensure the sharing of responsibility through a chain in all instances.</td>
</tr>
<tr>
<td>Case study phase 3 [see section 4.4.3 (d)]</td>
<td>There was a high level of interest in the value chain, and among industry observers, in Matilda’s agribusiness strategies, including sustainable irrigation water management, and there was strong evidence that value chain management principles were important to all members. However only one value chain member, GSF Australia, shared responsibility for sustainable irrigation water management.</td>
</tr>
<tr>
<td>Post case study [see section 4.4.3 (e)]</td>
<td>Commercial pressures on Matilda, that were obviously felt throughout the value chain, led to the deterioration of all value chain relationships, including that with the one value chain member who had actively shared responsibility for sustainable irrigation water management. This observation, and the ultimate demise of Matilda, indicates that the presence of value chain management principles does not ensure sustainable irrigation water management.</td>
</tr>
</tbody>
</table>
4.4.4 Summary of research findings in relation the research questions

This Chapter has considered the research questions relating to:

- the comparison of sustainable irrigation management practices with other strategic management issues that are dealt with by irrigation firms in food value chains;
- the influence of other than irrigator-producer members of value chains on those irrigation practices; and
- whether or not the presence of value chain management principles will ensure responsibility for sustainable irrigation is shared through the chain.

Whilst much of the observed behaviour, and data gathered from interviews with supply chain members, industry observers and other stakeholders, could be correlated to either water reform or value chain management literature, there were other issues encountered not identified in the literature.

Firstly, the combination of external water reform pressure and internal strategic management pressures, on an irrigation organisation’s ability to remain a member of a food value chain was an issue not encountered in the relevant literature.

The second issue not addressed by the relevant literature was that of the productivity and environmental stewardship demands being placed on irrigators by the broader community as evidenced by the water reform debate, despite the lack of evidence that the broader community, and in many cases other members of irrigators’ supply chains, are willing to actually share responsibility for such initiatives.

The identification of these gaps from a research data perspective accords with that outlined in section aligns with that outlined at the conclusion of the literature review (see section 2.6), i.e. the gap between the water reform debate themes of water access and supply and water use efficiency on one hand, and value chain management principles on the other. It also aligns with the contention that “attribution of blame to the nation’s farmers and exporters for potential water problems is seemingly indefensible for urban dwellers who consume food ...” (Lenzen and Foran, 2001, p. 334) wherein water reform expectations on one hand may not align with a willingness to share responsibility for that reform by other members of the supply chain who enjoy the benefits of irrigated produce.
The findings of the research conducted in this regard have therefore greatly assisted in addressing that gap in the literature between water reform management and value chain management as identified in Chapter 2. Chapter 5 draws conclusions from those findings.

### 4.5 Validation of the case study

As outlined in section 3.2 of this thesis, the research design for this project has required that as the inquirer I be linked to the subject and the social system that is being studied as an engaged participant who wished to understand the whole system. This presents a number of issues that need be considered in terms of the epistemological background to this case study. As was also addressed in section 3.2.4, the limitations of a single case study method of qualitative research are recognised in this thesis (particularly in relation of validation) in terms of being able to draw broad generalisations (Patton, 1990).

My own professional and personal background in Australian agribusiness, particularly irrigation based needs to be considered. I am familiar with the commercial challenges faced by Matilda through my exposure to the business and the family members involved in developing and managing the business. This familiarity has afforded relatively straight forward access to the company and its supply chain partners but at the same time presents the risk of bias and preconceptions on my part. This risks have been addressed through validation of the cases study outcomes with Matilda personnel; iterative analysis of developments in the company during the course of the study; triangulation with other industries and commercial validation within the case study itself; and in particular a deliberate focus on ensuring a participant observer role and avoiding strategic intervention. The avoidance of a strategic intervention role in particular has represented a challenge within the case study given my previous roles in consulting and advising the company. Nevertheless the discipline of avoiding such strategic intervention has made clear the delineation between my previous engagement with the company and the specific participant observation role of my engagement in this case study.

The processes therefore undertaken to validate the findings of the research for this project included:

- confirmation of draft summary of the case study confirmed with Supply Chain Manager, Business Development Manager, CEO and Chairman;
- commercial validation (post case study), based on summary of evidence and actions by value chain members, through in-depth interviews with company advisers John Herbert of The Goya Solution, and Russell Rankin of Food Innovation Partners); and
• triangulation of results from other water reform and agribusiness opinion leader interviews including neighbouring district irrigators.

In terms of the justification for considering the Matilda value chains as a single case study in this research, it should also be noted that the scale, breadth of contact and business experience of the value chain members considered in the research (i.e. Coles Group Supermarkets – one of the two largest chains in Australia, and Golden State Foods Australia – part of the global group supplying quick service food operations including McDonald’s and KFC) confirms that the unique value chain management and water use efficiency objectives being pursued in these value chains were in fact innovative.
5 Thesis conclusions

Based on the analysis conducted in this thesis, this Chapter presents conclusions from this study; addresses the research problem, questions and objectives detailed in Chapter 1, before outlining implications for future research. Following on from the preceding case study Chapter the next section provides background context for the conclusions in the subsequent sections.

5.1 Context and overview of case study

5.1.1 Motivation for the research

The original motivation for this research was partly based on the contemporary agribusiness challenge of seeking long term mutually beneficial commercial relationships between Australian producers of food, food retailers and food service companies. Such challenges were identified as particularly relevant for the case study organisation and their efforts to secure support from other members of the food value chain of which they were a member in order to respond to water reform pressures through the implementation of sustainable irrigation management practices. Chapter 2 introduced the concept of value chain management as an agribusiness strategy to address such challenges because, as described by Walters and Lancaster (2000, pp. 177-178) ‘Value Chain Management is a coordinating management process in which all of the activities (and their suppliers) involved in delivering customer value satisfaction are maximised and the objectives of the stakeholders involved (the suppliers of activities, processes, facilitating services, etc.) are optimised such that no preferable solution may be found.’

Consistent with the case study organisation’s aims, it was also noted in the literature that there have been strong suggestions from industry, academia and government agencies in Australia that value chain management can assist primary producers in optimising business activities and resource utilisation (see section 2.3). A variety of management literature from the fields of water resource management reform, supply chain management and value chain management was therefore considered and provided the theoretical context for the case study as reviewed in Chapter 2.

To adopt the stance of a participant observer in researching these issues in the case study, a soft systems approach (Kirk, 1995)\textsuperscript{41} was employed, facilitating an appreciation of the flexibility and variability of human relationships in Australian agribusiness.

\textsuperscript{41} See section 2.3.4 (d)
Accordingly the case study research is framed around the concept that implementation of value chain management principles, focused on competitiveness and business sustainability, by chain members who at the same time display a willingness to engage in water use efficiency, could provide the foundation for a business strategy focused on sustainable irrigation water use. It was on this basis that this research received the support of the CRCIF through its ‘Policy and Planning for Change Program’ (CRCIF, 2006).

5.1.2 Evolution of the observed supply chain relationships

The case study research revealed that over some years the Matilda Group had moved through iterations of development where activities conducted within the organisation using internal resources, together with those outsourced to external parties, were initiated in order to manage the risk of losing access to irrigation water. This process reflected the economic theory of transaction costs (Coase, 1937)\textsuperscript{42} where it is suggested that a firm will carry out functions within its own organisation provided the cost of those internal transactions is less than seeking such services from the open market. The retailer and food service organisations (Coles and GSF) who were in a position of power in the case study supply chains moved through similarly iterative processes of addressing the risk of produce supply, to the point that they decided to engage in a value chain relationship with Matilda group.

That evolution brought these parties into a relationship which initially appeared unique in terms of its alignment to irrigation. In line with Porter and van der Linde’s (1995) suggestion that the pursuit of environmental sensitivity in value chain management could provide environmental and corporate benefits (see section 2.4.1), it was envisaged at the commencement of this study that value chain management could be a suitable business management strategy to communicate and share the objective of sustainable irrigation management practices. This course of action was consistent with encouragement from consumers and government, who were applying pressure on food supply chain in terms of the need for sustainable irrigation management practices given prolonged drought conditions across the country at that time.

As outlined in Figures 1.1 and 1.2 introduced in Chapter 1, the response of an irrigated agriculture producer to water reform pressure, or environmental pressure, has important implications for any supply chain of which that producer is a member. A judgment from the community or government that the response is negative or non-existent (i.e. no action or the wrong action has been taken in

\textsuperscript{42} See section 2.3.4 (a)
response to water reform pressures) signals a risk for the supply chain in terms of losing access to the irrigation water supply, and in particular a risk for the irrigator of not only losing that access but perhaps membership of that supply chain if it is forced to seek alternative suppliers. If the response is judged to be positive, the potential water security outcome for the irrigation enterprise and the supply chain of which it is a member could be in the best interests of the competitiveness of the entire chain, not just the producer. The irrigation enterprise thus secures its access to irrigation water and retains its supply chain relationships. This outcome was observed in the case study where shared responsibility for sustainable irrigation practices helped secure and maintain, for a period of time, supply chain relationships.

In reference to the value chain management practices observed, it is apparent that when water supply pressure was acknowledged and the Matilda Group began to search for supply chain relationships to help address that pressure, the organisation had reached a critical point wherein it could no longer address that pressure in its own right and survive, a further reflection of the economic theory of transaction costs (Coase, 1937) (see section 2.3.4 (a)). It had no alternative strategies in place or other internal resources at its disposal. Matilda’s bank, Suncorp, was seen as an important internal partner in the organisation, a partner with whom all information could be shared in confidence without any concern for the organisation’s competitive commercial position.

Key issues that were underpinning the mounting business pressure on Matilda were:

(i) a need to refocus on the domestic market given export market challenges. This change of focus represented a significant change in the historic positioning of the company which had been committed to export markets for the long term (and was most reluctant to jeopardize that position by forays into the domestic market);
(ii) a history of below budget production volumes due to irrigation water shortages;
(iii) political and on-farm attempts to address water shortages had failed;
(iv) commitments to significant capital for the new business ventures in an attempt to address some of these challenges had been made; and
(v) other contracted produce suppliers were not performing in terms of the expected quality and volume of produce sourced in order to supplement Matilda’s own supply to Coles and GSF.

Whilst the organisation, consistent with transaction cost theory, had moved beyond its own resources and contracted to source produce from other suppliers, it was ultimately to find that supply to be unreliable due to a lack of commitment among suppliers. Commitment is recognised
as not only a critical relationship principle in value chain management (Morgan and Hunt, 1994), but also a key principle for stakeholders in efficient allocation of water (Roberts et al, 2006). Given its experience with unreliable suppliers Matilda decided to address these issues by supplying the extra volumes itself. So began the search for expansion of its own operations into other geographical regions in order to extend its own supply capacity (in terms of volume and year round supply) and at the same time take advantage of regional climatic and water security opportunities.

The search for other regions attracted the attention of the seedling supplier Withcott Seedlings who were keen to develop the supply chain of which they were already a member with GSF and McDonalds. Withcott Seedlings encouraged Matilda to engage in the Coles supply chain despite Matilda’s reservations about the supply chain power of the Coles Group. As confirmed with Matilda executives at the time, Matilda’s subsequent agreement to embrace the Coles supply chain was based on a belief that the market power of the Coles Group would present significant supply volume opportunities. This was in accord with the theoretical discussion in section 2.3.4 (c) (iii) which refers to Cox’s (1999, p. 173) concept of an ‘innovatively benign power structure’ within supply chains.

The essence of these newly formed supply chain relationships was that each party had identified partners that were willing to invest in and share the risk of business strategies designed to address the issues of shortages in irrigation water supply and their negative impact on business continuity.

### 5.1.3 Overall relevance to the literature

The above discussion indicates consistency in the case study findings with both the water reform and value chain management literature, as described in Chapter 2.

This section and the references contained in it confirm linkages between the literature and the case study, including:

(i) factors that have influenced the encouragement and uptake of value chain management principles in Australian agribusiness;

(ii) the position of individual irrigators within the Australian water reform process in terms of the environmental and community expectations placed upon them together with the nature of the complex social systems that are the food supply chains in which they operate; and
(iii) the suggestion that value management principles could assist in gaining commitment from other supply chain members towards investment in and implementation of sustainable irrigation management practices in order to secure ongoing access to limited water supplies.

This section also provides an overview of value chain management principles as observed in the case study through the various stages of the development of chain relationships. Consistency with the literature, in terms of transaction cost theory, environmental management ambitions in supply chain management, and a range of management theory perspectives underpinning value chain management, such as commitment and power, has been demonstrated in this section.

Despite these observations the ultimate demise of the case study organisation indicated that implementation of value chain management principles did not succeed in improving the organisation’s position in terms of water reform issues. This outcome presented a scenario not observed in the literature. As outlined in section 4.4.4, there is no literature identifying either (i) how the combination of external water reform pressure and internal strategic management pressures impacts on an irrigation organisation’s ability to remain a member of a food value chain; or (ii) the productivity and environmental stewardship demands placed on irrigators by the community, despite the lack of evidence that the community including other members of irrigation supply chains are willing to share responsibility for such initiatives.

The identification of these gaps from a research perspective accords with that outlined at the conclusion of the literature review (section 2.6) – that there is a gap between the water reform debate themes of water access and supply and water use efficiency on the one hand, and value chain management principles on the other. It is on that basis that the following conclusions are drawn.

5.2 Key research conclusions

5.2.1 Conclusion # 1
Value chain management principles promote sustainable irrigation management practices.

The value chain management principles considered in the literature and observed in the case study included: efficiency (transaction cost theory); optimisation of value; information sharing; quality management; cooperation; chain competitiveness; trust; commitment; risk sharing; and co-investment. From a sustainability literature perspective, the quadruple bottom line drivers of social,
economic, environmental and governance considerations were also noted, as was the significance of corporate social responsibility in food value chains. Wisner (2003) and others (Porter and van der Linde, 1995; Jones, 2002) go further to make direct linkages between these two areas of value chain management and environmental management literature.

Indeed the case study indicated clearly conditions under which the entire irrigation value chain, in the absence of any direct government intervention or regulation, would consider participating in initiatives that would ensure efficient use of irrigation water in Australian fresh food value chains. In times of drought and severe water shortages across a range of horticultural production areas of Australia those in positions of power in the value chain, in terms of their close business interaction with consumers (in this case Coles Group and GSF / McDonalds Australia), displayed a willingness to source vegetable suppliers who practiced sustainable irrigation management practices, and in the case of GSF a willingness to co-invest in capital and research and development investments. These relationships, developed through a common recognition of the potential value of sustainable irrigation management practices, were akin to the coordinating management processes referred to by Walters and Lancaster (2000), and the sharing of costs and benefits of value creation in the supply chain (Gifford et al, 1988; Susskind, 2005).

Regular reporting and return visits were typical of the relationship between GSF and the Matilda Group in particular. Matilda pursued, with GSF’s support, water use efficiency through:

(i) the development of new farming activities in new areas based on rainfall and weather characteristics to enhance water use efficiency;
(ii) application of broad acre farming techniques in new areas and to new crops;
(iii) employment of new irrigation techniques and infrastructure;
(iv) increased external advice from horticultural and irrigation experts; and
(v) research and development activities in terms of new varieties, new production strategies and new water management philosophies.

The case study also clearly outlines the drivers for each partner in these relationships to pursue a value chain management approach.

**Irrigator strategy**

Matilda was driven by the desire to lock in long term unique value chain relationships in order to secure the efficiency of its irrigation management practices in terms of economic and social responsibility imperatives; and to ensure the commercial sustainability of their farming operations that had spread across a range of production regions.
Retailer / food service company strategy
From the perspective of the retailer and the food service provider their level of interest in a
value chain management approach was driven by the need to secure consistent supply and
quality of produce in order to consistently meet consumer demands. As well as concerns about
water security for business continuity reasons, GSF also displayed a desire to pursue the
concept of promoting (ultimately through, and with their customer McDonald’s) the pursuit of
water use efficiency in this value chain in order to appeal to prevailing community concerns
regarding irrigation management practices in the Murray Darling Basin.

Sustainable water use practices and access therefore had become priorities among other strategic
management issues in the supply chain such as logistics efficiency, food safety and inventory
management.

Chain strategy
The pursuit of irrigation water use efficiency at farm level involves a wide range of variety
selection, soil preparation, hydrology, irrigation infrastructure design and management, crop
management and weather monitoring strategies. If the irrigator receives no recognition of these
strategies from the markets or other chain partners with which they transact, sub-optimal
irrigation management practices can evolve. Indeed if other members of the chain left it to the
irrigator as the member of a food supply chain most who is vulnerable in terms of unforseen
environmental impacts on production, the chain’s ability over the longer term to ensure
consistent supply and quality of produce, as well as addressing community concerns regarding
water use efficiency, is compromised.

As an alternative to a value chain management business strategy an irrigator could if they wished,
conduct their irrigation activities on an opportunistic basis with no regard whatsoever to the needs
and realities of the rest of any supply chain within which they operate. Similarly, a supply chain
member in a position of power close to the consumer could continue their sourcing activities
opportunistically choosing to ignore irrigation water supply and use realities. However in order to
secure sustainable irrigation management practices that are in the interest of stakeholders
throughout entire supply chains, this research has concluded that value chain management
principles are necessary, and that they were employed with positive results in the form of long term
exclusive supply arrangements, fixed prices and increased margins. As stated in section 2.3.3 value
Chain management is the management of the chain as a whole so as to optimise the benefits for all chain participants with a particular focus on value as perceived by the end consumer.

As outlined above, the principles identified in this case study as being necessary to secure sustainable irrigation management practices (as evidenced by their willing adoption and deliberate implementation by members of the supply chain) are summarised in Table 5.1. Principles are grouped under the three value chain subsystems of process, information, and relationship.

Table 5.1  VCM principles identified in case study

<table>
<thead>
<tr>
<th>Process</th>
</tr>
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<tbody>
<tr>
<td>• efficiency (transaction cost theory) (Coase, 1937)</td>
</tr>
<tr>
<td>• optimisation of value (Walters and Lancaster, 2000)</td>
</tr>
<tr>
<td>• quality management (Karapetrovic and Willborn (1998)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Information</th>
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</thead>
<tbody>
<tr>
<td>• information sharing (Walters and Landcaster, 2000)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>• cooperation (Dunne, 2001)</td>
</tr>
<tr>
<td>• chain competitiveness (Lambert et al, 1998)</td>
</tr>
<tr>
<td>• trust (Morgan and Hunt, 1994; Wilson, 1995; Cann, 1998)</td>
</tr>
<tr>
<td>• commitment (Morgan and Hunt, 1994; Wilson, 1995; Cann, 1998)</td>
</tr>
<tr>
<td>• risk sharing (Sheffi, 2005)</td>
</tr>
<tr>
<td>• co-investment (Simpson and Power, 2005)</td>
</tr>
</tbody>
</table>

Each of these principles has been identified in the case study as being consistent with literature reviewed in section 2.3.4. In particular Table 5.1 highlights the relationship principles identified in the case study (see section 4.4.3) as being important in terms ensuring sustainable irrigation management practices. These relationship principles are explored in more detail in the next section. Therefore the first conclusion in this thesis that ‘value chain management principles promote sustainable irrigation management practices’ is drawn from the case study data as reviewed and summarised in Tables 4.2, 4.3 and 4.4, and is consistent with the literature considered in Chapter 2.
5.2.2 Conclusion # 2

Whilst value chain management principles promote sustainable irrigation management practices (Conclusion 1), they are not sufficient in order to secure sustainable irrigation management practices.

Unforeseen developments in the case study towards the later part of the research phase of this thesis led to the eventual demise of the case study organisation. The Matilda Group was placed in voluntary administration and subsequently receivership after this research was completed. The directors of the organisation subsequently declared themselves bankrupt.

In the context of this thesis and the research conducted, there were a range of breakdowns in value chain relationships that can be noted in this case. Whilst it was the clear and stated intention of the members of the supply chain in which Matilda was operating to pursue a value chain management relationship, and despite the evidence of attempts to implement value chain management principles (see Table 5.1) relationships gradually broke down. In terms of the value chain management principles considered in the literature (see section 2.3) and observed in the case study, it is concluded that the principle of co-investment, as was observed particularly between Matilda and GSF Australia (see Appendix 1), is not a substitute for trust, commitment and sharing of information and risk. In fact it was the failure to successfully implement these other value chain management principles that precipitated the demise of the organisation despite the co-investment that had taken place.

It is further concluded therefore that Matilda’s sustainable water management practices were eventually lost and the value chain management principles outlined in Table 5.1, especially commitment, were lacking by the time the organisation failed. Before considering the evolution and demise of these relationships it is important to confirm if there was any prior evidence that Matilda’s individual business strategy would have led to business failure regardless of its value chain relationships. The progress of these relationships, from establishment through to business failure, can be summarised as follows in line with the Relationship Development Summary (based on Wilson’s (1995) Relationship Development Model) presented in section 2.3.4 (c) (Table 2.2) of this thesis:

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43 Appendix 1 and sections 5.2.2 (b) and (c), provide commentary on the commercial collapse of the case study organisation that occurred after the research phase of this thesis was completed.
Table 5.2 Relationship phase and the Matilda case study

<table>
<thead>
<tr>
<th>Relationship development stages</th>
<th>Matilda value chain relationships development</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Partner selection &amp; defining purpose</td>
<td>• Establishment</td>
</tr>
<tr>
<td>• Setting relationship value</td>
<td>• Evidence of VCM principles &amp; relationship</td>
</tr>
<tr>
<td></td>
<td>• Environmental problems &amp; inexperience impacting on supply &amp; cash flow</td>
</tr>
<tr>
<td>• Relationship maintenance</td>
<td>• Understanding &amp; forgiveness</td>
</tr>
<tr>
<td></td>
<td>• Loss of confidence (Coles then GSF)</td>
</tr>
<tr>
<td></td>
<td>• Alternative sourcing</td>
</tr>
<tr>
<td></td>
<td>• Supply agreement cessation</td>
</tr>
<tr>
<td></td>
<td>• Business failure</td>
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</tbody>
</table>

At the same time, from a sustainability perspective the broader quadruple bottom line drivers of social, economic, environmental and governance considerations were also noted, as was the significance of corporate social responsibility in food value chains.

Feedback during and after the research from various agribusiness management consultants, industry leaders and government agencies, as well as the value chain members themselves, centred on a shared belief that the model that Matilda was developing for its horticultural business was sound and promised to secure a range of commercial and industry benefits including efficient and sustainable irrigation management practices.

(a) Matilda value chain relationships - established and operating
In this case it is important to recognise that value chain management relationships had been established, and attempts to implement value chain management principles were evident. During the formation stages of these relationships Matilda’s credibility was supported by its history (as explained and summarised for new value chain partners in presentations during the establishment phase); industry recognition; industry references (e.g. Withcott Seedlings) and site, management and business evaluations (variously by GSF, Suncorp, Coles and ultimately Woolworths). Matilda’s credibility therefore had been established to a sufficient degree to secure the confidence
of its new value chain partners as evidenced through informal processes (meetings and dinners) and formal supply accreditation and contractual commitments (supply and finance agreements).\textsuperscript{44} 

Chapter 4 provides detail on the development and evolution of these supply chains. During the first year, commitments made within the new value chain relationships indicated a growing level of confidence in Matilda’s ability to provide a consistent supply and quality of produce given its focus on sustainable irrigation management practices.

It can be concluded therefore that value chain management principles were employed with positive results, as evidenced by the fact that long term exclusive supply arrangements were put in place with fixed prices and increased margins for Matilda.

So if the VC was established and VCM principles were clearly observed during the research, how did the relationships break down?

(b) Value chain relationship breakdowns

To consider the query raised above it is instructive to review the actual breakdown of these relationships and the opinions and attitudes of each of the parties to these relationships that were observed in the case study research.

\textit{The breakdown of the Matilda-Coles Group relationship}

The Matilda – Coles Group relationship began to founder as the incidence of supply failure due to lack of regular delivery of fresh broccoli and cauliflower, as well as quality concerns, began to rise. Matilda claimed this was due to: changing schedule arrangements by Coles; lack of commitment from outside growers who they sourced from due to delays in establishing and fine-tuning their own expanding irrigation activities; changes in Coles’ original program commencement schedules; and most significantly a change by Coles from a ‘cut and wrap’ cauliflower product line (for which Matilda committed significant capital investment) back to a whole head product. Coles would go on to claim that Matilda was not flexible enough and that alternative supply of produce was increasingly available from other suppliers as drought conditions abated in other production regions in Australia.

\textsuperscript{44} Research indicated (both during the research phase) and subsequent discussions with stakeholders (see Appendix 1), that there was no evidence that any party or value chain partner, including the Directors of Matilda, expected the eventual demise of the operation. Whilst commercial risks were recognised, these were all addressed with mitigation strategies recognised by VC partners.
The commercial reality from this case study is that despite the application of VCM principles, risk management was not aligned between the supply chain partners (e.g. Coles began to renege on previous supply arrangements as water supply in other traditional areas improved). This together with the move to a new lower cost approach under Wesfarmers ownership led to Matilda being left to the vagaries of the open market – i.e. the supply chain relationships were broken down. This in turn led to the demise of Matilda and an inability therefore to secure sustainable irrigation practices in this particular supply chain. A threshold is reached therefore where the risks for key supply chain members outweigh the benefits of remaining members.

**The breakdown of the Matilda-GSF/McDonalds relationship**

The Matilda – GSF relationship similarly began to breakdown as Matilda failed to supply agreed volumes and quality of lettuce for weekly McDonald’s requirements. GSF would claim that Matilda ignored the independent irrigation development and agronomic advice paid for and provided by GSF, and that as a result of supply volume and quality failures they incurred significant unbudgeted expense from sourcing produce from the markets to meet weekly requirements. They also claimed a lack of a return on the capital they invested with Matilda in new farming operations and failure to meet debt repayment schedules. At the same time Matilda claimed that GSF did not recognise the significance of the unusual environmental factors that Matilda production activities encountered (see Chapter 4). Matilda claimed that GSF should have maintained support as a value chain member in order to secure the agreed longer term advantages of reliable supply from a geographically diversified model of state of the art water efficient irrigation farms. Like Coles, GSF proceeded to reduce demand on Matilda (thereby compounding Matilda’s cash flow challenges) and increasingly sought produce from alternative suppliers as drought conditions abated in other production regions.

**The breakdown of the Matilda-Suncorp relationship**

It was not a surprise therefore for Matilda’s relationship with its banking organisation, Suncorp, began to unravel at the same time. With a highly leveraged position, failing cash flows, inability to meet budgets and the eventual failure of a capital injection strategy that was withdrawn at the last minute due to mounting concerns regarding the impending global financial crisis, Suncorp’s patience was nearing an end. Based on legal and accounting advice, Matilda went into voluntary administration with Suncorp quickly following suit to place the organisation in receivership.
All of the above members of the value chain of which Matilda was a part, Coles Group, GSF and Suncorp, clearly embraced and supported Matilda’s business and irrigation development proposals as Matilda undertook to achieve water supply security and efficient use practices. This was seen to be of benefit to all chain members, and similarly provided confidence to input suppliers who willingly supplied goods and services to Matilda’s development activities, including Landmark Pittsworth, Elders Armidale, Nolan’s Transport, Withcott Seedlings, South West Water and numerous other parts and service suppliers in Southern Queensland and Northern New South Wales.

Whilst the various value chain management principles considered in this thesis were clearly observed in operation in this case study (see Table 5.2), it is clear that their application was not sufficient to maintain the relationships that had been formed on the basis of a shared objective of efficient irrigation management practices. While water use efficiency and value chain management principles gave reason for these parties to come together there was a failure to maintain a sustainable relationship.

(c) Value chain fails

With the breakdown of these relationships the value chains that had been established between Matilda, GSF, Coles Group and Suncorp ceased to exist, and with them so did the shared objective of securing sustainable irrigation management practices. The presence of value chain management principles outlined in Table 5.2 was not sufficient therefore to sustain these relationships and maintain the functionality of the value chain in order that it could achieve that shared objective.

In concluding that the presence of value chain management principles is not sufficient to secure sustainable irrigation management practices, it is appropriate to consider in more detail the actions of the value chain members and alternatives they could have considered.

By the time the relationships were established and the value chain was functional, Matilda had no other objective (and given their investment and commitment, little other option) but to succeed in the endeavour. They would ultimately argue that any value chain is subject to unforeseen circumstances, particularly in the unforgiving environment (physical and financial) of food production, and that partners who were committed to the value chain and its shared objective would remain flexible enough to maintain support for the chain as a competitive entity.
Unlike Matilda, it became apparent that GSF and Coles Group did have other supply options that they could resort to as Matilda encountered consistency challenges at the same time as drought conditions were abating in other growing regions. GSF and Coles’ reluctance to remain fully committed to the Matilda value chain exacerbated the challenges being faced by that chain with a subsequent downward spiral of increasing cash flow problems despite capital investments that had been made.

GSF and Coles’ declining commitment to the Matilda supply chain, whilst apparently precipitated by short term commercial concerns about risks of supply and quality consistency, in effect represented the cessation of that value chain. Both GSF and Coles adopted a more opportunistic strategy instead by returning to the market place to source produce. Despite this, consideration of the original motivation of their move into the Matilda supply chain, supply security in times of severe water shortages, would suggest that such risks still remain. In the context of Australian weather patterns any horticultural supply chain is as uncertain and unpredictable as another in terms of irrigation water availability and climatic variables. Indeed the regular shifting from one supply relationship to another would be a very opportunistic supply strategy, bringing a range of different risks for the retailer or food service company than those encountered in a dedicated value chain management strategy.

In the special case of water there is no ability to predict supply status in the medium or short term, as was concluded in this case study. In an industry as small as Australia’s horticultural production sector (in terms of regions and operators) the risk of periods of low water supply are significant, enterprises are small, production capacity is thinly spread and as climate becomes more variable, supply risk in any one of those regions increases.

Despite the trust, commitment and co-investment that was observed in this case study, the commercial reality that eventuated was that in the face of challenges in terms of consistency of supply and quality, alternative supply arrangements re-emerged including those with suppliers which the retailer and food service partners (Coles Group and GSF) had previously stated did not necessarily employ efficient irrigation management practices. What became clear in the case study therefore, is that in times of relative water abundance (i.e. the end of drought conditions in a number of other horticultural production regions in Australia) the value proposition in sustainable water management (see section 1.2) weakens and other supply chain members turn to lower cost or lower risk supplier alternatives if there is insufficient commitment.
If attempts to implement value chain management principles have not been successful in reaching the objective of securing efficient irrigation management practices in this case study, the question becomes what other management strategies could be considered if this objective is to be met in line with community and government expectations.

Therefore, the second conclusion in this thesis, that ‘whilst value chain management principles promote sustainable irrigation management practices they are not sufficient in order to secure sustainable irrigation management practices’, directly addresses the gap in the literature between the water reform debate themes of water access and supply and water use efficiency on the one hand, and value chain management principles on the other as identified in section 5.1.3.

5.2.3 Conclusion # 3
Despite limitations (Conclusion 2) value chain management is the most likely business management strategy to secure sustainable irrigation management practices.

Having concluded that the evidence of the presence of value chain management principles is not sufficient to ensure sustainable irrigation management practices, it is appropriate to consider what other management strategies could be pursued. In doing this it is important to recognise the limitations and scope of this study as outlined in section 1.1.1, which emphasises that the study considers the position of the irrigator and their ability and capacity to engage in value chain relationships to manage water access challenges for their business. This scope does not include the role of external parties such as government and regulatory authorities. It should be noted that the role of such external stakeholders and potential alternative strategies to that observed in the case study are addressed in a discussion about areas for further research (see section 5.5).

The literature considered for this thesis suggests five key elements of particular relevance to this study.

- Water reform has evolved in Australia to include increased community involvement in the debate (see section 2.2.2).
- In response to increased community concern regarding water use efficiency government at Federal and State levels has enacted an unprecedented level of national water management monitoring, regulation and industry adjustment (see section 2.2.4).
- Value chain management is well recognised management strategy employed in Australian agribusiness to secure through chain benefits (see section 2.3.2).
Every value chain relationship is subject to competitive pressure and value chain management principles have developed in response (see section 2.3.4(c)).

Environmental pressures on irrigated food value chains in particular require flexible and adaptive management strategies (see section 2.4.4(a)).

In contrast to other successful value chain management examples in Australian agribusiness where consumer value has been pursued and secured this case study suggests that water is a special case. This conclusion assists in addressing the identified gap in the literature between the water reform debate themes of water access and supply and water use efficiency on the one hand, and value chain management principles on the other (see section 5.1.3).

The case study indicated that once drought conditions abated in other regions the retailer and food service company were able to revert to other suppliers rather than continue to cooperatively address challenges in the new value chain developed with Matilda. In contrast, Matilda had no other options given its investment and commitment to the new value chain.

The unique features of irrigation water as a variable in this value chain include the following.

- Water is fixed – it has a spatial element.
  It cannot be effectively transferred across the far flung horticultural production areas of Australia. Its management challenges are in situ and must be addressed in a physical manner.

- Water suitable for irrigation is a finite resource for which demand exceeds supply.
  Growing global demand for food based on population growth projections will increase the pressure on sustainable irrigation water use. The globe only has a finite supply of water that is recycled through natural phenomenon and consumptive uses – the world will need to be increasingly efficient with its use of water resources.

- Water is essential for food production and it has no substitutes - there is little that can be done to manage or alter its role in this regard.
  If soil, environment and water are considered as the basic requirements for food production; it is recognised that soil alternatives are available in soil-less cultures and hydroponics; it is recognised that natural environment can be managed or replicated through modified settings;

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45 Examples include the promotion of organic produce, food products that purport to provide nutritional and ‘heart smart’ benefits, and products based on supply chains that promote animal welfare consciousness (such as chickens, eggs, pork).
and it is equally recognised that water has no substitute, and is in reality embedded in all goods and services in a consumer society (Lenzen & Foran, 2001).

Given these global realities and challenges, and if value chain management is not presently sufficient to ensure sustainable irrigation management practices, the question becomes as to whether or not the community can leave the responsibility for efficient water use to the irrigator alone – the very member of a value chain shown in this case study to be most vulnerable to environmental and market challenges.

It has been concluded that water has no substitutes, and that sustainable irrigation management practices are recognised as a community requirement, as evidenced through increasing government regulation regarding water allocation. This case study has shown that a value chain management business strategy has the potential to assist in achieving the community objective of ensuring sustainable irrigation management practices provided all members of that chain continue to recognise the existence of that chain as critical to achieving that objective.

This was evidenced in the case study in terms of: the original shared recognition of the value of water; the shared desire to secure consistent supply and quality of produce (and hence cash flow); pursuit of product or service differentiation (in terms of water use efficiency); and corporate social responsibility imperatives. In this case study however there was an eventual failure to sustain value chain management strategies once drought conditions in other production areas abated and alternative supplies became available again.

Therefore whilst value chain management principles were employed, they were not sufficient to ensure sustainable use of water, and in this case market failure and consequent business failure for the irrigator followed. The potential risk for the other members who left this value chain relationship would resurface if they were to find themselves facing the same widespread drought challenge again. In this scenario they could well need to partner with an irrigation enterprise such as Matilda in the future and wish again to embrace broad acre production principles in the Darling Downs, Mary River or Armidale regions in which Matilda innovatively expanded its operations. Given that there are a limited number of horticultural production areas in Australia, and a limited number of large scale professional irrigators, it could have been, from a longer term risk management perspective, in the interests of Coles Group and GSF to remain committed to this value chain.
It is appropriate therefore to consider under what circumstances those in the position of power in the value chain (retailer and food service company) would continue committing to a chain based around the objective of ensuring sustainable irrigation management practices.

- Market regulation – where government regulation and or industry agreement stipulate that retailers and food service companies servicing consumer requirements can only source produce grown under sustainable irrigation management practices. Given the successful deregulation of many of Australia’s agricultural industries and competition policy a legislative approach is considered most unlikely.

- Industry development and assistance programs – where federal and state government incentives, together with industry and research programs, are specifically targeted to guiding value chains towards optimal water use efficiency outcomes.

- In line with communication, education and case study outcomes of industry development and assistance programs (where organisations are educated in value chain management principles), value chains could conceivably solve water sustainability problems through continued and more dedicated application of value chain management principles.

In the end though any of the alternative approaches considered above require through chain recognition of the problem, shared acknowledgment of the benefits of solving the problem, cooperation in addressing the challenges through co-investment, transparency in information relating to progress and outcomes of such through chain initiatives, and communication of the results of such initiatives to industry and the broader community that demands water use efficiency.

Supply chains such as those observed in this study remain complex, dynamic social systems. The application of value chain management doesn’t remove the need to be commercially vigilant – there is sense in being commercially positive and optimistic, but not idealistic. Following the placement of the Matilda companies into voluntary administration, and the subsequent move by Suncorp to place those companies in receivership, the receivers found they couldn’t sell the whole operation as a going concern on a tender basis. This suggests others couldn’t see the value of the group or weren’t comfortable with the apparent commercial risk. It also suggests that management of the Matilda Group could have considered other options as commercial pressure on the business increased.\footnote{Examples include the dairy, grains and cotton industries.\footnote{Section 8.4 considers implications of this thesis for future research including the concept of ‘real options analysis’.
}
The global challenges of water supply and demand and the resulting need to ensure sustainable use practices therefore require a through chain approach in which the whole food value chain benefits which in turn is in the best interests of the community. This responsibility cannot be left to the vulnerable irrigator alone.

It is thus concluded that value chain management is the most likely business management strategy to secure sustainable irrigation management practices.

5.2.4 Theoretical contributions from thesis conclusions

The conclusions presented in this thesis and outlined above are:

(i) value chain management principles promote sustainable irrigation management practices;
(ii) whilst value chain management principles promote sustainable irrigation management practices, they are not sufficient in order to secure sustainable irrigation management practices; and
(iii) despite limitations, value chain management is the most likely business management strategy to secure sustainable irrigation management practices.

These conclusions have been drawn from a case study that addresses the lack of literature on the combination of external water reform pressure and internal strategic management pressures on an irrigation organisation’s ability to remain a member of a food value chain; and the productivity and environmental stewardship demands placed on irrigators by the community, despite the lack of evidence that the community (including other members of irrigation supply chains) are willing to actually share responsibility for such initiatives. As outlined in 5.1.3 these conclusions assist in addressing the gap in the literature identified in Chapter 2 between the water reform debate themes of water access and supply and water use efficiency on the one hand, and value chain management principles on the other.

Within the limitations and scope of this research (see section 1.1.1) the conclusions therefore make a theoretical contribution by confirming that value chain management principles promote sustainable irrigation management practices and although they are not sufficient to secure those practices they are likely business management strategy to achieve such an outcome.
5.3 Addressing the research problem, questions and objectives

The conclusions outlined in the previous section namely:

(i) value chain management principles promote sustainable irrigation management practices;
(ii) whilst value chain management principles promote sustainable irrigation management practices, they are not sufficient in order to secure sustainable irrigation management practices; and
(iii) despite limitations value chain management is the most likely business management strategy to secure sustainable irrigation management practices;

are now reviewed from the perspective of the research problem, questions and objectives outlined in Chapter 1 of this thesis.

5.3.1 Addressing the research problem

The research problem of this thesis is:

What role can value chain management principles play in assisting Australian irrigated agriculture producers to secure access to irrigation water and maintain sustainable irrigation management practices?

The literature review indicated that community discussion and government considerations of water access rights has increasingly become the focus of the water reform process (see sections 2.2.1, 2.2.5). This debate, which has also been subject to an increasing level of community interest and involvement since the 1980’s, has driven a ‘culture of conservation’ of water management (see Table 2.1).

From a commercial perspective, the case study research indicated that in order to seek community acceptance and commercial validation of the need to secure access to irrigation water, irrigators could consider engaging with other members of the food value chain of which they are, or wish to become, a part. As an agribusiness strategy (see section 2.3), value chain management provides a basis for irrigators and other members of food value chains, to share the costs and benefits of value creation which is in the interests of the competitiveness of the entire chain (Gifford et al, 1988; Susskind, 2005). It is concluded, therefore, that value chain management principles are critical tools with which producers can work to secure their access to irrigation water supplies. This position is further explored in considering the specific research questions below.
5.3.2 Addressing the research questions

Chapter 1 of this thesis outlined three research questions that relate to the research problem above.

(i) The first research question is:

*How do sustainable irrigation management practices compare against other strategic management issues facing managers of irrigation firms within Australian food value chains?*

The case study indicated that in order to maximise productivity and hence the potential for optimum commercial return, it is critical that managers of irrigation firms implement sustainable irrigation management practices. Such a focus actually embodies and underpins a whole range of strategic management issues that these managers face: from management of agronomy, farming assets, technology and developed irrigation infrastructure, through to marketing and financial management. In an industry where one of the critical measures of performance often used is the financial return per megalitre of irrigation water employed sustainable management of irrigation water entitlements, in terms of water use efficiency and maintaining access, is usually the most critical strategic issue to be managed.

(ii) The second research question is:

*Can members other than the irrigator-producer in Australian food value chains influence sustainable irrigation water use practices, and if so, how?*

The literature review completed for this thesis suggested that from a theoretical perspective members of value chains can enjoy mutually beneficial relationships that are focussed on the competitiveness of the entire chain. Features of such chain relationships, including information sharing, cooperation, trust, commitment, risk sharing, co-innovation and co-investment, allow chain members to influence the actions of fellow members, particularly those in a position of power within the chain.

The case study explored the influence that Matilda’s (irrigator-producer) fellow chain members were able to exert. Initially this included constructive relationship elements of information sharing, co-investment and risk sharing that facilitated Matilda’s move into new and expanded irrigation ventures. This influence continued through the commercial drivers of supply agreements and performance management and monitoring, through to the ultimate commercial decisions of Coles and GSF that marked the end of the value chain relationships thus precipitating Matilda’s business downfall.
The third and final research question is:

*Does the presence of value chain management principles ensure that responsibility for sustainable irrigation water management can be shared throughout the food value chain, and if so, how?*

Clear indications in the case study, based on the successful establishment of value chain management relationships, are that responsibility for sustainable irrigation water management can be shared throughout the value chain. Indeed the conclusions of this research confirm that value chain management principles, including co-investment and risk sharing, are necessary in order to secure sustainable irrigation management practices. It was further concluded though that the presence of value chain management principles is not sufficient of itself to secure sustainable irrigation management practices.

Nevertheless, it is finally concluded from this research that value chain management is the likely agribusiness management strategy to secure sustainable irrigation management practices.

### 5.3.3 Addressing the research objectives

The research objectives for this study, as outlined in Chapter 1, include:

1. **Determine how relevant value chain management principles are to managers of irrigation enterprises in Australian irrigated agriculture value chains in terms of their need to manage: their access to water; and their sustainable water use.**

In relation to the relevance of VCM principles to managers of irrigation enterprises in terms of their management of water access and sustainable use, this study has concluded that VCM principles promote sustainable irrigation management practices which in turn underpin the value proposition that a focus on such practices can ensure the maximum return on available water resources and reduce exposure to water scarcity situations.

2. **Determine the significance of VCM principles to managers of irrigation enterprises in Australian irrigated agriculture value chains in relation to other management strategies employed in their enterprises and the contemporary business management challenges facing them.**

Managers of irrigation enterprises employ a number of strategies to sustain their operations, including agronomics, capital investment and equipment maintenance, and overall business management. In terms of the significance of VCM principles among these business management strategies, the second conclusion in this study found that whilst VCM principles promote
sustainable irrigation management practices, they are not sufficient in order to secure sustainable irrigation management practices. This case study indicated that other business management challenges need to be addressed at the same time.

(iii) Consider how value chain management can best be implemented as a business management strategy in Australia irrigated agriculture value chains in order to secure sustainable irrigation management practices.

The third key conclusion in this study is that despite limitations, VCM is the most likely agribusiness management strategy to secure sustainable irrigation management practices. In terms of the research objective of consideration of how this strategy should be best implemented, the discussion in section 5.2.3 is revealing as it considers circumstances under which supply chain members would maintain their commitment to a supply chain focussed on sustainable irrigation management practices irrespective of other pressures (something that was lacking in the observed case study). This conclusion raises a number of queries in relation to alternative strategies which are considered in section 5.5 as potential areas for future research.

5.4 Summation

As outlined above the conclusions in this Chapter have addressed the literature gap between water reform debate themes of water access and supply and water use efficiency on the one hand, and value chain management principles on the other. Accordingly the conclusions provide a clear response to the research problem of what role value chain management principles can play in assisting Australian irrigated agriculture producers to secure access to irrigation water and maintain sustainable irrigation management practices.

As outlined in section 1.1.1 it should be noted that there a number of limitations on this research that should be noted when considering its implications and potential future research.

Firstly, the results of this research must be interpreted in relation to the progress of the water reform process, which will continue to evolve both during, and after, this research project. This includes not only government regulation at all levels, competitive industrial and environmental uses for water resources, but climatic conditions as well.

Secondly it should be noted that the value chains considered in this thesis extend nationally and in some case internationally. The case study addressed in this research though is set in southeast
Queensland and northern New South Wales, although its findings have been validated with national agribusiness and water reform opinion leaders.

Thirdly, as outlined in Chapter 1, irrigated agribusiness value chains in Australia can be observed in both food and fibre industries operating in domestic and international markets. The case study considered in this thesis is restricted to vegetable value chains operating in the domestic market.

5.5 Potential implications and future research
The compilation of this thesis, and completion of the case study and conclusions on which it is based, has given rise to seven questions in relation to the applicability of the conclusions to other agribusiness management scenarios and challenges. It is proposed that these questions could be worthy of consideration in further research.

(i) Do the conclusions from this study in relation to the management of water resources for the purpose of irrigation apply to the management of other natural resources?

The contrasting of value chain management literature and water resource management literature conducted for this thesis could perhaps be similarly considered in relation to other natural resource management challenges in Australian agribusiness. Whilst this study has concluded that:

(a) value Chain Management principles are necessary in order to ensure sustainable irrigation management practices;
(b) whilst evidence of the presence of Value Chain Management principles is necessary, it is not sufficient in order to secure sustainable irrigation management practices; and
(c) despite limitations, Value Chain Management is the most likely agribusiness management strategy to secure sustainable irrigation management practices;

it may be of potential interest to Australian agribusiness value chain members and government agencies to consider such conclusions in relation to land and wildlife for example, as outlined in Chapter 2. The availability and status of strategic cropping land\(^{48}\) in the face of competing land uses such as mining and urbanisation could provide the basis of valuable research in this regard.

\(^{48}\) New ‘Strategic Cropping Land’ policies (previously referred to as ‘Good Qualify Agricultural Land’ policies) are in the process of development by the Queensland State Government (see: www.derm.qld.gov.au/land/planning/strategic-cropping/index.html) which will apply to some of the same regions on the Darling Downs in Southern Queensland that the case study organisation in this thesis (Matilda) operated. This process of policy development has come about
(ii) Do the conclusions from this thesis assist in considering the application of industry standards for the sustainable management of irrigation water?

Section 2.5.1 (d) refers to industry standards and accreditation programs for the supply of agricultural produce in line with industry standards or accredited quality and hence marketing or branding programs. The features of such programs included examples such as consumer health benefits, animal welfare benefits, labour and employment conditions, or geographical source (i.e. promotion of the region, state or country of origin).

To the extent that such programs are based on cooperation and coordination throughout the value chain, it may be of interest to consider the conclusions of this study, as they relate to the sustainable management of irrigation water resources, in terms of other agribusiness quality and product specification programs. At the same time the research in this thesis could be extended into the area of supply specification programs and associated branding strategies centered on the value of sustainable irrigation water management, as was suggested by GSF in the early stages of the case study in this thesis. Such programs could be strictly commercially based (i.e. product differentiation strategy for a supply chain; corporate social responsibility approach taken up by a supply chain) or industry wide (e.g. water use efficiency programs in horticulture, integrated pest management programs in cotton).

(iii) Do the conclusions from this thesis apply to processed food and non-food (i.e. not fresh food) irrigation supply chains?

The fresh vegetable supply chain considered in the case study undertaken for this thesis involved the variables of fresh food supply logistics, where both produce shelf life and seasonal conditions impact on the continuity of supply, and consumer driven demand for regular supply of fresh produce such that stockpiling and lags in the supply chain are not feasible.
These variables present significant challenges for any fresh food supply chain. It may be of interest to consider processed food supply chains that depend on irrigation (e.g. wine, dairy) and non-food irrigation supply chains (e.g. cotton), where inventory management strategies may present more flexibility in meeting demand, in relation to the conclusions from this thesis. For example, the second conclusion in this thesis:

*whilst value chain management principles promote sustainable irrigation management practices, they are not sufficient in order to secure sustainable irrigation management practices;*

may not apply to the cotton industry where, in the absence of some of the logistical challenges of fresh, non-stockpilable produce chains, value chain management principles are sufficient to maintain necessary chain relationships.

(iv) Do the conclusions from this thesis apply to other ‘sustainable’ product value chains, such as those that are focused on ‘organic’ and ‘green’ credentials; or are these conclusions irrigation chain specific?

In relation to the conclusion regarding value chain management be insufficient to ensure sustainable practices, it may be of interest to consider whether or not this relates specifically to sustainable management of irrigation water resource, or to sustainable management practices in general. Do this and the other conclusions apply to organic agribusiness supply chains or green supply chains for example?

(v) Do the conclusions from this case study apply equally to corporate and SME \(^{49}\) or family business irrigation enterprises?

Is there a difference in the wherewithal of SME agribusiness irrigators vs. corporate irrigators in terms of their ability to participate in supply chains focussed on sustainable management principles or to effectively partner with large corporate value chain partners in striving to meet the sustainability challenge?

(vi) What implications does this thesis present for government policy and industry assistance programs?

\(^{49}\) Small business enterprise
This thesis has considered the linkages and relationships between irrigation producers, processors, retailers and food service organisations in fresh vegetable value chains in Australian agribusiness. Cooperation between these various chain members in relation to sustainable management of irrigation water resources was a particular focus of the research.

Given this background it is proposed that further research could be conducted in the following areas.

(a) Value chain engagement in the planning and conduct of production oriented research. In the case of irrigation management for example, this research uncovered a willingness of other members of the value chain to be engaged and, and invest in, developments on farm. Similar engagement may be considered in relation to all facets of production research that has an impact on product and service quality characteristics that are of value to other members of the chain.

(b) Can the prevailing community attitudes to irrigation based agribusiness activities be measured given environmental, economic and regulatory developments in Australia in recent years? Have the water resource planning solutions presented by various State governments; the flooding in various regions; agricultural water use efficiency projects; media regarding the financial performance of large irrigation organisations such as Cubbie Station or failed irrigation based investment schemes (e.g. Great Southern Group, Timbercorp); government water licence buy-back programs and the various Murray Darling initiatives, relieved some of the community pressure on irrigated agribusiness value chains?

(c) Is there a disconnect between various government industry support and water use efficiency programs where irrigators may be encouraged to embrace supply chain relationships, export activities and value-adding for example (all of which require continuity of produce and hence water supply), at the same time as water use efficiency programs encourage them to reduce their consumption of irrigation water?

(vii) When value chain relationships are under pressure can other management strategies such as ‘real options analysis’ assist as a proactive, or even reactive, approach to ensure that all possible commercial options are considered?

For example, discussion on the third conclusion of this thesis (see section 5.2.3) covered the fact that the retailer and food service company members of the case study value
chain had other supply options once drought conditions abated in other regions of the country. In contrast to this the irrigator member had no other available to them, especially given the significance of the investment and commitment they had made to this particular value chain. ‘Real options analysis’ is about being commercially pragmatic about value chain management challenges, rather than potentially being idealistic about the benefits of value chain relationships, they may have been able to develop a strategy in a cooperative or at least transparent fashion with their fellow value chain members, that involved ‘real options analysis’. The interplay of such risk management strategies within the context of value chain management could be of interest in further management research.
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Appendices

Appendix 1  Case study organisation – historical context

Appendix 2  Research processes and details
Appendix 1  Case study organisation – historical context

The history of the Matilda Group can be traced back to the farming development activities of the late Bill Jauncey in the 1940’s, through the farm and business management pursuits of his grandchildren James Jauncey and Sonya McConville some 70 years later as outlined in research documented in this thesis.

The first generation – irrigation establishment and customer orientation
The Matilda Group had its origins in the farming activities originally commenced by the late Bill Jauncey and his family at Wando, Brookstead in the 1940’s. Bill’s career in agriculture spanned a number of farm management, cattle industry and earth moving operations but his largest achievement was recognised to be the establishment of successful grain growing activities at Wando, a former sheep property. Bill was also instrumental in the establishment of flood irrigation activities on the Darling Downs in the 1950’s. Bill was an avid supporter of free enterprise and a strong opponent of statutory marketing arrangements which in his view stifled his own ability to seek and establish long lasting relationships with specific customers. Bill strove to develop relationships with end users (e.g. as a feed grain supplier direct to egg and chicken meat producers throughout South East Queensland) and became increasingly frustrated with existing supply chain structures in the grain industry often quoting the Australian of the Constitution as a basis for his industry arguments. It can be thus observed that he was an early practitioner of business and marking principles later recognised in management theory as elements of value chain management.

The second generation – continued irrigation developments, new products and new markets
Bill’s son Phillip began taking over farm management responsibilities from his father during the 1970’s and quickly became a leader in the irrigation industry as the inaugural Chairman of the Condamine River Basin Irrigators Association (CRBIA)\(^50\). The CRBIA lobbied government particularly through the then Premier of Queensland, Joh Bjelkje Petersen, and was successful in securing Stage 2 of the Leslie Dam irrigation scheme in the Upper Condamine irrigation district (incorporating the central Darling Downs irrigation area). The CRBIA executive at the time were also successful in securing irrigation rights in the North Branch of the Condamine River between Lemontree and Cecil Plains, and ground water in lieu provisions in relation the Leslie Dam supplies. Whilst successful in this regard, members of the group including Phillip were to later

\(^{50}\) The CRBIA was established in 1973 as an irrigators representative body for irrigators – it is now known as Central Downs Irrigators Association.
encounter frustration in seeking government recognition of the need for extra irrigation water supplies for the Darling.

Like his father, Phil became vitally concerned in the markets and customers of Wando’s produce and through his association with the Royal Agricultural Society of Queensland lead a range of regional activities such as the Irrigated Crops Tour to encourage agricultural best practice and initiative.

Phil’s concerns about slim margins in grain production on the Darling Downs, and what he saw as his inability to secure stable, long lasting relationships with customers of Wando’s produce, led him to investigate alternative cropping enterprises around the world during the early – mid 1980’s.

Such investigations were to be based on what Phil termed his new crop philosophies:

- had to be a crop that was not ‘stock-pilable’ so that marketing opportunities could not be manipulated by larger producers or organisations able to store produce (e.g. grain); and
- had to be an industry that was not structured or regulated such that individual operators could market their own produce through to the end consumer if possible.

During this period many irrigators in Queensland and northern New South Wales began the move to irrigated cotton production which was to prove to be a lucrative activity for many. Phil however initially rejected cotton production as a part of his new crop philosophy given the facts that it could be warehoused throughout the growing season; did not present obvious opportunities to market produce through to the consumer; and presented a range of pest management regimes with which Phil was uncomfortable.

It was Phil’s belief that traditional broad acre farming activities on the Darling Downs, including winter crops such as wheat and barley, and summer crops such as maize and sorghum, were not providing sufficient return on irrigation systems, and nor did their supply chain structures provide individual producers with opportunities to identify or develop relationships with specific end users. By the mid to late 1980’s Phil had begun the process with likeminded Downs’ rural business identities, including Gordon Vandersee of Vanderfield Machinery (recognised as Australia’s largest John Deere Dealership) of investigating alternative crops. It was thought that the wider Darling Downs Community, as well as many end users of Downs produce, we unaware of the complexities

51 Cotton production was however later adopted as a part of Wando’s crop rotation programs.
and management systems employed to produce consistent irrigation based crops that provided benefits to the whole community.

Investigations including study tours throughout the United States of America identified both herb production potential and broad acre horticultural crop production opportunities for the Darling Downs region (an opportunity that was similarly being recognised by traditional intensive horticultural producers from the Lockyer Valley to the east. Two significant business activities were established on the Darling Downs as a result:

- horticultural production and trialling activities under the name of ‘Matilda Pty Ltd’ (including broccoli and daikon) based around the Jauncey family property, ‘Wando’ on the Central Darling Downs; and
- a herbal medicine manufacturing and marketing business based in Toowoomba, initially on the Vanderfield Machinery site, and later in a dedicated facility constructed to Therapeutic Goods Administration standards under the name of ‘Greenridge Botanicals’ Pty Ltd.

The Jauncey family were to remain shareholders of the ‘Greenridge Botanicals’ business until it was sold to Thursday Plantations in 2003, whilst the Matilda operation was wholly owned by them from the outset. Matilda commenced its activities by operating on behalf of a group of local irrigators from the Central Darling Downs area to produce and pack broccoli predominantly destined for Japanese importers supplying Japanese supermarkets. The market development activities were led by Phillip with the assistance and advice of the Queensland Department of Primary Industries; the Queensland Trade Office; and Austrade. Matilda’s supply relationships with growers were largely based on long term personal relationships within the local community.

The Jaunceys commenced Matilda’s marketing activities in association with Mr Joseph Shani, an Israeli with international citrus marketing experience most recently in the Mundubbera region of Queensland. The Wando packing shed was initially established in partnership with other interests and later purchased outright by the Jauncey family. Initially Joseph Shani managed all marketing activities with Phil looking after growing and packing but at the same time insisting on some involvement in marketing.

Whilst Joseph didn’t profess a detailed knowledge of the production and packing activities of the business, he did insist that his focus on sales activities would enable him to dictate production, packing and shipping imperatives in the supply chain. Gradually the relevant relationships began to break down with Phil eventually assuming Joseph’s marketing role for the business.
The burgeoning Matilda supply chain encountered a number of significant challenges during this early growth phase in the early 1990’s. Marketing challenges included the continued application of the Jauncey family’s philosophy of end customer relationships. A perceived imbalance of power in domestic supermarket chains led the company to essentially devote its attention to the export market rather than domestic customers, other than wholesalers (these domestic supermarket relationships were revisited some 15 years later – Coles etc.). This in turn led to the development of negative views of Matilda by traditional intensive producers of broccoli on small holdings in the Lockyer Valley, as they saw them as significant individual competitors able to influence wholesale prices significantly simply due to their volumes. This was an issue that would live on to resurface some ten years later when new water supplies for South East Queensland were being discussed (see section 4.6.1). At the same time export challenges in terms of developing relationships with end consumers were being gradually broken down as the company invested time and effort in establishing direct relationships with Japanese supermarkets (and later in other Asian countries) rather than the importer or agent.

Of more significance though were the supply challenges that Matilda faced during this period. Whilst the Jauncey family had adopted a philosophy of maintaining long term export customer relationships by maintaining supply even in the face of regular variations in more attractive prices on the domestic wholesale market, other local Darling Downs growers began to express great concern with that approach. They preferred to receive the highest price on offer and became increasingly frustrated with Matilda’s long term customer relationship approach. This led to the Jauncey family increasingly growing more of Matilda’s requirements to the stage that external supply ceased altogether.

**Second generation – business development, industry involvement, irrigation systems revisited and succession**

By the early 1990’s, with the Matilda business established with a core staff under direction from the Jauncey family, and firm supply chain relationships in place, Phillip turned his attention once more to the future trends affecting the farm business’s options. It was clear that the consistency of quality and quantity for which Matilda had developed a reputation was largely dependent on the sustainability of the Jauncey’s irrigation based farming systems. He thus stepped up his involvement in irrigation industry development activities, and further engaged external advisers in the operation of his own enterprise.
(a) **Irrigation industry involvement**

Just as Bill Jauncey’s (and later Phillip’s) efforts to secure sustainable water supplies for the Darling Downs farming community has met with the North Branch deviation from the Upper Condamine Irrigation system, and later the second stage of Leslie Dam and ground water in lieu entitlements; Phil believed he needed to refocus on further ensuring irrigation water supplies for the future. This vision extended to the view that the Darling Downs had the potential to equate the success of the San Joaquin Valley in California in terms of agricultural production and marketing. Phil’s views in this regard were further encouraged through his participation in the inaugural intake of the Australian Rural Leadership Program – a program with the vision of ‘rural, regional and remote Australia’s viability and sustainability is enhanced through committed individuals who are responsive and confident leaders’ (ARLP, 2008).

On completion of his ARLP course, Phillip devoted significant time, attention and funds to the establishment of a dedicated program of seeking community attention to the need for improved water supply for the region. In early 1994 Phillip hosted a gathering of local government and industry representatives for the purposes of setting a direction for the local Darling Downs community in terms of its future development and water needs. A visioning workshop was held in Toowoomba and facilitated by Ms Robyn Loydell, a fellow ARLP graduate of Phillip’s, Executive Director of the Forest Protection Society and organiser of the successful logging trucks blockade of Parliament House in 1993 aimed at increasing government and community awareness of the logging industry’s sustainable management credentials. Notable outcomes of the day included:

- agreement that sustainable water supplies were necessary for urban, industrial and agricultural users on the Darling Downs;
- acceptance of advice received by Bruce Vandersee, Managing Director of Vanderfield Machinery, from Paul Keating, then Prime Minster of Australia when he visited a Kingsthorpe property in the grips of the drought – “if you want the government to do something, get the community behind you”; and
- development of a vision statement regarding the future economic, environmental and social prosperity for the region.

Following the workshop, a group entitled “Darling Downs Vision 2000” was incorporated in order to pursue the vision and goals agreed upon through industry and political lobbying.

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32 Bruce Vandersee, pers. comm.
Based on collective frustration with the lack of attention by State and Federal Governments to the need for new water supplies for irrigation purposes on the Darling Downs, DDV2000 welcomed the opportunity to make a submission to the Borbidge Government’s State Water infrastructure Taskforce to secure new irrigation water supplies for the Darling Downs. With the support of the Condamine River Basin Irrigators Association, various businesses and farmers across the Darling Downs, Sinclair Knight Mertz Engineers, and Warwick Shire Council, DDV2000 submitted a proposal to divert water from the Clarence River in Northern New South Wales north across the Queensland border into the headwaters of the Condamine River and hence downstream across the central Darling Downs (or ‘Upper Condamine’) irrigation area. This application was ultimately unsuccessful due to feedback from the New South Wales Government to the then Queensland Minister for Natural Resources Howard Hobbs that no cross border transfer proposals would be considered.

At the same time a group of irrigators in the Lockyer Valley made a submission to the State Water Infrastructure Taskforce to secure recycled water from Brisbane for the purposes of irrigation throughout the Lockyer.

Following further consultation with the new Minister for Natural Resources, Lawrence Springborg (who succeeded Howard Hobbs), funding of $100,000 was secured to support investigations led by the Department under the auspices of the ‘New Water for the Darling Downs and Lockyer Valley’ Ministerial Taskforce. That taskforce’s report identified recycled water from Brisbane as the most appropriate source of new irrigation water supplies for both the Lockyer Valley and Darling Downs.

Once this report was presented to the new Minister for Natural Resources, Rod Welford at a Jondaryan Community Cabinet Meeting, it was adopted by the Department of State Development under Minister Terry Mackenroth as the basis on which to establish a ‘South East Queensland Recycled Water Project’ State-Local Government Taskforce following negotiation with the South East Regional Organisation of Councils (SEQROC). Chaired by Mr John Orange of Brisbane City Council, this taskforce, amid some controversy, concluded that the proposed project was not feasible on financial grounds.

53 The State Water Infrastructure Taskforce was established in 1996 in order to identify water infrastructure projects throughout the State for possible government funding)
Nevertheless, DDV2000 and the Lockyer group, ‘City to Soil’, combined their efforts to secure funding support from the Federal Government’s ‘Regional Solutions Program’ and ‘Regional Partnerships Program’ (through the Deputy Prime Minister John Anderson). Significant community and government consultation took place during this period including the formation of an Interdepartmental Committee by the then Deputy Prime Minister, John Andersen. Resultant project and business planning, completed with the assistance of Ernst & Young, Babcock and Brown, CH2MHiIl Engineers and others, culminated in a submission to the National Water Commission (NWC) in 2004. The NWC elected not to support this submission. During this period, the Toowoomba City Council (TCC) had submitted an application to the NWC for funding to support the Toowoomba Water Futures (recycled water for potable use) proposal. Many in the community saw these proposals as competitive in terms of NWC funds and a degree of animosity between DDV2000 (by now renamed NUWater) and the TCC developed. Whilst the TCC proposal failed to secure community support through a referendum required by Malcolm Turnbull, NUWater also gradually scaled back its activities and is now all but defunct.

The Lockyer group by this stage had elected to go their own way, under the new banner of Lockyer Water Users Forum, and continue to seek Federal and State Government support for a smaller scale Lockyer project as an adjunct to the South East Queensland Water Grid being developed by the Beattie and Bligh governments.

Whilst the above efforts to secure new irrigation water supplies for the Darling Downs were being undertaken, local irrigation interests were involved in community and government discussions and debate regarding access to existing water supplies. Under the encouragement of the Federal Government, the Queensland Government commended Water Allocation Management Planning (WAMP) in the Condamine Balonne River System (of which the Upper Condamine or Central Darling Downs irrigation area is a part). Again the Jaunceys were closely involved in these discussions with Phillip establishing the ‘Darling Downs WAMP Review Group’ which made a formal submission to the State Government on its ‘Draft Condamine Balonne WAMP’, and played a role in other community based submissions including the ‘CRBIA WAMP Submission’ and that of the ‘Darling Downs Cotton Growers Association’.

54 The National Water Commission was established under the National Water Commission Act 2004.
It is important to note that the history of the DDV2000 group, in which Phillip Jauncey has been instrumental since its inception, is characterised by a significant level of community interest and involvement. In particular, much of this involvement was from fellow supply chain partners of irrigators who were DDV2000 executive and members. Such entities included:

- Ergon Energy;
- South State Fuels;
- Grainco;
- South West Water;
- Port of Brisbane Authority;
- Westpac Bank;
- Suncorp Banking;
- Vanderfield Machinery / John Deere;
- Toowoomba Chronicle;
- WIN Television;
- Toowoomba City Council and other Darling Downs Shire Councils; and
- Incitec Fertilizers.

(b) **External advisers and generational changes**

In 1998, following his completion of the Australian Institute of Company Director’s (AICD) Company Directors’ Course, Phillip decided to seek external input on the management and direction of the company. Over the ensuing years, Ian Yeo of McConachie Stedman Accountants, John Herbert of The Goya Solution (Management Consultant), Allan Twomey of Excel Consulting; Matthew Holding Agronomist, Lionel Davidson of Davidson and Sullivan Solicitors, Russel Rankin of Food Innovation Partners, and me on behalf of Southern Star Consulting, became regular advisers.

External consultants were also specifically briefed to advise the group in terms of its consideration of the following.

- Strategic direction and margins on existing business units – including the farming operation, the packing shed, marketing activities, and an earth moving entity originally established to construct dams on Wando and latterly focussed on external clients.
- Management team development.
- Financial and marketing management initiatives.
One of the key roles of the external advisers was to assist in the succession process which involved:

- Separation of the Matilda Earthmoving business under Daniel;
- Development of the farming business under James; and
- Establishment of the food packaging and marketing business under Sonya.

**Third generation - business expansion**

The fortunes of water supplies and management on the Darling Downs again played a significant role in these decisions, which ultimately led to the restructuring of the whole organisation so as to carve out the entities as listed above.

(a) **Matilda Earthmoving established and separated from the group**

Under tighter water supplies and uncertainty regarding the Queensland Water Allocation Management Planning process, Matilda Earthmoving ventured further afield than the Darling Downs, water development, and agriculture; ultimately focussing on the outsourced/leased equipment requirements of the mining industry. Matilda Earthmoving has since moved on to be an extremely profitable and successful business (Dan Jauncey, pers. comm., 2008).

(b) **Matilda Farming established**

It was recognised that the farming operation would need to focus on as wide a product range as possible whilst maintaining its traditional activities in grain, cotton and horticulture production. Serious discussions regarding the purchase of neighbouring properties when they became available for sale resulted in a firm decision to focus on water supply risk management rather than more farming land in the same valley and water catchment area. Subsequent property leases and purchases were secured in different valleys as a result of this decision.

(b) **Matilda Fresh Foods established**

The packing marketing business, subsequently named Matilda Fresh Foods, needed to ensure as robust a supply chain as possible – based on the expertise developed with the Matilda Farming business over many years – but also incorporating supply from as broad a geographical basis as possible. In order to manage both its water supply risk, labour supply risk, and so as to develop a standalone off farm asset, Matilda Fresh Foods was destined to
relocate its packaging and processing activities to Toowoomba, some 80km to the east of the Jauncey farming operations at ‘Wando’.

The scene was therefore set for the next generation to take its place in management of the Matilda companies. The Matilda group’s expansion in terms of farming area, crop production and supply chain relationships was, as is the cases with many family farming operations, driven by the need to support the next generation’s careers and families.

Pressures encountered during this third generation expansion phase included the following.

- **Internal subsidisation risk management**
  Matilda soon recognised the need to adjust its management practices analyse returns from farming as distinct from processing business activities (i.e. analysis of returns from various activities throughout the entire supply chain including research, production, packaging, processing, and marketing) where opportunities to outsource various activities remained.

- **Changing banking relationships**
  Whilst the Jauncey family had been banking with Westpac for many years, this relationship began to deteriorate following the establishment of the Charlton processing plant in 2005. Concerns about operating costs of the new facility and insufficient capital led to pressure from the Westpac Bank such that a decision was made to move to Suncorp. Suncorp subsequently supported further expansion in relation to new farming areas, but the pressure to meet debt reduction and cash flow milestones remained.

- **Supply chain pressures**
  The Matilda group has experienced a number of frustrations in relation to other growers supplying the Charlton processing facility. As outlined in section 4.3.2, the Matilda horticulture operation encountered difficulties in sharing a common marketing philosophy with other local Darling Downs growers during the early 1990’s to the extent that all external supply ceased and Matilda grew all of its own produce for the original packing shed located at Wando.

  Upon expansion into the Charlton processing facility in the mid-2000’s, Matilda again found itself in need of external growers to not only maintain throughput in the expanded facility, but also to maintain year round supply for retail and food service customers that Matilda’s Wando properties could not meet due to seasonal production limitations.
Initial supply arrangements from Tasmania, Canowindra and Stanthorpe were characterised by inconsistent quality and hence troublesome shipment claims; lack of supply commitment when wholesale markets were attractive; and various debates about transport arrangements, quality, pricing and payment terms. Matilda concluded that most (but not all) external growers would continue to cause concerns and that its own production facilities should be expanded.

- New roles and responsibilities
  The generational change precipitated a raft of changes in roles and responsibilities throughout the organisation. With Phillip and his wife Dianne moving into a mentoring role, the need to let go of day to day management responsibilities presented a range of challenges. Training and experience were necessary for the next generation and their responsibilities, as outlined in section 4.3.3. When personal relationships (i.e. father – son; father – daughter; sister – brother) complicated the understanding of the various roles and responsibilities, external facilitators, especially John Herbert (see section 4.3.3), were engaged in mentoring activities.

The new roles and responsibilities were equally challenging for some staff members. Some in senior farming or packing shed roles encountered difficulty in taking direction from “the kids who have really just left school” (anon – factory and farm managers) rather than from Phillip to whom they had reported previously. Some of the more traditional long term staff members even expressed concern in reporting to a woman. Similarly a number of suppliers and customers expressed concern and frustration at dealing with the next generation when the transition began. These concerns were centred around the “changing communication channels, daily reporting mechanisms, and the end of a trading relationship with Phil where we knew how each other worked and thought (anon, Brisbane Markets trader).

- Water versus property asset planning
  As outlined in section 4.3.4 – ‘Matilda Farming established’, the generational change led to recognition in the group that they were ‘farming water not land’ (pers. comm. James Jauncey). In a broad acre farming area where it was typical for farming families to purchase neighbouring properties for sons who decided to take up farming, the temptation for the Jaunceys to purchase neighbouring properties on the Darling Downs was strong. However a history of below budget performances due to water shortages on the Downs; a lack of bank support for one proposed purchase of a neighbouring property; and the failure of political and on-farm attempts to address water shortages, meant this strategy could not be pursued.

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Therefore the need to secure sustainable irrigation water supplies to meet supermarket and food service supply consistency requirements, at the same time as balancing the risks of water supply reliability in one catchment area (the Upper Condamine) by establishing irrigation operations in other catchments, outweighed the ‘buy the farm next door’ mentality.  

This expansion led the organisation to deal with a range of increased and new water supply risks including:

- irrigation water supply continuity, both on existing farms as traditionally managed, and across the various farms as a group entity (and hence risks associated with produce supply continuity and ultimately the sustainability of the business itself);
- water quality, again both on existing farms and across the whole entity (water quality); and
- increasing irrigation infrastructure maintenance costs and the direct and indirect costs of new infrastructure development.

- Australian dollar exchange rate and impacts on export strategy

An increasing Australian dollar currency exchange rate by 2008 had significantly reduced Matilda’s export activities. Export demand still existed for specific supply periods where Matilda, as a southern hemisphere producer, faced little completion, but the relatively high value of the Australian dollar rendered Matilda uncompetitive in comparison to China and other producers.

This reality significantly impacted on Matilda’s long held commitment to export markets and further encouraged the company to embrace a larger commitment to the domestic market and a broader range of value added products. Those impacts included:

- organisational culture and practice – the Matilda Group had become accustomed to annual budgets and business planning built around the annual Asian marketing trip conducted by family and management personnel;
- the decline of export supply chain relationships (and friendships) – particularly with similarly sized family business in Asian wholesale and trading markets; and
- the cessation of a long held and public stance that Matilda maintained within Australian agribusiness circles of a strong commitment export markets for the long term (and most reluctant to jeopardize that position by opportunistic forays into the domestic market).

The other key motivation for establishing in other catchments was the seasonal driver for supermarket and food service supply chain partners.
• Capital investment requirements
The vertical integration and move into increased processing and packaging activities presented significant capital investment challenges for the group which included:
  o the necessary development of a new off-farm packaging facility;
  o acquisition of farming equipment for separate farming properties (i.e. numerous smaller machines given the inability to transport larger more efficient equipment that could be shared between properties in closer proximity);
  o increasingly complex processing equipment required for packaged products and higher quality requirements of supermarket and food service industry clients;
  o increasing credit lines with Matilda’s bankers;
  o the change in banking providers;
  o increased reliance on other finance providers through complex leasing arranges given the unique nature of some of the processing equipment;
  o increased reliance on government grants and assistance programs for equipment and process research and development;
  o private finance and loan agreements with other family and friends; and
  o sale of personal assets and investments including a holiday unit, vehicles and an aeroplane.

• The establishment of new supply chain relationships
Given the challenges encountered during the third generation business expansion phase as outlined above, the organisation, in accord with transaction theory, had to move beyond its own resources, hit some snags (wherein it found that it was less expensive to conduct those transactions internally), and began the search for its own operations in other regions to address both climatic and water challenges.

The search for other regions itself engaged external contacts such as Withcott Seedlings who were keen to develop the supply chain of which they were a member (GSF-McDonalds about which they reported big & positive difference to what they had seen previously in Coles). In turn they found a partner willing to invest or share the risk in water supply with them.

Whilst the commitment and challenge of stepping up to the reporting and management challenges of these new supply chain relationships was significant, the organisation as a whole was very exciting to be moving into this scale of operation. This excitement was clearly displayed in the following email, with two photos attached, from the CEO to key staff, company advisers and myself given my participant observation role in the case study.
Hi Everyone

What a day!!!
Coles orders have exceeded expectations in the 1st week of production, we had budgeted 9,500 tubs, confirmed orders for Coles are at 11,000. (Total tubs produced last week 5,500 with IGA on special). All has gone well today with the YLC Broccoli, we will begin producing Cauliflower tubs tomorrow.

LET THE FUN BEGIN!!!

Sonya

CEO
Matilda Fresh Foods Pty Ltd
PO Box 9413
Wilsonston 4350 QLD
Ph: 61 7 4614 3000
Fax: 61 7 4614 3040
Email: sonya@matildafresh.com.au
Matilda factory staff (dubbed the ‘Fabulous Floreters’ by the CEO) displaying product from the first shipment of tubbed broccoli florets in February 2007.

- Observations regarding the demise of the organisation

There is no doubt that this study was complicated by the fact that the case study organisation encountered business failure after the research phase was completed. The Matilda companies were placed in receivership in October 2008. This reality has been referred to, and incorporated in, the analysis and conclusions from the entire study.

The key aspects that have assisted this analysis included the following.

(i) Commentary from informed observers

- Rob Robson, Founder of Harvest Fresh Cuts and Board Member of the Produce Marketing Association (PMA) Australia.
  As a well recognised Australian produce industry leader, Rob Robson expressed a view that the Matilda business model was a sound if not ambitious model, and his concern that Matilda’s expertise would be a loss to the Australian horticulture industry (pers.comm., Rob Robson).

- Ian Neeland, Former Senior Manager of Coles and Executive with international produce industry business development experience.
Ian Neeland expressed a view that it would be a tragedy if the demise of Matilda sent a message to others in the industry to not engage in supply chain management initiatives as encouraged by potential chain partners such as Coles (pers. comm., Ian Neeland).

- **Colin Hudgson, Former Woolworths Supply Chain Manager.**
  Colin expressed a view that it was very sad that Matilda had failed in the process of implementing innovative product development strategies that were well suited to the requirements of Australian supermarkets and their clients (pers. comm., Colin Hudgson).

- **Michael Berman, Former Supply Chain Manager, GSF.**
  Michael acknowledged the pressure placed on Matilda to perform to GSF requirements despite the weather vagaries and challenges they faced in setting up new farming operations (pers. comm., Michael Berman).

- **Russell Rankin, Director of Consulting company ‘Food Innovation Partners’ former Executive with Federal Government’s Food Industry Strategy, coordinating with Horticulture Australia Limited’s Food Innovation Grant program.**
  Russell expressed the view that he was surprised at Matilda’s failure given their professionalism displayed through a number of government and industry funded research and development projects (pers. comm., Russell Rankin).

(ii) **Evolving circumstances during the case study phase**

- During the case study phase of this research, drought conditions in a range of alternative horticultural production regions abated. This had the effect of providing the retailer and food service company in the case study value chain with alternative supply arrangements. At the commencement of the case study phase, when most of the horticultural production regions of Australia were in the midst of a prolonged drought, the water use efficiency principles and risk management strategies presented by Matilda were or significant attraction to the retailer and food service company. Whilst those organisations had alternative supply arrangements re-emerge in other areas as the drought abated elsewhere, Matilda had no such supply chain alternative and competitiveness with other regions therefore began to put pressure on the developed value chain relationships.

- As drought conditions abated the community pressure on irrigators in terms of water use rights and water use efficiency also began to reduce.

- With a change in federal government allocation pressure nevertheless increased and further government water reform programs began to be implemented (e.g. water buy
back in the Murray Darling system, and reductions in annual announced allocations in various irrigation regions). It is envisaged that the nature of such programs and government policies on which they are based could alter again in the future as relatively higher rainfalls and water flows return to many Australian irrigations regions.
Appendix 2  Research processes and details

Research processes and details employed in this thesis are outlined below.

(i) Interview question checklists.

(ii) Ethics:
   a. Informed consent form;
   b. Research project information sheet; and
   c. Ethical Research Approval

(i) Interview question checklists

The following checklist an example of those used for the purposes of semi-structured in-depth interviews.

Interview checklist for value chain stakeholder interviews:

1. Explain your role / position in the Value Chain.
2. Review status of a selection of irrigated agribusiness value chains in respect of their attitudes towards the water reform process.
3. Nature of the value chains to be studied.
4. Role of the irrigator in the water debate.
5. Understanding of Water use efficiency issues.
6. Understanding of water allocation principles.
7. Understanding of environmental responsiveness and corporate social responsibility.
8. Where do you think the responsibilities lie?
9. Are consumers interested / concerned?
10. Should they share responsibility?
11. Value chain management principles in relation to water reform
12. Value chain management practices and principles as well as perceptions of environmental performance.
(ii) **Ethics**

The following applications and approvals were sought during this project in order to address and confirm ethical considerations in the research.

a. **Informed consent form**

The following informed consent form was used to secure the agreement of those interviewed during the course of the project.

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**THE UNIVERSITY OF QUEENSLAND**

**AUSTRALIA**

**School of Natural and Rural Systems Management**

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**Informed Consent Form**

Name of Project: Australian irrigated agriculture: supply and sustainable use of water – a value chain management approach.

Investigator: John McVeigh

Supervisor: Assoc. Prof. Ray Collins

I, (name)…………………………………………………, agree to be involved in the above research project as a respondent. I have read the relevant research information sheet and understand the nature of the research and my role in it.

☐ I would like to be acknowledged in the final report

☐ I would like a copy of the report

☐ Other ________________________________________________________________

Date________________________

Signature________________________

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b. Research project information sheet

The following research project information sheet was supplied to those interviewed in the project.

Research Project Information Sheet

Thank you for the interest in our study. This information sheet provides you with information about our project, and your right of participation. If you have any concerns, please feel free to contact us. Contact details are included at the end of this sheet.

Project title: Australian irrigated agriculture: supply and sustainable use of water – a value chain management approach.

Investigator: John McVeigh

Supervisor: Assoc. Prof. Ray Collins

Purpose of the project

The Australian water reform process is placing significant pressure on Australian irrigators to justify their access to water in the face of competition from urban, industrial and especially environmental needs.

This research recognises a value chain as the physical chain of processes that sources inputs, transforms them into marketable goods and distributes them through to final consumers. This project will consider how value chain management principles can assist Australian irrigated agriculture producers optimise their access to irrigation water. It is proposed that an appropriate response to water reform must be based on a balance between the economic needs of irrigators and the communities and value chains of which they are a part, and the needs of other uses in the community.

This topic will be considered through interviews and questionnaires with water reform and irrigated agribusiness value chain opinion leaders as a basis for detailed participatory inquiry in a commercial horticulture value chain case study. A value chain management model focusing on sustainable water use will be developed as a result.

The expected duration of your participation

Fieldwork for this project will be conducted during the period November 2006 and June 2007. Your involvement in an interview will last 1 to 1.5 hours. You may be contacted after the interview to clarify details or if extra information is needed. You may also be contacted in the later stages of the research regarding your opinion of research conclusions.

Your involvement

You will be involved in an interview with the researcher. The interview will consider your thoughts, perceptions and experiences relating to the research questions. As such you will be one of the informants who are being consulted regarding this research topic.

Your right of participation

Your participation in this study is purely voluntary. You have the right to withdraw the data you have provided prior to it being pooled with that from other research exercises. In the event you do wish to withdraw your data all such information will be destroyed and not used for the purpose of this study or any other purpose.

Use of information
The information that you voluntarily provide for this research will only be used for the purposes of this study in line with the confidentiality and privacy statement above.

**What we will use to maintain your confidentiality and privacy**
The information that you provide will be maintained as anonymous and confidential. Any reference to you will only be maintained by the researcher for record purposes. The resulting report will not make any reference to you unless you wish to be acknowledged for your input. At the completion of the study a copy of the report will be forwarded to you if you so wish (see accompanying Informed Consent Form).

This study adheres to the Guidelines of the ethical review process of The University of Queensland. While you are free to discuss your participation in this study with the researcher (John McVeigh, School of Natural and Rural Systems Management, University of Queensland Gatton QLD 4343 Australia, Tel: +61 417 782 847, Email: j.mcvieigh@uqg.uq.edu.au), if you would like to speak to an officer of the University not involved in the study, you may contact Prof. Helen Ross, School of Natural and Rural Systems Management University of Queensland Gatton QLD 4343, Email: hross@uqq.uq.edu.au, Tel: +61 7 5460 1648 or +61 408 195324.

**Date:**

**Signature of Investigator:**

c. **Ethical Research Approval**

Ethical approval was sought and confirmed from the University on 16th November 2006.