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ABSTRACT

Agricultural marketing is frequently distinguished from marketing as it is described in the business literature because agricultural marketing theory focuses on policy, distribution channel, and efficiency issues, and has not evolved with a marketing management orientation. Business marketers have developed an interdisciplinary and strategic approach to research while agricultural marketing researchers continue to rely on economic principles. In this thesis the extent of the apparent gap between the disciplines is reviewed. The role that marketing management and strategic management have in agriculture is investigated, first within a general theoretical context, than more specifically at the farm business level.

It is suggested that the marketing strategies of farmers are not adequately described within either the business or agricultural marketing literature. Business marketing researchers focus attention on large businesses, and even in the small business marketing literature few studies investigate or describe the marketing management activities of farmers. In the agricultural marketing literature the farm business marketing process is not described as part of an integrated strategic operation with interfunctional relationships between many business activities. It is often implicitly assumed that farmers follow relatively homogenous patterns of strategic behaviour. In a similar way the farm management discipline tends not to include the marketing behaviour of farmers within its domain. This contrasts with the business management literature which suggests that marketing and strategic management are complex processes and that a business may utilise a variety of strategic approaches in its attempt to gain competitive advantage.

Strategic group studies empirically identify groups of firms within an industry which follow similar strategies. Although the investigation of strategic groups within the agribusiness sector has been

identified as an important area for future research, there appears to have been little research which has examined strategic groups at the farm business level. In the empirical component of this thesis farm business marketing and strategic management processes are investigated. The results show that strategic groups of Canterbury crop farmers exist, and describe the marketing, business and management characteristics associated with each strategic focus.

The range and complexity of marketing activity identified in this study suggest that traditional agricultural marketing and farm management approaches to analysing farmers' management and marketing behaviour can benefit from insights gained from the business marketing and strategic management literature. Marketing behaviour may involve more than sales decisions, and an undue focus on this behaviour leads to the exclusion of other activities such as production planning and product differentiation. Similarly, a view of farm management which excludes marketing management and integrated strategic behaviour is restrictive. The disciplines of agricultural marketing and farm management will be enriched by viewing farm management with this strategic perspective.

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TABLE OF CONTENTS

Chapter	Page
1. THE PROBLEM SETTING	
1.1 Introduction	1
1.2 Thesis Objectives	5
1.3 Thesis Outline	6
2. A REVIEW OF THE ROLE OF MARKETING MANAGEMENT IN AGRICULTURAL MARKETING THEORY	
2.1 Introduction	7
2.2 Defining Agriculture and Business Marketing	7
2.3 The Scope of Agricultural and Business Marketing	10
2.3.1 Historical Developments	11
2.3.2 Agricultural Marketing Theory	13
2.3.3 Business Marketing Theory	20
2.4 The Difference Between the Disciplines	23
2.5 A More Interdisciplinary Approach to Agricultural Marketing?	26
2.6 Summary	27
3. THE MARKETING MANAGEMENT BEHAVIOUR OF FARMERS	
3.1 Introduction	29
3.2 The Marketing Management Behaviour of Farmers	29
3.3 Farm Marketing Studies	35
3.3.1 Normative Research	38
3.3.2 Descriptive Research	40
3.4 Summary	42

TABLE OF CONTENTS (continued)

Chapter	Page
4. BUSINESS STRATEGY AND ITS ROLE AT THE FARM LEVEL	
4.1 Introduction	44
4.2 A Brief Overview of Business Strategy	44
4.3 Small Business Strategy	47
4.4 Strategic Planning	50
4.5 The Strategic Management Process	52
4.6 The Need for Strategic Management Research Within the Agricultural Sector	56
4.7 Studies of Business Strategy at the Farm Level	57
4.8 Summary	60
5. STRATEGIC TYPOLOGIES AND TAXONOMIES	
5.1 Introduction	61
5.2 A Brief Overview of Strategic Typologies and Taxonomies	61
5.3 Strategic Typologies	62
5.3.1 Porter's Generic Strategies	63
5.3.2 Miles' and Snow's Strategic Typologies	66
5.3.3 Research Investigating Porter's and Miles' and Snow's Typologies	67
5.3.4 Approaches to Categorising Businesses into Existing Typologies	69
5.4 Strategic Taxonomies	70
5.5 A Typology or Taxonomy of Farm Business Strategies?	71
5.6 Strategic Groups	74
5.6.1 Purposes of Strategic Group Studies	75
5.6.2 Strategic Groups, Performance and Mobility Barriers	79

TABLE OF CONTENTS (continued)

Chapter	Page
5.6.3 Strategic Groups and the Environment	82
5.6.4 The Dynamics of Strategic Group Membership	82
5.6.5 The Basis for Strategy Identification	83
5.6.6 Approaches to Forming Groups	86
5.6.7 Industries Studied	86
5.7 Summary	87
 6. METHODOLOGY	
6.1 Introduction	88
6.2 Method of Analysis	89
6.2.1 The Approach used to Identify Strategic Groups	89
6.2.2 Stages Involved in the Analysis of the Data	93
6.2.3 Stage 1: R Type Factor Analysis	94
6.2.4 Stage 2: Cluster Analysis	99
6.2.5 Stage 3: Testing for Inter-Cluster Differences	102
6.3 The Sample	103
6.4 Variables and Measurements	104
6.5 Method of Data Collection and Questionnaire Development	106
6.6 Summary	110
 7. RESULTS AND DISCUSSION	
7.1 Introduction	111
7.2 Sample and Response Rate	111
7.3 Identifying Strategic Dimensions	113
7.3.1 Description of Factors	115

TABLE OF CONTENTS (continued)

Chapter	Page
7.4 Identifying Strategic Groups	121
7.5 Describing Strategic Group Members and the Strategies they Follow	123
7.5.1 The Strategy followed by Members of each Group	124
7.5.2 Farm and Farmer Characteristics	128
7.5.3 Crop mix	138
7.5.4 Sales Methods	141
7.5.5 Miscellaneous Marketing Characteristics	141
7.5.6 Information gathering	144
7.5.7 The Environment	147
7.5.8 Performance Implications of Strategic Group Membership	148
7.6 Summary of Strategic Groups	149
7.7 Summary	151
8. SUMMARY AND CONCLUSIONS	
8.1 An Overview	156
8.2 Implications	158
8.3 Limitations and Areas for Further Research	162
REFERENCES	164

LIST OF TABLES

Table	Page
2.1 A Review of Agricultural Marketing Texts	17
2.2 Subject Areas Addressed in Agricultural Marketing Texts	19
2.3 Subject Headings for the Journal of Marketing's Literature Review	22
3 Empirical Studies of Farm Business Marketing Strategies	36
5.1 A Selection of Typologies of Business Level Strategies	64
5.2 Empirical Studies of Strategic Groups	76
7.1 Comparison of Sample and Population Statistics	113
7.2 Eigen Values and Percentage of Variation Explained by Factors	116
7.3 Results of Principle Component Analysis of Strategy Variables	117
7.4 Initial Cluster Centroids	121
7.5 Characteristics of Five Strategic Groups Derived from Cluster Analysis	125
7.6 Farm and Farmer Characteristics	129
7.7 Percentage of Strategic Group Members who Breed their own Replacement Ewes	131
7.8 Financial Characteristics	132
7.9 Personal Characteristics of Farmers	134
7.10 Percentage of Strategic Group Members who have Worked at a Non-Farm Job	135
7.11 Positions of Responsibility	136
7.12 Crops making up each Crop Type	139
7.13 Crop Mix	140
7.14 Miscellaneous Marketing Characteristics	142
7.15 Percentage of Farmers Involved with Marketing, Growing Niche Crops, or other Value Adding Activities	143

LIST OF TABLES (continued)

Table		Page
7.16	Information Utilised by Strategic Group Members	145
7.17	Information Sources and Types Ranked by Level of Importance	146
7.18	Environmental Factors	148
7.19	Percentage of Farmers who were Performing better than Average	149

LIST OF FIGURES

Figure		Page
4.1	Competitive Business Strategy Formulation	48
4.2	The Strategic Management Process	54
5.1	Porter's Generic Strategies	65
6.1	Comparisons between Q type Factor Analysis and Cluster Analysis	92
6.2	Method used to Identify and Describe Strategic Groups	94
7.1	Scree Plot	116
7.2	Increase in Cluster Coefficients	122
7.3	Proportion of Businesses in each Cluster	123
7.4	Farm Area Statistics	130
7.5	Farmer Experience	135
7.6	Positions of Responsibility within a Non-Farm Business	136
7.7	Positions of Responsibility (Farm Related)	136
7.8	Time Spent Working away from the Farm	137
7.9	Number of Different Types of Crops Grown	139
7.10	Number of Agents Sold to and Crops which had not been Grown Previously	143
7.11	Marketing Orientation	144

LIST OF APPENDICES

Appendix		Page
6.1	ANOVA and the Chi-Square Test of Independence	176
6.2	Questionnaire	184
6.3	Covering letter for Questionnaire	188
6.4	Reminder Letter	189
7.1	Correlation Matrix of Variables used in Factor Analysis	190
7.2	The Anti-Image Correlation Matrix	193
7.3	Inter-Cluster Differences for Individual Attitudinal Questions Included in Factor Analysis	196
7.4	Proportion of Strategic Group Members Growing Individual Crops	198
7.5	Sales Methods	199

CHAPTER 1

THE PROBLEM SETTING

1.1 Introduction

Marketing theorists suggest that businesses are more likely to succeed if they utilise certain marketing management approaches or techniques such as the marketing concept. The marketing concept, a cornerstone of business marketing¹ thought which stresses the importance of determining the needs and wants of consumers and delivering the desired satisfactions more effectively and efficiently than competitors. Theories from marketing management have recently been applied to almost every industry from insurance to travel and hospital services, but not usually to farming. Traditionally, schools of business management have surrendered the theory of agricultural marketing to agricultural specialists and agricultural universities (Bartels, 1983). One of the consequences of this is that agricultural marketing issues are studied using techniques that predominantly originate from within the agricultural economics discipline.

Concerns have been raised about a dichotomy which appears to exist between agricultural and business marketing theory (Bartels, 1983; Bateman, 1976; Muelenberg, 1986). Agricultural marketing theory does not seem to incorporate managerial marketing paradigms or examine marketing problems in a strategic manner, and farmers are not perceived to utilise marketing management techniques.

Traditionally, agricultural marketers have taken the simplistic view that marketing is all that happens to produce after it leaves the farm (Breimyer, 1973). Production is on the farm with marketing seen to be off the farm. By definition, the majority of agricultural marketing texts

¹ To avoid confusion *marketing* as it is referred to in business literature will be referred to as business marketing.

continue to exclude many 'on farm' activities from the marketing process, and indicate that farmers undertake only limited marketing activities. A typical definition by Kohls and Uhl (1980), describes marketing as:

"the performance of all business activities involved in the flow of food products and services from the point of initial production until they are in the hands of consumers."

In reality, farmers have at their disposal a wide range of marketing strategies and tactics which they can use to improve their business performance. For example, production planning is a marketing activity that many farmers are likely to undertake. Crop farmers may grow malting or feed barley, wheat or triticale, a farmer may produce low quality crops at a low input cost which will sell for a low price, or top quality produce with high input costs and high returns per unit.

In some agricultural marketing texts it is suggested that farmers can store crops, influence the quality of their produce, choose different market outlets to sell produce, or use different methods of sale as part of their marketing activities, but commonly farmer marketing strategies are limited to sales tactics which occur with a change of ownership. In recent empirical examinations of the marketing activities of farmers there continues to be a view that marketing means sales, and therefore research is confined to the analysis of a limited number of sales or disposition activities (for example Anaman and Boggess, 1986; Jensen, 1988).

Despite these theoretical approaches, claims have been made that agricultural marketing problems should be viewed from a marketing management viewpoint (Bateman, 1976; Muelenberg, 1986; Barker, 1989). Politicians, public speakers and the farm press have all criticised farmers for their lack of attention to marketing, and published articles continue to suggest that farmers can benefit

from utilising marketing management principles (for example Fletcher and Napier, 1981; Tilley, 1989). Other literature highlights the need to teach farmers marketing management concepts, or attempts to outline these principles to farmers (for example Manwaring, 1979; Abbott, 1983; Bateman, 1972; Nichols and Skewers, 1987).

While it seems inappropriate to suggest that farmers do not have basic business skills or strategic capabilities, suggestions that business marketing principles should be incorporated at the farm level lack empirical or case study support. While seemingly sound in theory, the apparent lack of application of marketing management techniques such as target market selection and marketing planning suggest that these ideas may be inapplicable to farmers.

Business marketing theory has developed from conceptual, empirical, and anecdotal research into the marketing activities that business firms undertake. However farm businesses continue to operate in conditions distinct from non-farm firms, and although the differences between farm and other businesses may be narrowing, they must still be acknowledged. It is naive and possibly dangerous to view marketing management principles as the panacea for farmers' problems without first examining if they are appropriate at the farm business level. Farmers may face distinct problems which require separate remedies to those of other businesses. Individual farmers may not employ business marketing techniques such as promotion, product development, branding, strategic market planning, or competitive analysis, however they may utilise principles associated with marketing that are different, but have parallels with those employed by non-farm businesses.

Empirical studies of the marketing activities of farmers, do not appear to depict marketing strategy as part of an integrated process that involves interfunctional relationships with other business operations and complex interactions between marketing variables. It is frequently assumed that

optimal farm marketing strategies should be relatively homogenous and only differ with changes in farmers risk preferences, or the environmental conditions farm businesses face, or resources they are endowed with.

Within the business literature the results from studies of strategic typologies and taxonomies suggest that businesses within an industry may take considerably different approaches to gaining competitive advantage. It seems possible that different groups of farm businesses may exist where members behave in a similar way or follow similar business strategies, however take a different approach to management than other farmers. Each approach to business is likely to involve a distinctive mix of strategic variables and have specific marketing implications. Therefore, if researchers are to increase their understanding of the marketing behaviour of farmers it is important that they study the interactions between marketing and other components of business strategy, and attempt to understand the relationships between marketing and more general strategic management processes at the farm business level.

There appears to be a need to establish whether managerial marketing and strategic processes are an important component of farm management for modern commercial farmers, and if alternative patterns of strategic behaviour exist within the farming sector. This thesis will empirically analyze the complexity of the farm business marketing process, establish if groups of farmers with distinctive patterns of strategic behaviour exist, and ascertain if farmers utilise the techniques suggested by marketing and strategic management theories.

The recent deregulation of the New Zealand economy, and specifically the agricultural sector, has possibly led to many new options emerging for farmers. Current economic pressures have led to New Zealand farmers facing severe financial difficulties in recent years, which could mean that

strategic choices have become more important for farmers. It is highly possible that some farmers have not altered their traditional preferences, while others have changed their approaches to business management and become more like other small business managers.

1.2 Thesis Objectives

The general objective of this study is to review the similarities and differences between agriculture and business marketing theory and investigate the diverse and complex nature of the marketing and strategic behaviour of farmers. The study will be mainly descriptive rather than normative in nature, and will provide information which can be used to compare the marketing and strategic behaviour of farm and non-farm businesses.

The approach taken in this thesis will be to:

1. *Conduct a literature review which:*

- a. examines the dichotomy that apparently exists between agricultural and business marketing theory at its most general theoretical level;
- b. reviews suggestions that farmers become more actively involved with marketing management;
- c. examines literature that specifically assesses the marketing activities of farmers;
- d. reviews the role of strategic management at the farm level, explores the strategic options available to farmers and determines whether conclusions developed within the literature assume farmers are, or should be homogenous in the business and marketing strategies they utilise;
- e. compares the approaches to research and results from studies made within the agricultural marketing and business literature.

2. *Develop a methodology for this study which:*

- a. analyses the full array of marketing tactics utilised by farmers;
- b. models interactions that occur between marketing variables;

c. identifies any interfunctional relationships that exist between marketing and other strategic variables.

A potentially useful way of conducting such an evaluation is to measure if farmers follow different business strategies that have specific marketing implications. A range of alternative approaches for conducting such an investigation will be examined to ascertain their usefulness for this study.

This will serve as a basis for an analysis which will determine if distinctive patterns of strategic behaviour exist at the farm business level and describe the marketing, management, and business, characteristics associated with having a distinctive strategic focus. The role of environmental variables as moderators of business strategy will be investigated.

3. Survey an appropriate farm type, analyze results, and develop appropriate conclusions.

This part of the study will form the empirical component of the thesis and allow conclusions to be developed regarding the role of marketing management and strategic management in agriculture.

1.3 Thesis Outline

In chapter 2 the theoretical similarities and contrasts between the business and agricultural marketing disciplines are reviewed. The 3rd chapter looks more specifically at the role of marketing management for farm businesses. It is argued that by better understanding patterns of competitive strategy at the farm business level, it will be possible to increase the understanding of the specific marketing activities undertaken by farmers. The role of strategic management processes at the farm level is examined in chapter 4, while in chapter 5 schemes for classifying patterns of competitive strategy are reviewed and used as a basis for forming the methodology used in this study, in chapter 6. In chapter 7 the results of an empirical investigation are discussed, while the studies conclusions and implications are developed in chapter 8.

CHAPTER 2

A REVIEW OF THE ROLE OF MARKETING MANAGEMENT IN AGRICULTURAL MARKETING THEORY

2.1 Introduction

In chapter 1 it was suggested that agricultural marketing is frequently distinguished from business marketing theory. In this chapter the extent to which the apparent differences exist will be examined by reviewing the role of marketing management within agricultural marketing theory.

The theoretical similarities and contrasts between the agricultural and business marketing disciplines are examined at their most general level, and the degree to which marketing management paradigms have been incorporated within the scope of the two disciplines is highlighted. Variations which exist in definitions of marketing, the disciplines' historical developments, the techniques they use to research marketing problems, and their scope or subject matter are outlined. Finally suggestions that the agricultural marketing discipline should develop an orientation more closely aligned with business marketing theory are reviewed. It is argued that the marketing management behaviour of farmers has not been investigated in a strategic manner, and therefore this is an area worthy of further research. In chapter 3 the role of marketing management within the farm business is considered in more detail and the nature of relevant research is discussed.

2.2 Defining Agricultural and Business Marketing

An examination of textbook definitions of business and agricultural marketing provides a guide to theoretical content. Although there is no generally accepted definition of agricultural marketing, it is generally viewed as part of the economic system and is widely recognised as involving the exchange process (Ritson, 1986; Bateman, 1976). A definition widely quoted in reviews of

agricultural marketing theory is given in Kohls' book, **"Marketing of Agricultural Products"** (Barker, 1989; Ritson, 1986; Muelenberg, 1986). In the fifth edition of the book Kohls and Uhl (1980) describe marketing as *"the performance of all business activities involved in the flow of food products and services from the point of initial agricultural production until they are in the hands of consumers."* This description suggests that agricultural marketing is concerned with increasing performance and efficiency.

Another typical definition is given by Shepherd and Futrell (1982) who state *"in physical terms, agricultural marketing begins when the product is loaded at the farm gate, and ends when the goods reach the consumers table. It is concerned with such physical things as trucks, refrigerator cars, and packing plants and also with technological developments in preservation and packaging."*

The title of their book, **"Marketing Farm Products: Economic Analysis,"** indicates the approach they take is mainly an economic one. They continue *"the economics of (agricultural) marketing takes in more territory. It deals with three separate but related problems: consumers demands for farm products, the price system that reflects these demands to distributors and producers, and the methods or practices used in exchanging title and getting the physical product from producers to consumers in the form that they want and the time and place desired."*

These definitions and others (for example Elz, 1987; Purcell, 1982) suggest that agricultural marketing theory focuses on the workings of the distribution system, and is typically viewed as a process which begins after produce leaves the farm gate, even though the content of textbooks suggest that the discipline is also concerned with farm firms. The content implied by the definitions is restrictive, as farmers' marketing activities are limited to sales tactics for goods already produced, and thus production planning and other farm level marketing activities are frequently excluded from the marketing process.

Although there is no universally accepted definition of business marketing, it is generally acknowledged that business marketing, like agricultural marketing involves the exchange process. Kotler (1972) defines marketing as the "*set of human activities directed at facilitating exchange.*"

More recent interpretations however, place increasing emphasis on the importance of satisfying customer needs and wants in order to fulfil business objectives. The latest definition from Kotler's popular "*Principles of Marketing*" describes marketing as "*a social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging products of value with others*" (Kotler and Armstrong, 1991).

A review of other business marketing definitions indicates a similar theme to that identified above, in that business objectives are achieved by producing or creating goods and services which satisfy consumer needs and wants (for example Stanton, 1981; McCarthy and Perreault, 1984).

Because most farmers deal with market intermediaries which are industrial buyers rather than final consumers, it is also important to review industrial marketing definitions. There seems to be more consensus as to what industrial marketing incorporates. It is generally acknowledged that industrial marketing involves the marketing of goods and services for further processing or use in a production process. Stanton (1981) describes industrial marketing as the "*marketing of industrial goods and services to industrial users,*" where industrial users are "*businesses or institutions that buy products or services to use either in making other goods or services or conducting their own operations,*" and industrial goods are those "*intended for use in making other products or operating a business or institution.*"

A similar interpretation defines industrial marketing as the "*marketing of goods and services to*

formal organisations for their use in furthering organisational objectives" (Vinson and Sciglimpaglia, 1975).

Apart from highlighting the distinct needs and capabilities of industrial buyers or markets, industrial marketing definitions are not greatly different from those of business marketing. They indicate that industrial marketing involves achieving business objectives by satisfying the consumer, except in this case the consumers are industrial buyers rather than end users.

The preceding definitions indicate that agricultural marketing's scope is different from that of business marketing. It covers all activities within a distribution channel and is concerned with the economic efficiency of the distribution system as well as the exchange itself. Business marketing on the other hand, places more emphasis on the management activities of individual businesses, the fulfilment of business objectives, and the role of consumers. In the following section it is shown that differences also exist between the subject areas addressed within the disciplines, however this divergence has not always existed.

2.3 The Scope of Agricultural and Business Marketing

To gain a better understanding of the development of the business and agricultural marketing subject areas, the history of the two disciplines will be discussed within this section. Popper (1962) suggests that the theories a discipline uses to solve its problems and not its subject matter, should be used to define a discipline, therefore the development of approaches used to research marketing problems, as well as the scope of the disciplines are briefly reviewed.

2.3.1 Historical Developments

Agricultural and business marketing emerged from economic theory and the economic function of distribution, and in the early 20th century were not considered to be separate disciplines (Muelenberg, 1986). Early marketing researchers and academics were economists who studied the distribution system, with early marketing theory owing much of its development to what is considered today to be the analysis of agricultural marketing problems (Kotler, 1972; Barker, 1983; Bartels, 1983).

Many agricultural marketing studies made during the early twentieth century contributed to the development of both disciplines. For example, Jones and Monieson (1990) discuss how agricultural marketing publications during the early 20th century aided the development of a philosophy of business marketing thought. These include Henry C. Taylor's, "*The Prices of Farm Products*," H.E. Erdman's "*The Marketing of Whole Milk*" (1921), Hilbard's (1921) "*The Marketing of Farm Products*," and Macklin's (1921) "*Efficient Marketing for Agriculture*." Welds' (1920) book "*The Marketing of Farm Products*" is also recognised as a classic early study of marketing (Hunt, 1976; Muelenberg, 1986).

It seems from the literature that until the 1950's both streams of marketing theory focused on exchange and the study of the distribution problems, but since this time, agricultural marketing literature has not moved with business marketing theory (Muelenberg, 1986; Bateman, 1976). While agricultural marketing researchers have continued to rely on their economic foundations, business marketers have developed an interdisciplinary approach to research and have focused attention on the marketing management activities of individual businesses.

Business marketing has changed from a study of economic activity where the marketer was

considered to be the initiator of marketing actions, to a study of the exchange of values where the consumer has greater power than the marketer (Sheth and Gardner, 1982). Therefore theory has incorporated ideas from the behavioural sciences to supplement concepts from economics in an attempt to understand consumer behaviour (Sheth and Gardner, 1982; Deshpande and Webster, 1989). Contributions from the behavioral sciences include those from psychology, sociology, anthropology, and political science, while additional extensions to marketing theory have originated from within the management sciences (Bartels, 1962; Horsky and Sen, 1980).

Agricultural marketing theory has not developed the interdisciplinary approach of business marketing. Instead, it continues to follow the mainly economic approach utilised by both disciplines prior to 1950, and has failed to incorporate large areas which are very important in business marketing theory.

The business marketing discipline has also distanced itself from agricultural marketing. For example, when Shelby Hunt became the editor of the Journal of Marketing in 1985, agricultural marketing was dropped as a literature review topic, although other "special topics" including industrial, international, non profit, and services marketing remained. Bartels (1983) confirms that business marketing is distancing itself from agricultural marketing theory from a more historical viewpoint. He notes *"progressively several elements have been eliminated from marketing, at least as it is regarded in schools of business. The marketing of agricultural products, was surrendered early to agricultural specialists, colleges of agriculture, agricultural extension divisions, farm bureau organisations, the U.S. Department of Agriculture and the like."*

Before summarising the current differences that exist between the two disciplines it is valuable to briefly examine the scope of agricultural and business marketing theory.

2.3.2 Agricultural Marketing Theory

Agricultural marketing does not have the extensive literature development of business marketing, and although now almost twenty years old, the most comprehensive reviews of agricultural marketing theory remain those by Breimyer (1973) and Bateman (1976). More recent assessments include efforts by Muelenberg (1986), and Ritson (1986). An examination of these articles suggests vastly different perceptions of agricultural marketing have led to difficulty in reviewing the disciplines' scope or subject matter. These perceptions range from the business schools view which suggests that marketing involves the utilisation of the marketing concept, to neoclassical studies of marketing functions and institutions (Watson, 1983).

Breimyer (1973), identifies three distinctive schools of thought or approaches to agricultural marketing. The first approach is the most conventional and traditional of the three, taking the simplistic view that marketing is all that happens to produce after it leaves the farm gate. Production is on the farm, with marketing envisaged to incorporate everything that happens between the farm and the consumer. The second and third schools of thought both suggest that this approach is inappropriate.

The second approach is the most common of the three and focuses on the coordinating role of marketing. It is perceived that marketing occurs wherever identity changing transformations take place and that marketing is a coordinator for economic activity. Price is seen to play the most important role in coordinating marketing activities, which explains the considerable emphasis on price analysis and marketing efficiency. Agricultural marketing is acknowledged to encompass all activities but the management of the farm business.

Breimyer views the third approach as a form of market development. Attention is focused on

cultivating demand and generating purchasing power among consumers by differentiating and promoting products. This is closer to the business marketing approach because it focuses on consumption and consumer behaviour, however it appears to attempt to alter the demand for existing products rather than erase the demarcation between the production and marketing of farm products.

Breimyer identifies and gives examples of studies in the six main areas that the theory of agricultural marketing embraces. These areas are:

1. *Collective action* (studies examining voluntary cooperatives, mandatory cooperation, and horizontal and/or vertical integration)

2. *Allocative efficiency* (including research analysing commodity prices, marketing margins, marketing costs, and market concentration)

3. *Operational efficiency* (studies examining output relative to inputs, the goals of the firm and applied theories in this area)

4. *Demand creation and market development* (encompassing consumer preference studies, research which measures the effect of advertising and promotion and examinations of the results of supplementary food programmes)

5. *Transportation and Regional economies* (research into transportation systems and costs, and intra and inter-regional trade and model building)

6. *Macro-structural studies* (studies of the entire marketing system).

None of these areas focus specifically on the management activities of individual firms within the agricultural sector.

Bateman's (1976) review article takes a different approach to that by Breimyer. Bateman claims that agricultural marketing theory focuses on macro-issues and government policy concerning the distribution and processing of farm produce. Unlike Breimyer, Bateman does not outline the

economics of traditional agricultural marketing. Instead he reviews the scope of agricultural marketing and details the role which alternative theoretical business marketing frameworks have in agricultural marketing research. Although traditionally seen as a policy subject, Bateman suggests agricultural marketing may also be able to be viewed as a business subject, or an aspect of social marketing.

Muelenberg (1986) reviews the evolution of agricultural marketing theory and illustrates a marketing management approach to agricultural marketing. According to Muelenberg most functions in agriculture have been assumed by the government, therefore agricultural marketing has developed with a policy orientation. Studies embraced in the agricultural marketing literature covering many topic areas including market structure analysis, marketing efficiency studies, regional and spatial analysis, economic demand analysis and price analysis, competition within the agricultural marketing sector, and marketing institutions (eg futures markets, cooperatives, statutory marketing boards) are referenced. Physical distribution is seen as a popular research topic, especially the areas of transportation and storage. Again, studies of the marketing management behaviour at the firm level are not identified as an important topic area within the agricultural marketing literature.

Ritson's (1986) essay, *"The Scope and Subject Matter of Agricultural Marketing"* emulates Bateman and Muelenberg in acknowledging the importance of government policy in agricultural marketing. Ritson suggests that agricultural marketing is usually regarded as the affair of special institutions created to improve the situation of the whole sector. A quotation from Ritson's essay states *"the subject of agricultural marketing developed as the study of the economic structure and efficiency of the agricultural marketing sector, and the government's role in intervening to improve the performance of agricultural markets and increasing the expenditure on food received by farming."* Ritson claims that this is the way in which agricultural marketing is taught in many universities.

Parts of other articles also examine the subject matter of agricultural marketing. Richardson (1986) suggests that what agricultural economists call marketing is really price analysis, while Watson (1983) also identifies the considerable overlap between the subject matter of agricultural pricing and agricultural marketing courses, indicating the importance of pricing studies within the agricultural marketing literature. In addition Watson notes the prominence of studies related to horizontal and vertical integration, and agricultural marketing institutions. Zwart, (1986) argues that agricultural marketing theory normally takes an industry perspective and examines the way in which firms interact to determine incomes, prices and trade flows within industries. These review articles highlight that it is difficult to arrive at a conclusion as to what agricultural marketing involves. However they clearly indicate that attention has been focused on distribution channel and policy issues rather than marketing management at the firm level.

An examination of the topics or subject areas addressed by popular agricultural marketing texts may give a clearer indication of common themes and the scope of the agricultural marketing discipline. Common agricultural marketing textbooks include those by Shepherd and Futrell (1982), Purcell (1982), Kohls and Uhl (1985), Barker (1989), Rhodes (1983), and Campbell and Fisher (1982). Table 2.1 summarises details of the above six books. Some authors have different aims or objectives, address different audiences, or identify and detail separate agricultural marketing problems or issues. The ideas presented in the texts are accepted internationally, as evidenced by the fact that the texts originate from three different continents; the UK (Barker), Australia (Campbell and Fisher) and the US (the others).

Table 2.1 A Review of Agricultural Marketing Texts

AUTHOR	Barker	Campbell and Fisher	Kohls and Uhl	Purcell	Rhodes	Shepherd and Futrell
TITLE	Agricultural Marketing	Agricultural Marketing and Prices	Marketing of Agricultural Products	Agricultural Marketing: Systems, coordination, cash and futures prices	The Agricultural Marketing System	Marketing Farm Products
YEAR PUBLISHED	1989	1979	1985	1982	1978	1982
Edition	2nd	2nd	6th	1st	1st	7th
AUTHORS PROFESSION	Agricultural Marketer	Agricultural Economist	Agricultural Economist	Agricultural Economist	Agricultural Economist	Agricultural Economist
AUDIENCE ADDRESSED	Beginning agricultural marketing students, farmers and members of the agricultural industry.	Undergraduate students or lay readers interested in rural affairs.	Students beginning a study of the food marketing system.	Beginning marketing students with material for advanced undergraduate study.	Undergraduate agricultural marketing Students.	Not specified by authors. Common undergraduate agricultural marketing text.
PREREQ. SUGGESTED	None	Basic economic principles	None	Basic economic principles/ theory	Economic principles	None
MAJOR AIMS OR OBJECTIVES OF TEXT	Give a background to the marketing that can be practised by UK farmers. To meet the need for an elementary agricultural marketing text of interest to students and members of the agricultural industry.	To introduce factors influencing agricultural prices, and public policies affecting pricing and marketing arrangements for rural products.	To describe the structure of the food marketing system, to examine how this system affects farmers, consumers and middlemen, and to understand how this dynamic system has responded to technological, social, economic and political changes over time.	To give a treatment of agricultural marketing that focuses attention on the total marketing system and provides the analytical base to handle increasingly complex marketing problems.	To emphasise management options of agribusiness firms, conflicts within the system, consumer interests and policy issues.	Not explicitly stated.
MAJOR PROBLEMS OR ISSUES IDENTIFIED BY THE TEXT:	<ol style="list-style-type: none"> 1. Consumer demand for farm produce is derived demand. 2. Price signals reaching farmers may not adequately represent consumer demand. 3. Getting produce from the producer to the consumer at the lowest possible cost. 	Not specified. Focuses on market prices.	<ol style="list-style-type: none"> 1. Organisation and competitive issues. 2. Coordination and control issues. 3. Farmer marketing problems. 4. Consumer and public interest issues. 	Not explicitly specified.	Not explicitly specified.	<ol style="list-style-type: none"> 1. Keeping abreast of changes in demand. 2. Reflecting consumers demands to producers. 3. Marketing efficiency.

It has been argued that agricultural marketing has developed with an economic background using a mainly economic approach to examine issues and problems. It therefore seems probable that these texts may be written by economists or agricultural economists. Examination of authors occupations indicates that most are University staff employed in Agricultural Economics Departments. No authors appear to have a strong background in the behavioural sciences. Most texts aim to introduce agricultural marketing to undergraduate university students, or interested members of the agricultural

sector, while none of the books reviewed require marketing knowledge as a prerequisite for reading the text. Some suggest a knowledge of basic economic principles or theory would be useful, while others outline basic economic theory themselves, again emphasising the economic approach employed by agricultural marketers.

The preface in most texts includes a discussion on the aims or objectives of the author. Most endeavour to describe the agricultural marketing system. Barker looks at agricultural marketing at the firm level, using an approach closer to that found in business marketing texts than other books. Campbell focuses on price, the pricing mechanism, and policies affecting pricing using a mainly economic approach. Other texts aim to examine the food marketing system as a whole. Kohls uses a mixed approach employing functional, institutional, market level and commodity perspectives to examine food marketing processes and problems, in a descriptive, normative and analytical manner. Purcell attempts to focus attention on the total agricultural marketing system and provide an analytical base suitable for researching complex marketing problems. Discussion of model specification and simple quantitative models is included, however he mainly focuses on pricing. Rhodes seeks to integrate applied economic theory with a managerial approach to agricultural marketing. Shepherd and Futrell study the marketing of farm products using the traditional analytical, functional and commodity approaches.




Most texts focus on policy issues rather than the managerial marketing concerns of individual agribusiness managers. Table 2.2 presents the eleven major subject areas addressed by the six text books, with issues forming the focus of most discussion positioned near the top of the table. The relative importance¹ of subject topics to each text is represented by the size of the circle. In decreasing order of importance these areas are government policy, pricing behaviour and analysis,

¹ In terms of the extent to which a text describes each subject area.

futures and hedging, voluntary cooperatives, competition, commodity markets, grading, demand and supply analysis, marketing efficiency and distribution channels. Many areas are interrelated, therefore they cannot be considered as entirely separate topics. The topic areas identified within table 2.2 are similar to those identified in reviews of the agricultural marketing literature, however in section 2.3 it is suggested that these areas are considerably different from those investigated within the business marketing literature.

Table 2.2 Subject Areas Addressed in Agricultural Marketing Texts

Topic	Author					
	BARKER	CAMPBELL & FISHER	KOHL & UHL	PURCELL	RHODES	SHEPHERD & FUTRELL
GOVERNMENT POLICY	●	●	●	●	●	●
PRICING BEHAVIOUR/ ANALYSIS	●	●	●	●	●	●
FUTURES AND HEDGING	●	●	●	●	●	●
VOLUNTARY COOPERATIVES	●	●	●	●	●	●
COMPETITION	●	●	●	●	●	●
COMMODITY MARKETING	●	●	●	●	●	●
GRADING	●	●	●	●	●	●
DEMAND AND SUPPLY ANALYSIS	●	●	●	●	●	●
MARKETING INFORMATION	●	●	●	●	●	●
MARKETING EFFICIENCY	●	●	●	●	●	●
MARKETING CHANNELS/ DISTRIBUTION	●	●	●	●	●	●

 EXTENSIVE COVERAGE
  MODERATE COVERAGE
  SOME COVERAGE

A Conclusion on the Scope of Agricultural Marketing Theory

An examination of the contents of agricultural marketing texts confirms the work of Muelenberg, Bateman, and others. Studies of government programmes or policy and the reasons for intervention appear to be prevalent within the agricultural marketing literature. Pricing behaviour or analysis is

a popular research area, as is the investigation of the level and nature of competition, and marketing efficiency. Studies of the functions of the agricultural marketing system include those which analyze grading, transportation, market information and storage. Other research examines the marketing of commodities or institutions involved in agricultural marketing; for example cooperatives and marketing boards. Most of this research involves the study of marketing systems or distribution channels within the agricultural marketing sector, rather than business level marketing management behaviour.

Although now almost twenty years old, review articles by Breimyer and Bateman remain the most comprehensive for the discipline and the areas they identify still appear to be popular topics in agricultural marketing theory. Agricultural marketing continues to focus on aggregate industry and policy issues rather than business level marketing studies of individual firms. Details of the differences between agricultural and business marketing, will be summarised in section 2.4. First section 2.2.3 will give a very brief discussion on the scope of business marketing. Marketing management and marketing strategy are defined and the role they play in business marketing theory is outlined.

2.3.3 Business Marketing Theory

Business marketing theory covers such a varied and wide ranging domain that reviewing its scope would be a major task which is outside the realms of this thesis. It has not been guided by a single paradigm, but applies a hybrid of other disciplines to the relevant problem areas, and has such wide ranging subject areas that the discipline's conceptual boundaries may never be fully established (Ardnt, 1985; Krapfel, 1982).

However, a central idea in business marketing theory is the marketing management concept which

suggests that a business can best achieve objectives by determining the needs and wants of target markets and delivering the desired satisfactions more efficiently and effectively than competitors (Kotler, 1986; Stanton, 1981; Kohli and Jaworski, 1990; Clark, 1987). Marketing management involves managerial decision making concerned with the set of controllable variables a firm uses to satisfy its market (McCarthy and Perreault, 1984; Kotler, 1972). These controllable variables are referred to as the marketing mix and generally consist of price, place, product, and promotion, activities. The emphasis of marketing management is at the business level, and concerns making a profit or satisfying business objectives (Hunt, 1976; Kotler and Armstrong, 1991). Kotler and Armstrong (1991) define marketing management as *"the analysis, planning, implementation and control of programmes designed to create, build and maintain beneficial exchanges with target markets for the purpose of achieving organisational objectives."*

Hunt (1976) reviews the scope of marketing and indicates that marketing includes *"such diverse subject areas as consumer behaviour, pricing, purchasing, sales management, product management, marketing communications, comparative marketing, social marketing, the efficiency/productivity of marketing systems, the role of marketing in economic development, packaging, channels of distribution, marketing research, societal issues in marketing, retailing, wholesaling, the social responsibility of marketing, international marketing, commodity marketing and physical distribution."* The Journal of Marketing's literature review (October 1991) classifies marketing under five broad subject headings and a number of subheadings as detailed in table 2.3. A comparison with table 2.2 shows the topic areas embraced within the two disciplines are considerably different. Unlike table 2.2, many of the subject areas identified in table 2.3 can be considered as part of the marketing management discipline, as they place emphasis on the marketing management activities of individual businesses.

Table 2.3 Subject Headings for the Journal of Marketing's Literature Review

1. THE MARKETING ENVIRONMENT	
Consumer Behaviour Legal	Political, and economic Issues
Ethics and Social Responsibility	
2. MARKETING FUNCTIONS	
Management, Planning, and Strategy	Retailing
Wholesaling	Channels of Distribution
Physical Distribution	Pricing
Product	Sales Promotion
Advertising	Personnel selling
Sales Management	
3. SPECIAL MARKETING APPLICATIONS	
Industrial	Nonprofit, political and Social Causes
International and Comparative	Services
4. MARKETING RESEARCH	
Theory and Philosophy of Science	Research Methodology
5. OTHER TOPICS	
Educational and Professional Issues	General Marketing

Marketing management with its focus on individual firms dominates the business marketing discipline (Wind and Robertson, 1983). For example a search on the New Zealand Bibliographic Network realizes more than six hundred books containing the words marketing management in their titles. Most introductory marketing textbooks contain large areas describing the subject area with Kotler and Armstrong (1991) devoting a considerable part of their "*Principles of Marketing*" text to addressing marketing management issues, and McCarthy and Perreault (1984) explicitly stating their text focuses on "*management orientated micro marketing*". However the marketing management approach has not become prominent in agricultural marketing theory (Manwaring, 1979; Bateman, 1976; Muelenberg, 1986).

In recent literature the concept of marketing management has been broadened, incorporating marketing strategy and strategic management theories and developing a more strategic orientation. Marketing strategy involves "*the allocation of resources to achieve a sustainable competitive*

advantage in selected product markets" (Wietz and Wensley, 1984). The subject area is broader in perspective than traditional marketing management. It has close links with business level strategy and the strategic management discipline, in that it is usually associated with a competitive business environment and synergistic relationships with other functional areas of the firm, as well as elements of the marketing mix (see Day and Wensley, 1983; Wind and Robertson, 1983; Walker and Ruekert, 1987a).

Strategic management literature is concerned with studying the way in which firms achieve objectives by matching internal business capabilities and constraints with the opportunities and threats provided by the external environment (see chapter 4). Developments within the strategic management literature have led to an increasing recognition of the linkages and relationships between marketing strategy and more general business strategy within the business, but not the agricultural marketing literature. Because agricultural marketing theorists are mainly concerned with aggregate issues they work above the level of the individual firm, and have not developed a management orientation. An under-developed area of literature appears to be that which studies the marketing management behaviour of agricultural producers in a strategic manner.

2.4 The Differences Between the Disciplines

The previous discussion outlines business and agricultural marketing theory and indicates that although the two subject areas have originated and developed from similar theoretical underpinnings, diversity exists between definitions of the disciplines, the theories they use to examine problems, and their subject matter.

In the literature it is suggested that a dichotomy exists between agricultural and business marketing because the marketing management approach is not prominent in agricultural marketing theory.

Bateman (1976) suggests that agricultural marketing has traditionally incorporated everything that happens between the farm gate and the consumer, therefore encompassing areas which may not be considered as marketing. While the analysis of government intervention and policy form the focus of agricultural marketing theory, studies of the objectives and decisions confronting individual businesses (marketing management) are central to business marketing theory.

Muelenberg (1986) also identifies the gap that exists between the two disciplines. He notes that agricultural marketing theory has not adopted the marketing management approach of business marketing theory or examined competitive strategy in the same way as the business literature. According to Richardson (1986) the marketing management approach (which he refers to as the agribusiness concept) has *"gained very little acceptance ... and no significant analytical or research results"* in the area of agricultural marketing. Although the marketing concept is a cornerstone of marketing management thought, it has not been widely adopted in the agricultural marketing literature. Strategic marketing and marketing strategy research with close ties to the strategic management discipline is popular within marketing management circles, but has been traditionally ignored within the agricultural marketing discipline.

Agricultural marketing theorists also appear to overlook other marketing management research areas including competitive analysis, consumer behaviour, marketing segmentation, synergy, competitive analysis, and the concept of target markets, at the business level where farm level issues are missed. They only focus on two elements of the marketing mix; price and to a lesser extent place (distribution) (Ritson, 1986). The small scale nature of farm business and the homogeneity of their produce may limit the applicability of promotion at the farmer level, however other marketing activities may still be important to farmers.

While differences between the two disciplines clearly exist, parts of agricultural marketing theory seem to be moving towards the marketing management approach employed by business marketing theorists. For example Watson (1983) acknowledges that during the 1970's a minor paradigm shift occurred within the agricultural marketing discipline, with a move towards business marketing theory. He notes how successive editions of Kohl's agricultural marketing textbook (1972 and 1980), change to describe the marketing concept. Ritson (1986) also believes that since the 1970's agricultural marketing theory has become more closely aligned with business marketing.

Muelenberg (1986) identifies a number of agricultural marketers who have partially incorporated the marketing management approach into their textbooks, but they mainly focus on the behaviour of agribusiness companies, rather than individual farmer firms (for example Bresch, 1981; and Yon, 1976). Out of the books examined in table 2.1, Barker (1989) takes more of a marketing management approach than most agricultural marketing texts. However he focuses on the difficulties of directly applying business marketing principles to farmers, not acknowledging that in practice farmers may use different but equivalent approaches to those identified in business marketing theory.

Ritson (1986) argues that agricultural marketing theory should focus on government policy because in European agriculture, parts of the marketing mix which would normally be undertaken by individual business are controlled by the government. In some countries, marketing boards have exclusive control of the price, place and promotion of agricultural products. These organisations supposedly carry out many marketing management practices on behalf of businesses including farm firms.

Although central control or government intervention may limit the marketing options available to

individual businesses, farm firms still have some control over their marketing mix and production decisions. The presence of government intervention or marketing activity does not preclude or excuse individual business firms from any marketing activity or strategic process associated with the marketplace. In business marketing theory it is acknowledged that the external environment has a major influence on the marketing activities of most firms.

Agricultural marketing research which examines the marketing management activities of individual firms continues to be outside of the norm. However in many articles it has been suggested that agricultural marketing problems should be studied using a more interdisciplinary approach to research and that attention should be focused on the marketing management activities and strategies of individual firms, including agricultural producers. The following discussion examines these issues in more detail.

2.5 A More Interdisciplinary Approach to Agricultural Marketing?

It has been argued that traditionally, agricultural marketing studies have been conducted by agricultural economists using economic principles and techniques. The application of these principles and techniques to marketing have recently been subjected to criticism. For example Horsky and Sen (1980) examine the interfaces between marketing and economics and conclude that economic theory is too narrowly focused to solve complex marketing problems. Bateman (1976) suggests that agricultural marketing theory is restrictive and pays insufficient attention to business marketing, and that concepts from the behavioral sciences should be used to complement economics. Muelenberg (1986) agrees and recommends that agricultural marketing should be more closely coordinated with business marketing, adopting a marketing management approach to research. He argues that many farmers have non-profit goals, therefore agricultural marketing theory may benefit from incorporating non-profit marketing ideas from the business marketing discipline.

Criticisms of researchers who confine their work within a narrow economic focus also exist within the broader area of the agribusiness discipline. Some criticisms focus on the agricultural economics discipline. Departments of Agricultural Economics have been seen to be too narrowly focused with little or no concept about what business is really about (Wallace, 1989). Sonka and Hudson (1989) describe how recent examinations of agribusiness programmes illustrate "*the efficacy of economics as the underlying discipline for agribusiness efforts.*" However, they suggest that in the future agricultural economists will turn to other disciplines and use traditional mainstream economics relatively less. As researchers confront more complex problems, concepts which are prevalent in business marketing studies will be used with increasing frequency.

Although both marketing and strategic management have been identified as areas of research priority for agribusiness researchers (Sonka, 1989; Dobson and Akridge, 1989), little research appears to have been conducted within these areas, especially at the individual producer level. Studies which suggest agricultural marketing theory should be more closely aligned with business marketing theory do not point out specifically what should be done at the firm level.

2.6 Summary

In this chapter it has been shown that confusion exists as to the role of marketing management in agricultural marketing theory because agricultural marketing is not management orientated. Although the business and agricultural marketing disciplines have originated and developed from similar theoretical underpinnings, they differ by definition, by the theories they use to examine problems, and by their subject matter.

Unlike other branches of marketing such as industrial, international, or services marketing, agricultural marketing theory has not been developed with the interdisciplinary approach of business

marketing theory. Instead, it continues to rely heavily on concepts that originate from economics and agricultural economics. Therefore agricultural marketing is usually identified as a division of agricultural economics, not business marketing, and continues to focus on aggregate distribution channel and policy issues rather than business level marketing studies of individual firms. To quote Bateman (1976), "*marketing has developed with a business orientation, agricultural marketing with a policy one, and this accounts for the fact that the two approaches sometimes appear to have the same language but are unable to communicate.*"

The apparent differences between agricultural marketing and business marketing theories may not present a problem because both disciplines examine issues which are likely to require different theories and techniques for analysis. However, concern must be expressed at the failure of researchers to comprehensively examine the marketing management activities and strategies of farm businesses. Businesses in the agricultural sector include farmers and other, often larger more sophisticated agribusinesses such as input suppliers and merchants. Business literature contains published articles examining the marketing strategies of large agribusiness companies however little research appears to reach down to the farm business level.

The arguments developed within this chapter suggest that because agricultural marketing is not management orientated and has not incorporated concepts from strategic management theory the marketing management behaviour of individual firms does not appear to have been investigated in a strategic manner at the farm level. In order to further develop these arguments, the following chapter contains a more narrowly focused review of literature which specifically analyzes the marketing behaviour of farm firms.

CHAPTER 3

THE MARKETING MANAGEMENT BEHAVIOUR OF FARMERS

3.1 Introduction

In chapter 2 the broad theoretical differences existing between the agricultural and business marketing disciplines were discussed. It was argued that within both the business and agricultural marketing disciplines little attention appears to have been focused on the marketing management behaviour of individual farmers. This chapter reviews literature which specifically investigates the marketing behaviour of agricultural producers.

It is argued that agricultural marketing and farm management specialists have studied the marketing activities and behaviour of farmers in an over-simplified manner and although there have been calls for farmers to more actively utilise marketing management concepts, these recommendations appear to have little empirical or case study support. Therefore studies examining the marketing behaviour of farmers are reviewed, and their limitations briefly discussed. Finally, a conclusion is reached which suggests that a further investigation of the complexity of farmers' marketing and strategic management processes is necessary.

3.2 The Marketing Management Behaviour of Farmers

Traditionally agricultural marketing theorists have not acknowledged the complex array of marketing management decisions that modern farmers encounter. A lack of supply control, the relatively homogenous characteristics of farm produce, and the small scale nature of farm businesses are perceived to limit the applicability of marketing management principles to farmers (Bateman, 1976). Government regulations, some of which empower statutory organisations such as marketing boards, are often presumed to control a farmer's marketing mix (Ritson, 1986). If these regulations are not

present, some economic arguments would suggest that producers should persuade the government to introduce controls, or encourage farmers to group together and form cooperatives which control their marketing (Manwaring, 1979). It has also been suggested that individual farmers are price takers and therefore marketing concepts do not apply to farmers (Richardson, 1986). This is possibly one of the reasons why the agricultural marketing literature limits the farm business marketing process to sales activities which occur with a change of ownership. However Hanf and Kuhl (1986) contend that any farmer may use a number of marketing activities to improve performance by reducing input prices and/or increasing farm gate output prices. Some agricultural marketing texts detail how farmers can store crops, influence the quality of their produce and choose different market outlets to sell produce (for example Purcell, 1979; Kohls and Uhl, 1985; Barker, 1989).

It can be argued that farmers are more actively involved with marketing than agricultural marketing theorists acknowledge, and that the traditional view which sees agricultural firms as thousands of small businesses, producing a uniform product, acting as price takers, and facing only limited marketing alternatives, is an oversimplification. In the agricultural marketing literature it is frequently suggested that the peculiarities of farm businesses, their produce, and the environment they operate in, make farm enterprises different from other businesses. This means business marketing principles are not applicable to farmers. However, evidence presented in recent studies suggests that the differences between many farmers and other small business operators are not as great as they once were. American producers are facing a more unstable and uncertain environment than in the past (Edleman *et al.* 1990; Harling and Quail, 1990). European farmers are facing the threat of less protection and more competition, and the recent deregulation of the New Zealand economy and agricultural sector may have increased the number of marketing and management options available to New Zealand farmers. This changing environment would appear to at least

place farmers in a similar competitive environment to other small businesses.

The change in the environment in which farmers operate has led to calls for them to more actively utilise principles of marketing management. Politicians, public speakers and the farm press have all criticised farmers for their lack of attention to marketing. Within some academic literature there is a belief that prosperity in farming is dependent on the agricultural sector adopting the marketing concept, and farmers have been called upon to "market" their way out of financial problems (Ritson, 1986; Fletcher and Napier, 1981; Blight, 1984). However, these ideas are not new. Twenty years ago Bateman (1972) pointed out that farmers, more than other businesses, were being criticised for paying insufficient attention to the market.

It has been suggested that farmers may benefit from adopting business marketing management principles and employing a marketing orientated attitude to management (for example Carpenter, 1972; Chandler, 1974; Watts, 1974). Lyons *et al.* (1986) feel that marketing is an essential part of the management process for modern commercial farmers while Ferris (1988) recommends that farmers should develop a successful marketing plan and follow it. As a first step farmers should determine what buyers want, then, how much to produce, what quality to produce, and where, how, and when to sell. Tilley (1989) suggests that marketing planning is important to farmers adopting alternative agricultural enterprises. For example, crop farmers breeding new varieties of crops.

Several books also stress the perceived importance of marketing management for farmers. Barker's (1989) agricultural marketing text suggests that marketing management considerations should be present in the majority of farmers management decisions including production planning. He argues that "*marketing is not a concept that is beyond the scope of farmers.*" Futrell (1982) feels that marketing is becoming more important for farmers and writes what he considers to be a practical book on marketing for farmers.

Two recent farm management texts also recommend that farmers should use marketing management concepts. Turner and Taylor (1989) outline the importance of a marketing orientation to farmers, suggesting they should segment their market and grow produce which satisfies the requirements of their target markets. Boehjle and Eidman (1984) believe that marketing and market planning are an important part of farm management. However, the inclusion of marketing management theories within a farm management framework has not been prevalent within the literature and there has been little detailed discussion of how these theories might be applied.

Traditionally farm management specialists have viewed production as the cornerstone of farm management with supporting functions of record keeping, financial analysis and legal planning. This model of farm management evolved from production economics with financial management supporting this production activity (Lyons *et al.* 1986). Marketing decisions are excluded from this management process as is the mechanism to facilitate the interactive thinking which is needed to take a strategic approach to managing a farm business, although in the business marketing literature the marketing behaviour of firms has been investigated in a strategic manner (Lyons *et al.* 1986; Harling and Quail, 1990).

The perceived need for farmers to utilise marketing management principles is highlighted in articles which suggest it is necessary to teach farmers these concepts. Manwaring (1979) feels that agricultural firms have been slow to adopt managerial marketing concepts, and that farmers do not have adequate knowledge to apply marketing concepts without further education. He talks about the necessity of educating farmers in marketing, stressing the need to spell out the marketing concept, but mainly focuses on the profits to be gained from group action. Abbott (1983) suggests that extension programmes which teach farmers practical ideas on marketing would aid agricultural

development. Negendank (1987) believes that because New Zealand farmers are not organised to meet consumers' wants and needs, there is a requirement for advisory services to assist farmers developing marketing strategies.

Other literature attempts to outline marketing management principles to farmers. For example, a book edited by Bateman (1972) contains papers presented at a course on agricultural marketing for farmers which encouraged farmers to accept the marketing concept and introduced marketing tools perceived to be useful for farmers. Haines and Davies (1987) text, "*Diversifying the Farm Business*" outlines what the authors believe are marketing principles to farmers interested in diversifying. They suggest that these farmers should develop a marketing plan that embodies the four P's, in a similar way to business marketing texts. Cornelius (1988) describes how in his view, farmers should develop a successful marketing strategy, suggesting a written marketing plan is essential for successful farmers. However, by defining marketing as sales activities he excludes production planning and other activities from the marketing process. Nichols and Skewers (1987) provide worksheets for use in developing a marketing plan for corn producers, however their marketing plan is considerably simpler than a typical marketing plan found in business marketing literature, consisting of a budget analysis of the sales alternatives for one crop.

When making the suggestion that farmers should more actively utilise marketing management principles it is usually recognised that farmers have difficulty in implementing these concepts. For example, Barker (1989) devotes a chapter of his book to examining the applicability of business marketing principles to farmers. Other authors however, have implied that farmers would benefit from directly copying the marketing management approaches outlined in business marketing theory. An extreme position taken by Blight (1984) suggests farmers should utilise marketing management techniques such as advertising. Blight examines concepts commonly accepted within the business

marketing discipline and suggests they will work at the farm level. In a similar way, calls for farmer marketing education programmes and literature which shows farmers how to go about marketing, must acknowledge the unique nature of farm firms. Calls for farmer education in marketing management are not necessarily inappropriate, but they must teach farmers concepts which are suitable for farmers, not other businesses.

Many farmers seem to acknowledge that marketing management skills present a weakness in their management ability. For example a survey of Ontario farmers by Harling and Quail (1990) found that 78% were dissatisfied with their marketing management skills, and it is unlikely that this problem would be confined to Ontario. Although Manwaring (1979) suggests that individual producers do not normally have adequate knowledge to apply marketing concepts, it seems inappropriate to suggest that farmers lack basic business skills or strategic capabilities. Suggestions that business marketing principles should be incorporated at the farm level need empirical or case study support. Because farmers do not generally lack access to education in business management skills, it could be assumed that the apparent lack of application of marketing skills reflects the fact that they are not useful.

Business marketing theory has developed from conceptual, empirical, and anecdotal research into the marketing activities that business firms undertake. Farm businesses continue to operate in conditions distinct from non-farm firms and although the differences between farm and other businesses may be narrowing, they must still be recognised by researchers. It is naive and possibly dangerous to view marketing management principles as the panacea for farmers' problems without first examining if they are relevant. Farmers may face distinct problems which require separate remedies to those of other businesses and they may use approaches to marketing that are different but equivalent to those employed by non-farm businesses. Consequently, discussion contained within

section 3.3 will review research which examines the marketing strategies and tactics of farm firms.

3.3 Farm Marketing Studies

In chapter 2 it was argued that the agricultural marketing discipline traditionally focuses on aggregate policy and distribution channel concerns rather than the marketing management problems facing individual farmers, however a small number of empirical studies have researched the marketing behaviour of farmers'. Although the case study approach is common in the business literature and has been suggested as an alternative method for farm management research (Howard and MacMillan, 1991), no case studies examining farm business marketing activities appear to have been published. This section will review published literature which describes farmer marketing activities at the business level or prescribes optimal mixes of marketing variables for farmers. Comments are made regarding the limitations of these studies.

Details of empirical research which examines the marketing strategies and tactics of farmers are summarised in table 3¹. At its simplest, the marketing management process involves managerial decision making involving a number of marketing variables, therefore research which investigates only one marketing activity is not included in the table. For example studies which investigate sales activities using futures and hedging, or options, which are common in the agricultural marketing literature (for example Karp, 1987; Shideed, *et. al.* 1987; Hauser and Eales, 1986). The table is divided into two parts containing research of a normative and positive nature, with each discussed in the following paragraphs.

¹ these are mainly found in the agricultural economics, farm management and agribusiness journals. No relevant research was found in the business marketing literature.

Table 3 Empirical Studies of Farm Business Marketing Strategies

NORMATIVE RESEARCH				
Author	Farm Type	Marketing Activities Studied	Analytical Methods Utilised	Description of Study
Bailey and Richardson (1985)	Cotton	9 combinations of cash and futures alternatives	Stochastic dominance	Evaluate alternative marketing strategies incorporating yield, quality, timing and price risk.
Anaman and Boggess (1986)	Mixed Crop	-cash sales at harvest -forward contracts at planting -hedging at planting -buying futures options at planting	Stochastic dominance	Determine optimal marketing strategies for farmers with different attitudes to risk.
Berg (1987)	Wheat	Timing of sale	Dynamic programming and Monte Carlo simulation	Determine optimal timing of sale for wheat growers with different degrees of risk aversion.
Curtis, Kahl & McKinnel (1987)	Soybeans	103 sales and timing of sales variations	Target MOTAD Linear programming	Investigate risk efficient marketing mixes which minimise absolute negative deviations below a target return level.
Zacharias, Zaunbrecher, Traylor and Mcmanus (1987)	Soybeans	-preharvest forward -preharvest futures -cash at harvest plus date of contract and fraction of crop contracted	Stochastic dominance	Determine optimal risk efficient sets of preharvest soybean marketing strategies for Louisiana producers.
Jensen (1988)	Cotton	55 sales alternatives	Stochastic dominance	Analyze marketing alternatives in order to develop a cotton marketing strategy that is best at a point in time.
Rodriguez and Taylor (1988)	Cattle	-timing of sale plus optimal animal weight and animal density	Stochastic dynamic programming	Test the certainty equivalence property of sequential timing of sales and stocking densities, with stochastic steer prices and rainfall, for a Colorado cattle ranch under risky and riskless conditions.
Brennan and Hoffman (1989)	Cattle Corn Soybeans	Sell by Carcass Sell by live-weight plus type and quality of cattle and inputs utilised	Simulation Deterministic linear programming	Develop an interactive linear programming model to evaluate the effects of marketing alternatives, type of ration and feeding management practices on the relative profitability of producing feedlot cattle under midwestern conditions.
Groover, Kenyon and Kramer (1989)	Cash grain	5 sales alternatives plus government and government programme alternatives	MOTAD linear programming	Provide optimal production and marketing strategies under different risk scenarios for a sample of four typical Eastern Virginia cash grain farmers.
Lambert and McCarl (1989)	Wheat	Combinations of: -sale on cash market -future sale on cash market -future delivery cash contract	Discrete stochastic programming	Determine marketing strategies which maximise expected net worth according to the utility function specified. Test if model approximates actual producers sales patterns.
Schroeder, Grunewald, Langemeier and Allen (1989)	Cattle	31 mixes of cash, futures, put option and call option alternatives	Stochastic dominance	Empirically identify optimal option and hedging strategies for cattle feeders.
Freeze, Nelson, Musser and Hironaka (1990)	Cattle	-cash sale -2 hedging options (each with and without participation in a government programme)	Target MOTAD Linear Programming	Identify optimal mixes of marketing variables depending on expected level of income and risk associated with each combination of activities.
McKinnel, Kahl and Curtis (1990)	Soybeans	32 sales methods and timing of sales combinations	Target MOTAD linear programming	Examine the average revenue and risk for a selected set of marketing strategies between 1972 and 1975, and compare results across three states.

NORMATIVE RESEARCH (continued)				
Author	Farm Type	Marketing Activities Studied	Analytical Methods Utilised	Description of Study
Garion, Mjelde and Conner (1990)	Calves and Yearlings	-timing of sale -number of cows to sell plus herd size	Stochastic dynamic programming	Give optimal decision rules according to price and the amount of standing crop available.
Schroeder and Featherstone (1990)	Cattle	-Cash -Hedged using futures and put options plus cow retention	Discrete stochastic programming	Determine optimal retention and marketing activities for cow-calf producers under different risk scenarios.
Tronstad (1990)	Wheat	Quantity of grain sold by cash and futures each month	Stochastic dynamic programming	Determine and analyze optimal grain marketing decisions depending on market conditions, the financial position of the firm, marketing constraints of the producer and participation in government programmes.
Turvey and Baker (1990)	Corn Soybeans	-cash -futures -options -timing of sale	Two period discrete sequential stochastic programming	Model optimal use of futures, options and cash under alternative farm programmes with varying financial constraints.
DESCRIPTIVE RESEARCH				
Fletcher and Terza (1986)	Wheat	-spot sale at harvest -sale after storage -contract sale	Maximum Likelihood multivariate probit analysis	Determine demographic and production characteristics of farmers, which correlate with farmers marketing decisions.
Harwood, Hoffman and Leath (1987)	Corn	12 sales and storage alternatives	Little empirical analysis	Measure the proportion of Midwestern corn producers marketing and pricing corn using various alternatives.
Carley, Fletcher and Tzongyun (1988)	Peanuts	-cash marketing -centralised forward deliverable contracts -futures market exchanges -computer assisted exchanges -plus storage, drying, transportation, and pricing information	Probit analysis	Determine factors which influence the adoption of marketing alternatives for farmers of stock peanuts.
Fu, Epperson, Terza and Fletcher (1988)	Peanuts	-informal cash -informal contract -forward deliverable contract -futures -computerised	Multivariate probit (joint estimation)	Determine attitudes of peanut producers towards different marketing alternatives and describe their characteristics.
Kwakyi, Epperson, Fletcher and Carley (1989)	Peanuts	-private treaty market -futures market -formal forward contract -computerised market	Multivariate probit model	Assess stock peanut buyers and producers' attitudes towards different market outlets and profile producer characteristics associated with different markets.
Snyder (1989)	Cattle	-cattle age at sale -timing of sale -method of sale -market information utilised	Little empirical analysis	Survey Utah cattle producers' marketing operations and perceptions of risk.
Edleman, Schmiesings and Olsen (1990)	Grain Hogs Feeder Cattle	-cash sale -forward contract -hedging -options	Maximum Likelihood Regression	Examine (1) the use of various forward pricing alternatives; (2) relationships among farm size, financial status, management indicators, policy preferences, and the use of various marketing alternatives (3) marketing information used by producers; and (4) producer reasons for not using forward pricing alternatives in the private sector.

3.3.1 Normative Research

In normative studies operations research techniques are used to find optimal combinations of a selected number of marketing variables, but as marketing decisions are normally made with imperfect knowledge, most problems are stochastic in nature. Analytical approaches utilised include various forms of mathematical programming, risk analysis and simulation.

Research of a normative nature which examines the marketing activities of farmers does not model the interactions that may occur with a network of other marketing and strategic variables. Business marketing researchers acknowledge the complex nature of the marketing process which is involved with human judgements and imperfect knowledge. They do not normally attempt to prescribe answers to complex marketing problems in the same way as studies which model the marketing behaviour of farmers.

Marketing management theory indicates that marketing strategy is part of an integrated process (Wind and Robertson, 1983). A successful marketing strategy is likely to involve complex interactions between a wide range of marketing variables as well as other strategic variables that are available to a farm business. The studies reviewed look at only part of the marketing strategy process and do not depict marketing strategy as part of an integrated process which has interfunctional and synergistic relationships with other business operations. Interactions between variables are modelled in a simplistic manner, usually in linear form.

Researchers frequently take the traditional viewpoint that marketing means sales, and limit analysis to the determination of optimal combinations of a small number of sales or disposal variables. These so called marketing variables include; market outlet utilised, method of sale, timing of sale, and the amount of produce to sell, sometimes at or during different discrete time periods.

Although marketing management theory suggests that production planning is an important part of the marketing process, most normative studies of farmer marketing activities do not attempt to determine optimal product mix combinations. Farmers are usually assumed to have a pre-determined type of produce available for sale, therefore production planning is not modelled as part of the marketing process. However business marketing theorists would suggest that business managers should simultaneously plan production and sales decisions.

Normative models which depict optimal marketing strategies for farmers are of only limited value in aiding actual farmers decision making. The complex procedures involved in implementing these models would suggest they are not operational or economical enough to be useful for individual farmers (Malcom 1990). Solutions presented are only appropriate for farmers who operate within the strict assumptions or conditions specified by the models.

Each study presents combinations of variables which maximise expected utility, measured in terms of short term returns and their variations. Marketing strategies employed in the real world are influenced by business goals. It is possible that some farmers may sacrifice short term utility for longer term gains while other farmers may attempt to maximise prestige by gaining higher crop yields or qualities than would maximise long term profit. These studies present optimal tactics for maximising short term profits rather than optimal long term strategies.

Often results are only applicable to the farm and time period being studied, and farm businesses are assumed to be relatively homogenous, or only differ in their risk preferences (in terms of variation in income or returns) or their environmental conditions (eg. discrete variations in rainfall, prices, taxes, interest rates, or financial conditions). However, farm businesses differ in more ways than this. For example, distinctive competencies in areas such as management skills (human capital) are

not accounted for in any of the models, but are likely to influence the outcome of any marketing strategy a farm business may undertake. Distinctive competencies are special or unique capabilities which allow a business to perform various functions more effectively than competitors. According to Day and Wensley (1988), distinctive competencies arise from either the skills of a firm's staff or a business's resources.

Concepts from the business marketing literature suggest that marketing strategy is a principle component of business strategy and involves developing a strategic fit between internal business characteristics and external non-controllable factors in order to achieve business objectives. These ideas have not been utilised by researchers of farm business marketing strategy, although descriptive studies suggest that different business and demographic characteristics are likely to correlate with and influence farmers marketing decisions.

3.3.2 Descriptive Research

Like normative studies, descriptive examinations of the marketing strategies and tactics of farmers' take the view that marketing means sales. The utilisation of different marketing tactics or producer attitudes towards alternative marketing outlets and activities are frequently analyzed, however because attempts to investigate the complexity of the farm business marketing process are not normally made, many of the limitations outlined for normative studies apply. Some studies describe how different farmer or farm characteristics are associated with particular marketing tactics, and therefore show that individual farmers can take different approaches to marketing. Others examine the demographic and business characteristics associated with farmers' sales decisions or attempt to measure farmers' attitudes towards various sales alternatives. They appear to implicitly acknowledge that further research and a greater understanding of the farmer marketing process is necessary before normative studies can take place.

A research effort which is not included in table 3 (because of its age) is Barker's (1980) PhD thesis titled *The Importance of Marketing Management to the Individual farmer*. Barker's work is unique as it is one of few farm level studies to view marketing as more than sales activities. Barker analyses the use of marketing management principles by UK farm businesses and the financial gains to be made by taking a more "*marketing orientated*" approach to management.

Barker (1980) asks farmers a number of questions relating to the importance of marketing to them and farmers in general. For example, the importance of production, marketing, financial, or labour organisation decisions. Findings indicate that most farmers feel production considerations are more important than marketing. Other questions relate to the use of market outlets, the source and frequency of use of market price information and other factors. The hypothesis that marketing orientated farmers were likely to perform highly was tested by examining whether farmers who use forward contracts received higher prices for their produce. Farmers were also asked the tasks that they felt were related to marketing and those related to production. It was shown that young inexperienced farmers with high levels of education believed that marketing management incorporated the widest variety of activities. It was concluded that only a small proportion of UK farmers regard marketing management as an important part of their decision making process and that most farmers do not utilise marketing management principles to any great extent.

Descriptive studies show how different farmer or farm characteristics are associated with particular marketing tactics, indicating that certain types of farmers take different approaches to marketing. In the business literature reasons as to why these differences exist have been presented. Business marketing theory has incorporated concepts from strategic management and industrial organisational economics which suggest there are a limited number of unique combinations of strategic variables which businesses may utilise to maintain a competitive position and profitability. Each combination

results in unique patterns of strategic behaviour and a strategic focus which is likely to have different marketing implications. The strategic behaviour of businesses has been classified both conceptually (strategic typologies), and empirically (strategic taxonomies) (see chapter 5). These concepts have been clearly defined in the business literature but have not been widely utilised in agricultural marketing research. However because different strategies are likely to have specific marketing implications, an understanding of business strategy at an individual firm level may help researchers understand individual producers marketing management behaviour.

3.4 Summary

In the first part of this chapter it was suggested that farmers may utilise more sophisticated marketing strategies than are portrayed in the agricultural marketing and farm management literature. For farmers, marketing has been traditionally viewed as a process that occurs after the product leaves the farm gate or with a change of ownership, thus farmer marketing decisions are frequently limited to sales tactics. A literature review indicated that empirical studies of the marketing activities of farmers do not depict marketing strategy as part of an integrated process with interfunctional relationships with other business operations and complex interactions between marketing and other strategic variables.

Suggestions that farmers should utilise marketing management concepts, have little empirical backing. It is suggested that because marketing strategy is likely to be closely aligned with business strategy and because marketing behaviour is likely to be influenced by the strategic approach a business takes, one method of evaluating the marketing behaviour of farmers is to search for the existing strategic approaches which farmers utilise. It is argued that by better understanding patterns of strategic behaviour at the farm business level it will be possible to increase the understanding of specific marketing activities undertaken by farmers. Ongoing research is necessary to examine these

issues and will allow a greater understanding of the role of marketing management in agricultural marketing theory and producers' marketing management behaviour.

In chapter 6 the methodology for such a study will be developed. However before this can take place a detailed understanding of the concept of business strategy is crucial. A brief review of business strategy and examination of the role of strategic management at the farm level is provided in the following chapter.

CHAPTER 4

BUSINESS STRATEGY AND ITS ROLE AT THE FARM LEVEL

4.1 Introduction

The discussion in the previous chapter illustrated the importance of understanding business strategy at the farm level. In this chapter the concepts of business strategy, strategic planning, and strategic management processes are described and the relevance of these concepts to management at the farm level is discussed. Business strategy is defined and then described using mathematical and diagrammatic approaches. Because strategic management theory has originated from studies of large organisations there appears to be a need to ascertain whether the underlying concepts and principles are likely to apply for small businesses such as farm firms. Because most small business and farm level studies investigate strategic planning rather than strategic management, the role of strategic planning techniques and formal strategic management prescriptions at the farm level are explored before strategic management processes are described. Papers which outline the need for research which analyses the strategic management activities of agribusiness and farmer firms are also reviewed, and finally studies which investigate business strategy and strategic management at the farm business level are examined. The conclusions developed from this review suggest that a study which investigates the alternative strategies followed by farmers would contribute a great deal to the understanding of farm firm and small firm, business and marketing strategies.

4.2 A Brief Overview of Business Strategy

The word strategy originates from the Greek word *strategos*, meaning general, with strategy being a term used to describe the art of the general. Strategy was first used in strategic management literature in the military sense to describe what a manager does to offset the actions or potential actions of competitors but more recently, considerable academic debate has focused on defining

strategy in a business context (Stiener *et al.* 1986). Typical definitions of strategy include:

"The policies and key decisions adopted by management that have major impacts on financial performance. These policies and decisions usually involve significant resource commitments and are not easily removable" (Buzzel and Gale 1987).

"A consistent pattern of managerial controllable or decision components representing scope, resource deployments, and competitive advantages; and the directions in which these components are shifting over time which characterise the way businesses tend to compete" (Galbraith and Schendel 1983).

"The fundamental pattern of present and planned resource deployments and environmental interactions that indicate how the organisation will achieve its objectives" (Hofer and Schendel, 1978).

Although there are differing views on what is the proper definition of business strategy, there appears to be many similarities in the authors' views of what business strategy involves. It is generally accepted that strategy relates to achieving business objectives by matching a firm's activities with the opportunities and risks created by the environment in which it operates (Johnson and Scholes, 1984; Wietz and Wensley, 1984). Although different authors have placed varying levels of emphasis on competitive strategy there seems to be a movement towards viewing business strategy with a competitive perspective by focusing attention on the influence that competitors have on a firm's strategy. Competitive strategy can be defined as an integrated set of actions which firms utilise to create and sustain competitive advantage (Kerin *et al.* 1990).

The previous paragraphs have defined business strategy and competitive strategy. These concepts can be described mathematically and illustrated diagrammatically, as is shown in the subsequent paragraphs.

Business strategy can be described in the following simple economic model. In matrix notation the problem can be stated as:

$$\max \Omega(y, x)$$

subject to

$$y = f(x_p, z_p, y_{t-1}, x_{t-1}, z_{t-1}, \dots)$$

where:

Ω = an objective function

y_t = strategic outcomes in time period t

x_t = strategic decision variables in time period t

z_t = environmental variables in time period t

The purpose of business strategy is to satisfy business objectives which are influenced by the outcomes of the strategic decisions made by businesses and the strategic options available to a firm. The border line between x and z is often fuzzy because factors which are non-controllable in the short run are often flexible in the long term.

Such a model would imply the relationships between strategic decisions (x), environmental variables (z), historical factors (t^{-1}), and strategic outcomes (y) are known and measurable. Attempts to measure these relationships in practice have been incomplete and limited. Most research published in the agricultural marketing literature investigates single variable relationships or attempts to solve optimisation problems with respect to a small number of variables, and therefore does not attempt

to investigate the complexities of business strategy. In the business management literature there has been little success in modelling these relationships in a detailed way, because business strategy often incorporates management skills and personal judgements which are difficult to measure.

A diagrammatic illustration which shows the interactions between factors which influence business strategy formulation within a competitive framework is presented in figure 4.1. Porter (1980) suggests that at the broadest level, four key factors influence competitive strategy. The strengths and weaknesses of the business combined with the personal values of the business manager make up internal firm factors. Factors external to the business include economic and technical industry opportunities and threats, and broader societal expectations including government policy and social concerns. Competitive strategy is formulated as a result of complex interactions between these four factors. Each factor in turn is made up of a large number of variables.

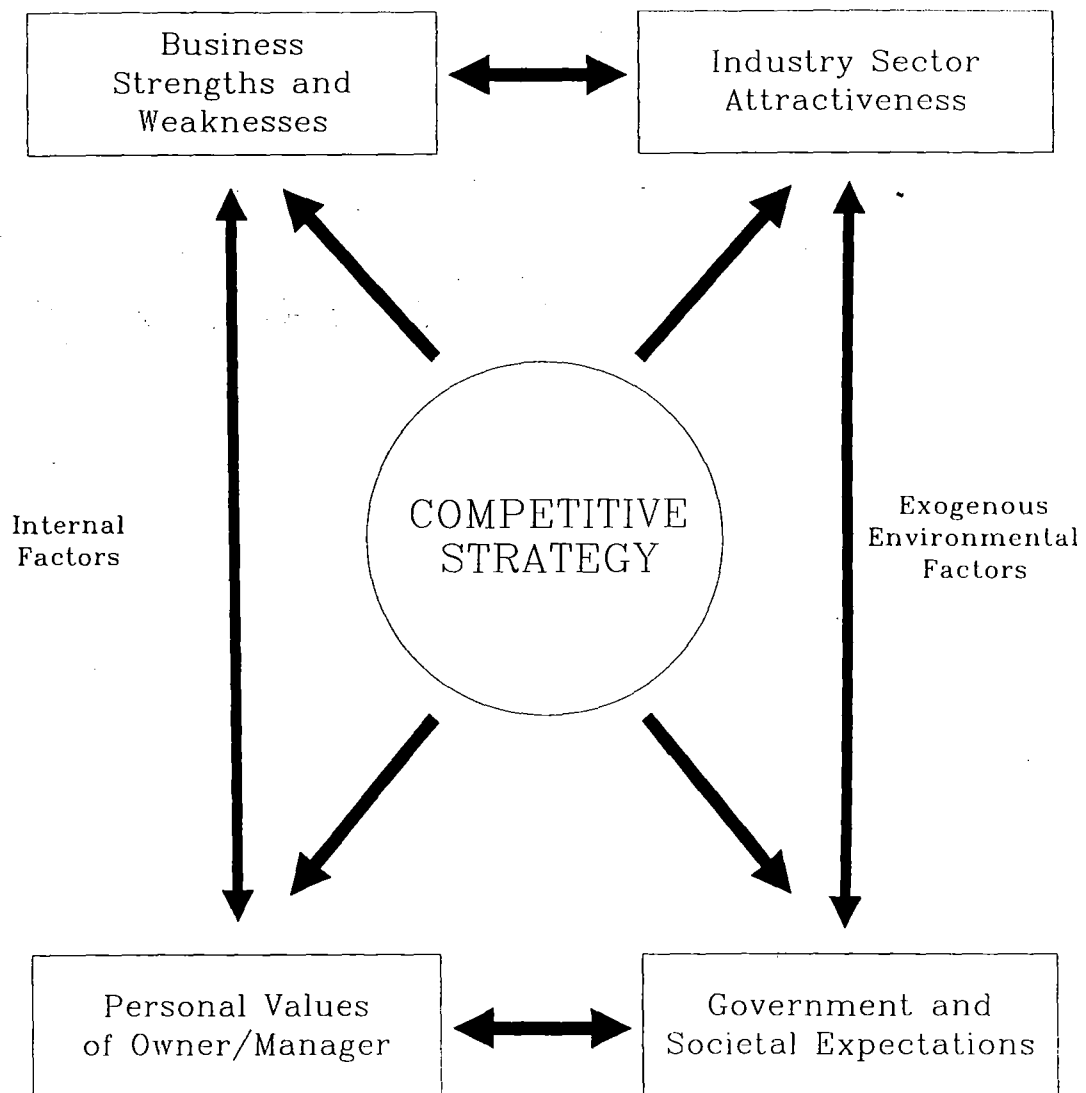
A review of literature indicates that strategic management work carried out in the domain of small sized businesses is considerably more extensive than that which details or prescribes farm business strategy. Most small business strategy literature is concerned with businesses larger than farm firms. However because farms are a specialist type of small firm, literature examining strategy within a small business framework may provide insights into studying and understanding the strategic behaviour of farmers and is therefore briefly reviewed in the following section where the implications of these studies at the farm level are discussed.

4.3 Small Business Strategy

Strategic management theory has generally developed from studies of large established business corporations. Although it is common to see literature prescribing strategic concepts which have

been developed within large firms at the small business level¹, small businesses are not little versions of large businesses because they have peculiarities which may lead to the development of management approaches which differ from those utilised by large businesses (Robinson and Pearce, 1984; Welsh and White, 1981; Shuman and Seeger, 1986; Shuman *et al.* 1985; Carson, 1985a).

Figure 4.1 Competitive Business Strategy Formulation



Adapted from Porter (1980)

¹ Carson (1985b) describes how a similar view is taken in many business marketing texts and in the business marketing literature. In the marketing context, literature often suggests that small businesses should conduct marketing in a similar way to large businesses, but on a smaller scale.

Small businesses are normally owned by a limited number of people and managed in a personalised fashion. Because business objectives are influenced by the owner/manager's personal and family needs, the goals of the small organisation and motives of the owner are often indistinguishable (Birley and Norburn, 1985; Mendham and Bannock, 1982). This seems particularly true for farm firms which are often family businesses because farmers' lifestyles and livelihoods are not easily separated (Brunaker, 1990a).

Strategic decision making in a small business is usually the sole responsibility of the owner/manager. Although this may allow rapid responses to changing environmental conditions it means managers are likely to be involved in all areas of strategy making. Marketing strategy is just one element of strategic management, with all business functions (for example production, marketing, finance, and labour relations), to some extent embodied within the process. Small businesses including farmer firms often have a single owner/manager controlling the functional areas of a firm which in larger corporations may be separate functional departments or business unit divisions.

Small businesses are less likely to hire the specialised personnel who are in charge of making strategic decisions in large corporations, and their managers do not usually have to answer to higher authority or shareholders, thus they are unlikely to have the detailed reporting system of large businesses, meaning evaluation and control systems are probably not as complex.

It appears that the distinctive competencies of small businesses may be more rigid than in large firms. In a small business situation distinctive competencies are likely to be very much associated with the human capital of the owner/manager and will therefore be relatively inflexible.

It is beyond the scope of this thesis to review the numerous other differences between large and small businesses which may also influence a small firm's strategic behaviour. More detailed reviews of these differences are given by Welsh and White, 1981; Schollhammer and Kuriloff, 1979; and Carson and Cromie, 1989. These factors may lead to a small business taking a relatively informal and unstructured approach to business strategy. Because most studies of business strategy at the small firm or farm level focus on strategic planning the concept of strategic planning is reviewed within the following section, and the role of strategic planning at the farm level is discussed.

4.4 Strategic Planning

Most small business and farm firm strategic management literature focuses attention on strategic planning rather than strategic management processes. Robinson and Pearce (1984) review and classify over 50 studies concerned with small firm strategic planning and conclude that most small firms do not formally plan. Because of the differences between large and small businesses these authors question the relevance of transferring concepts which have developed within large firms to small business applications. The results from other studies also indicate that most small businesses do not appear to utilise formal strategic planning procedures (Jauch and Glueck, 1988; Robinson and Pearce, 1983; Robinson, 1982). It has been argued that formal plans may contribute to small businesses losing the flexibility that is one of their main sources of competitive advantage (Robinson and Pearce, 1984). The apparent lack of application means that in their present form strategic planning techniques may not be suitable for small businesses such as farmers, however, at the farm level a number of authors have prescribed a "little big business" approach to strategic planning.

White (1987) suggests farmers should formally conduct strategic planning to improve their success and outlines seven steps of the strategic planning process which farmers should go through. Jepsen

(1990) describes a modular strategic planning tool for farmers while Wierzbicki (1990) develops a computer programme for farm business strategic planning. In more exploratory studies Brunaker (1990a) surveys farmers who have diversified successfully to determine how they use strategic planning, and Rasmussen *et al.* (1990) identifies areas for strategic planning and decision making at the farm business level.

It is inappropriate to propose that techniques aimed at improving the outcomes from a strategic decision making process may not be beneficial. However, at the farm business level prescriptive tools for farm firms should not be developed by copying methods that have been developed within the strategic management literature from studies of large corporations unless these methods have been evaluated in a farming situation (Soler, 1990; Martin *et al.* 1990).

Strategic management is different from strategic planning. It emphasises a more constant surveillance of the environment, and a more systematic link with implementation than strategic planning (Hofer and Schendel, 1978). Strategic management focuses on obtaining sustainable competitive advantage as opposed to the focus on strategic business units and portfolio planning models which form the core of strategic planning theory (Day and Wensley, 1983). It seems reasonable to assume that a small business may utilise a strategic management process which is informal and unstructured and therefore does not involve formal strategic planning.

For the purpose of this study it seems sensible to examine the strategic management processes of small businesses and farmers rather than prescribe formal strategic planning models or determine if firms actually undertake strategic planning. This view is supported by the arguments presented by a number of authors including Walker and Ruekert (1987a) who describe how strategy implementation rather than strategic planning is important to business success. They suggest that

the strategic approach a business follows has more influence on business success than the firms involvement in strategic planning. Westgren and Cook's (1986) research findings indicate that regardless of strategic planning, strategic issue identification is important to agribusinesses. Mintzberg (1992) states that his new textbook critiques the "*idea that strategy can be viewed as a formal process,*" although this is assumed in strategic planning theory. He suggests that strategy exists in the mind and is difficult to write down formally. From a marketing perspective Day and Wensley (1983) argue that while strategic planning was a prominent research area within the marketing discipline in the 1970's, strategic management research with its focus on competitive advantage has dominated during the 1980's.

Within the farm level literature there appears to be confusion between strategic planning and strategic management processes. For example Kühl's concluding remarks following a 1989 seminar on strategic management for farm firms state that for farmers, business strategy involves developing a long term business plan which is flexible enough to move with changes in environmental or non controllable conditions. However arguments presented in the preceding discussion suggest that strategic management does not have to be a formally planned process. While literature examining farm level strategy continues to concentrate on strategic planning rather than strategic management processes, strategic management has been identified as a popular area for agribusiness research. In section 4.6 this issue will be discussed in more detail, but first the strategic management process is discussed in a farming context in section 4.5.

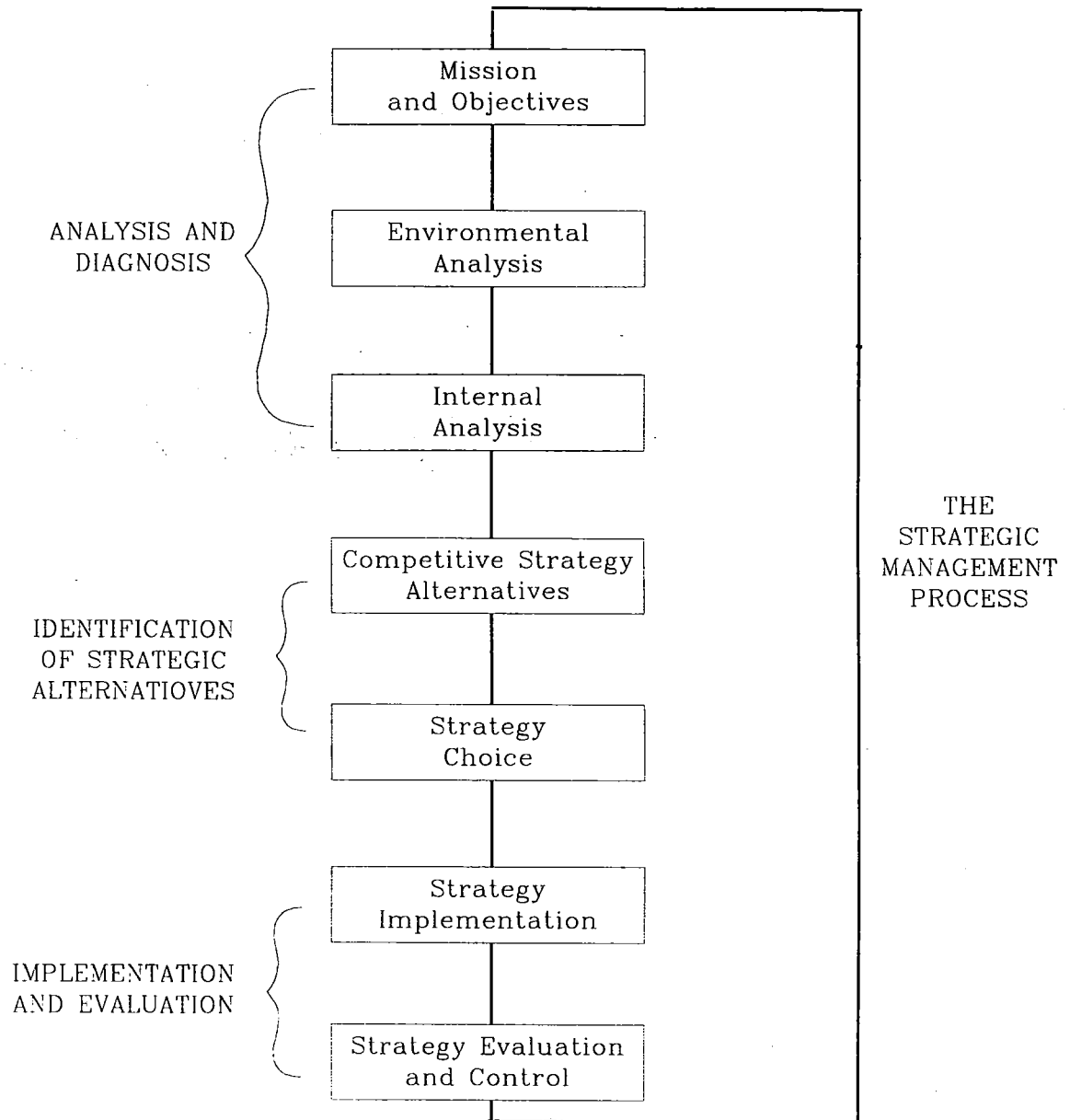
4.5 The Strategic Management Process

Strategic management is the management process concerned with understanding, choosing, and implementing, the strategy or strategies a business follows (Thompson, 1991). It involves a complex, interrelated stream of decisions and actions which lead to the development of an effective

strategy or strategies which help achieve business objectives (Jauch and Glueck, 1988). Strategic management is a continuous, iterative process aimed at aligning a business with the opportunities and threats provided by its environment. Unlike strategic planning, the strategic management process does not have to be formally planned or structured.

A typical representation of the strategic management process, which is depicted as an ongoing operation with several parts of the process occurring simultaneously, is presented in figure 4.2. Similar descriptions are given in many strategic management textbooks and while models and descriptions may differ slightly, the differences do not seem to be significant, but are variations on a central theme. Although Brunaker (1990b) suggests that a flow chart type approach to modelling farm level strategy may not be appropriate and a dynamic non-hierarchical model is more suitable, within this thesis it is acknowledged that farm businesses are unlikely to follow the formal hierarchical type of approach to strategy depicted in figure 4.2. However a more appropriate representation of farm business strategy is yet to be developed and tested. If the limitations of such a model are understood the ideas presented in figure 4.2 can give insights into the strategic behaviour of farm businesses and lead to a greater understanding of their strategic management process.

The model indicates that strategic management may be separated into three stages; analysis and diagnosis, identification of strategic alternatives, strategy implementation and evaluation. Each stage is described in more detail by Martin *et al.* (1990) who use an example of a Canterbury crop farm to illustrate a formal model representing the strategic management process at the farm business level.

Figure 4.2 The Strategic Management Process

Adapted from Jauch and Glueck (1988)

Stage two of the process is concerned with identifying and evaluating alternative strategies, and choosing an appropriate competitive strategy. This stage of the strategic management process presents a major weakness in farm level strategic planning and management models. As Rasmussen *et al.* (1990) argue, the area of farm level competitive strategy choice has received only limited research attention. Muelenberg (1986) suggests that agricultural marketing theory has focused little attention on the area of competitive strategy although the discipline would profit from work in this area.

Researchers using strategic planning models often try and formally model the strategic management process. Mathematical programming techniques such as those described in chapter 3 and computer models or other planning tools which prescribe strategic choices for farmers do not appear to adequately model the strategic alternatives available to farm businesses. Often they identify a combination of variables which maximise objectives for one strategic function (for example sales activities) and do not acknowledge the internal competencies of owners and managers.

In the business literature strategic alternatives have been classified both empirically (strategic taxonomies) and conceptually (strategic typologies). Theoretically derived classifications of strategy take a relatively prescriptive approach and often suggest the strategy most appropriate for a business to follow in a given situation. Classifications of strategic taxonomies have been developed from the results of empirical studies which measure the actual strategic outcomes of the strategic choices business managers make. A study which classifies the strategic alternatives which farmers have successfully used under a variety of scenarios would answer the calls for this type of research made by Martin *et al.* (1990). Ultimately such research could be used to help build a prescriptive strategic planning model.

At the farm business level the strategic management process is not easily observable and may be instinctive rather than a formally planned process. However farmers do make strategic decisions although they may be informal and relatively difficult to quantify (Brunaker 1990b). If the peculiarities of farm business are recognised and accounted for, there appears to be no reason why tools and techniques developed within the strategic management literature to study strategic choices and outcomes can not be used to measure farm business strategy. Part of this thesis will identify the range of strategic choices which farmers make and measure the resulting strategic outcomes. This will provide an indication of the diversity which exists in the development of distinctive competitive strategies within the farm business sector.

4.6 The Need for Strategic Management Research Within the Agricultural Sector

Although strategic management concepts have been under utilised in agribusiness management research, research on strategic management is seen as being of high profile by agribusiness professionals (Rogers and Caswell, 1988; Dobson and Akridge, 1989; Westgren *et al.* 1988). Specifically there is a need to study the behaviour of agribusiness managers using techniques such as those found in strategic management theory (Westgren, 1987; Litzenberg and Schneider, 1989; Harling and Funk, 1987; Cotterill, 1987).

One area which has been singled out for attention are studies which examine the alternative strategies which firms within the agribusiness sector follow. In particular, the theory of strategic groups which is concerned with classifying businesses which follow similar strategies has been identified as one of the areas which holds promise for agribusiness management research (Marion, 1986; Westgren, *et al.* 1989). Marion suggests opportunities exist for identifying whether strategic groups exist within the agribusiness sector and studying the performance implications, competitive consequences and characteristics of these groups. At the farm business level, strategic group

research may help contribute to efforts aimed at understanding the decisions made by farm business managers.

Farm businesses are facing an increasingly uncertain, unstable environment and the more specialised and capital intensive nature of farming has led to farm firms becoming more like other businesses (Harling and Quail, 1990). These authors express concern at the failure of farm management specialists to draw on concepts and tools developed in business literature, particularly those concerned with business strategy. Attonaty and Soler (1991) believe that because of changing conditions it is necessary to adapt or revise theoretical and methodological frameworks which analyze farm level strategic decisions. However at the farm level little is known about how strategic decisions are made (Howard and MacMillan, 1991), or the strategic outcomes which result. Within the following section empirical and anecdotal studies of farm business strategy are examined.

4.7 Studies of Business Strategy at the Farm Level

Because prescriptive studies of farm business strategy have been briefly outlined in previous paragraphs, this section will focus on all known empirical and anecdotal research which examines farm level strategic management processes (not strategic planning). For farm businesses the strategic management process may be informal, intuitive, and unstructured. It is assumed that farm business strategy relates to the way a farm firm attempts to develop a fit between its internal capabilities and constraints, and exogenous environmental variables, in an effort to achieve business objectives, rather than formal planning.

Brunaker's (1990a) case studies of Swedish farmers indicate that at the farm level strategic management has a very tentative structure. Brunaker suggests farm businesses are small firms with a strong dependency on the personal motivations of the farmer and it is not possible to tell where

the strategic management process starts because the sequence of different factors in a formal strategic management model vary from farmer to farmer. Because of this, formal hierarchical models of the strategic management process such as that depicted in figure 4.2 are not appropriate. However as was argued earlier, within this thesis it is not suggested that farm business strategy is a formal hierarchical procedure with processes that occur in a chronological order.

In an exploratory study Harling and Quail (1990) question farm management specialists for studying topics associated with the functional areas of a business rather than taking an inter-functional approach which is associated with strategic thinking. Farmers were asked questions relating to strategy, the environment, their resources, managerial preferences, and the organisation of their business. Conclusions from this study suggest that farm managers think about their business in a similar way to non-farm business managers and utilise business management tools and concepts. Farm business decision making is a complex process and farmers are aware of the interrelationships between various elements of business management.

In a follow up study Harling (1992) claims to conduct the first study which considers farm management from a strategic management perspective. He tests if successful farmers are likely to think in the way that is suggested in strategic management theory and argues that such an approach leads to a business developing a strategic fit between the environment, business resources, managerial preferences, and an organisations administration systems. To assess strategic fit farmers were asked to answer 10 statements relating to strategy. Results of a discriminant analysis suggested that successful farmers are more likely to think strategically about farm business decisions than less successful farmers, although neither group employed a formal approach to strategic management.

None of the studies discussed previously have assessed if farmers take different strategic approaches or arrive at different strategic outcomes. However a number of prescriptive studies suggest that as part of the strategic management process farmers should assess strategic alternatives (eg. Brunaker, 1990a, 1990b; Martin et al. 1990) .

What appears to be a parallel to the competitive strategy alternatives found in the business literature is found within the rural sociology literature where research has indicated that farmers have distinctive management styles which relate to farmer goals. Fairweather and Keating (1990) review a number of such studies, then use Q type factor analysis to statistically identify three Canterbury farmer management styles. *Dedicated producers* strive to be the best farmer, develop the farm and achieve a high quality product. *Flexible strategists* attempt to market their produce well and use information effectively. Quality of life and off farm activities are important to these people. *Lifestylers* are environmentally aware. They prefer to work with the family and are concerned with enjoying the farming lifestyle rather than being the best farmer they possibly can.

The results from similar studies have been presented within the agricultural economics literature. Kühn and Kühn (1990) cluster German farmers into groups which change their product line, farm area and workforce in similar ways over a ten year period. Brunaker (1990b) suggests that farmers may follow either a cost efficiency or diversification strategy. Other research findings indicate that farmers take different approaches in functional areas of business strategy, for example in the approaches they take to buying agricultural inputs (Funk and Huddon, 1988).

However, no studies of farm business strategies attempt to operationalise the complex nature of the business strategy process. The linkages between internal business capabilities, constraints, and environmental factors, have not been explored, and the marketing implications of following a

particular strategy have not been examined in detail.

4.8 Summary

The discussion within this chapter has presented a brief overview of business strategy and the related concepts of strategic planning and the strategic management process. It has been argued that farmers operate small businesses that have different characteristics from the large divisionalised companies on which strategic management theory is based. The predominating influence of the owner/manager and unique managerial and structural features of farm enterprises means they differ from large corporations. These differences may influence farmers' patterns of strategic behaviour and lead to farm businesses taking distinctive approaches to strategy which are suited to specific farmer needs and capabilities. Little is known about the strategic management processes of farm businesses, in particular the strategic decisions made by farmers, the strategic alternatives available for farmers, and the resulting strategic outcomes. However, for farmers the strategic management processes may be informal, unstructured and performed intuitively or instinctively rather than as part of a formal hierarchical process.

The empirical component of this thesis will not examine the farm level strategic management process per se. Instead it will attempt to operationalise the complexity of the farm business marketing and business strategy process by measuring the strategic and marketing behaviour of farmers. If the peculiar nature of farm businesses, their produce and the environment in which they operate are accounted for, the concepts which have been developed in the business literature to measure strategic behaviour can be applied at the farm level. These concepts are examined in more detail in the following chapter.

CHAPTER 5

STRATEGIC TYPOLOGIES AND TAXONOMIES

5.1 Introduction

In previous chapters it has been argued that empirical studies of the marketing behaviour of farm businesses' focus on sales tactics such as timing, method, and place of sale. It is argued that by better understanding alternative farm level competitive strategies, it will be possible to increase the understanding of the marketing behaviour of individual farmers'.

In the business literature, classification schemes known as strategic typologies and taxonomies have been used to identify a number of different strategies that businesses may follow to gain competitive advantage and have identified patterns of business strategy, each of which may have specific marketing implications. Within this chapter studies of strategic typologies and taxonomies will be reviewed as an aid in determining the approach to use in the subsequent stages of this thesis.

5.2 A Brief Overview of Strategic Typologies and Taxonomies

Industrial organisation economists have attempted to explain industry level performance using the structure-conduct-performance framework developed by Bain (1968) and Manson (1957). Firm performance is attributed to both industry structure and the strategies that firms pursue. Recently, concepts from industrial organisational economics have been integrated into strategic management theory to investigate the relationships between strategy, the environment and performance. Strategic typologies and taxonomies have been developed in studies of business level strategy.

Strategic typologies and taxonomies classify patterns of strategic behaviour. Each pattern of behaviour represents a unique strategic approach which firms take in their attempt to achieve

business objectives or gain competitive advantage. For example one firm may operate successfully by having a low cost structure and selling large volumes of produce for a low price, while another firm could have a higher cost structure but obtain equivalent profits, by selling lower volumes of higher quality produce at a higher price. The strategy most suitable for a business is likely to depend on the external conditions the business faces as well as internal business capabilities, constraints, management styles, and objectives (Carroll *et al.* 1992).

Before reviewing studies of strategic typologies and taxonomies in more depth it is useful to detail the differences between the two classification schemes. Although there are some exceptions it is generally accepted that typologies are developed conceptually, using theoretical and deductive reasoning. They may be underpinned by empirical or anecdotal observation, but are usually not quantitatively based (Hambrick, 1984; Harrigan, 1985; Fahey and Christensen, 1986; Miller and Friesen, 1984). Taxonomies are statistically derived classifications of strategic behaviour, although they may be formed using theoretically derived variables. Typologies are normally developed to answer normative questions regarding the different ways a business can gain success while taxonomies are often more positive in perspective.

5.3 Strategic Typologies

Within the literature strategic typologies have been referred to as gestalts, strategic types and generic strategies. Strategic typologies are usually conceptually (theoretically) derived generalisations which are equally applicable over a number of industries and types of businesses. Each typology suggests that there are a limited number of identifiable strategies which a business may successfully follow.

Surveys of literature have identified an increasing number of strategic typologies and the competitive

conditions under which each strategy should be pursued (see Galbraith and Schendel, 1983; Herbert and Deresky, 1987). A number of commonly cited business level typologies are summarised in table 5.1. Galbraith and Schendel suggest that the number of strategies identified within each typology and the characteristics of each strategy type varies from one typology to another, and is associated with what different authors perceive business objectives to be. Because the most widely referenced strategic typologies are Porter's three generic strategies and Miles' and Snow's four organisational typologies; these are discussed in more detail below.

5.3.1 Porter's Generic Strategies

Porter (1980) investigates case studies in a variety of industries to derive three generic strategies which he feels a firm may follow to gain sustainable competitive advantage. They are a cost leadership, differentiation, and focus strategy.

1. *Cost Leadership* strategies require a firm to produce a low cost standardised product (or service) in order to attract price sensitive buyers. Porter suggests that to obtain a successful low cost position, a firm must be a market share leader, thus a firm following a low cost strategy would usually commit resources to plant, equipment and technological improvements. Skills and resources capable of controlling expenses are necessary for firms following this strategy.

2. *Differentiation* strategies may be used to produce a product that appeals to buyers who are more interested in elements other than price. Factors that can be used to differentiate products and services include product design and features, brand image, distribution networks, and customer service. Businesses that employ this strategy require strong marketing and product development skills. Following a differentiation framework means that although low costs may still be important, they are not the primary target of the business.

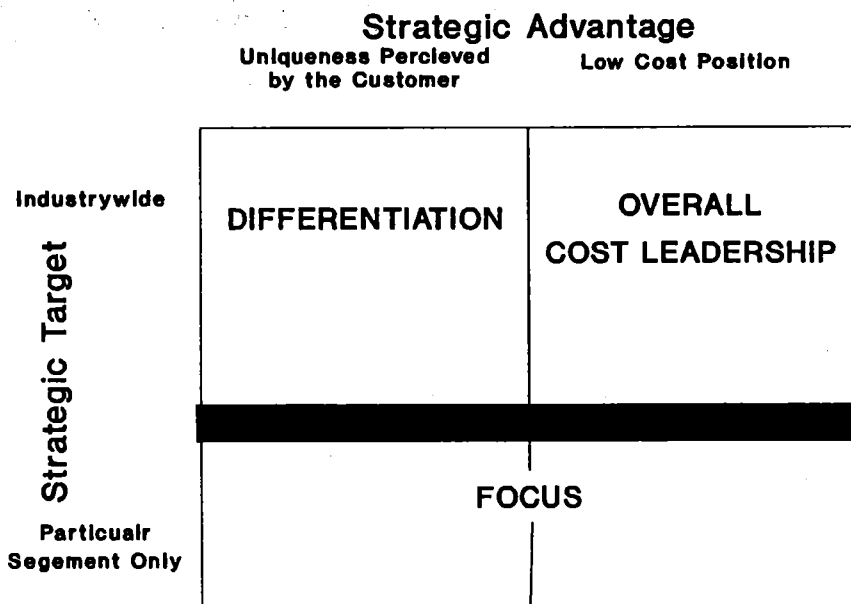
Table 5.1 A Selection of Typologies of Business Level Strategies

Author and Strategy Label	Characteristics of Strategy Type
Buzzel et al. (1975)	
(1) Building	High investment to increase market share position
(2) Holding	Investment at market norms to maintain market share
(3) Harvesting	Low investment allowing market share to decrease; cost controls to generate cashflow and profitability
Utterback and Abernathy (1975)	
(1) Performance maximising	Emphasis in product and/or service performance; technology and product R&D emphasised
(2) Sales maximising	Marketing emphasis to increase total sales and market share of firm
(3) Cost minimising	Emphasis placed on process technology/R&D to decrease total cost of production
Hofer and Schendel (1978)	
(1) Share increasing	High investment to increase share of market
(2) Growth	Maintain position in expanding market, investment at industry norms
(3) Profit	Investment at industry norms, cost controls to "throw of cash."
(4) Market concentration and Asset reduction	Realignment of resources to focused, smaller segments
(5) Turnaround	Improve strategic position, may require investment
(6) Liquidation	Generate cash while withdrawing from market
Vesper (1979)	
(1) Multiplication	Expansion of market share by multiplying present market structures
(2) Monopolising	Eliminate competition, establish barriers to entry and control resources
(3) Specialisation	Specialise in products and/or production process
(4) Liquidation	Give up business and product position
Wissema et al. (1980)	
(1) Explosion	Improve competitive position in short term
(2) Expansion	Improve competitive position in long term
(3) Continuous growth	Maintain position in expanding markets, normal investment
(4) Slip	Give up market share to generate cash in growing market
(5) Consolidation	Give up market share to generate cash in stable market
(6) Contraction	Liquidate assets and terminate market position
Miles (1982)	
(1) Domain defence	Preservation of traditional product-market
(2) Domain offence	Attacking strategies based on: <ul style="list-style-type: none"> <li>(a) Product innovation <li>(b) Market segmentation

Source: Adapted from Galbraith and Schendel (1983)

- 3. Firms following a *focus* strategy gain advantage by using either a low cost or differentiation strategy, while focusing on a narrow target market segment. A focus strategy involves fulfilling the needs of a particular market segment and is different from both of Porter's other generic strategies, where the product market scope is industry wide (see fig 5.1).

Figure 5.1 Porter's Generic Strategies



Source: Porter (1980)

Porter suggests that any one of the three generic strategies may be successful, depending on the resources available to the business, the businesses' distinctive competencies, and other non controllable environmental factors. He states that if a business does not follow one of these three generic strategies an organisation may become "*stuck in the middle*"¹ with a very poor strategic position (no competitive advantage and below average performance). A firm that is stuck in the middle will not have the large volume of customers that a low cost producer requires, or sufficient differentiation to demand the higher price a differentiated firm requires to cover costs. As differentiation is costly, achieving cost leadership is inconsistent with differentiation.

5.3.2 Miles' and Snow's Typologies

Miles' and Snow (1978) categorise firms into four broad types based on organisations' adaptive behaviour and general strategic orientations. Their typology of strategies was developed to increase the understanding of the processes by which organisations continually adjust to their environments, and provide an explanation for the alternative forms of adaptive behaviour that exist in industries (Miles and Snow). Each strategic type responds to environmental changes in a particular way and has its own combination of structural and cultural processes. The four typologies are named defenders, prospectors, analyzers, and reactors. The first three typologies are expected to enjoy success while the last is perceived to be a failure.

1. *Defenders* normally have a limited and stable set of products (or services) and focus on improving the operating and cost efficiency of their existing operations, and serving a well defined target market. Little attention is paid to outside developments and trends, meaning defenders are unlikely to be innovative in new areas.

¹ Segev (1989) considers "stuck in the middle" a fourth generic strategy

2. *Prospectors*, have a very flexible innovative approach and emphasise creativity over efficiency. Advantage is gained by finding and exploiting new product and market opportunities and frequently changing products and markets. Broad product lines and a focus on product innovation and market opportunities are characteristics of prospectors.

3. *Analyzers* have both a stable and changing product market. They maintain a stable base of products while selectively moving into new areas. Analyzers attempt to balance cost containment and efficiency with risk taking and innovation, combining the strengths of defenders and prospectors into a single system.

4. *Reactors* do not have a consistent strategy, therefore *a priori* assumptions cannot be made about their strategic behaviour.

Inductive logic based on field studies in four industries was used to develop the typologies. While Miles and Snow emphasise a different level of strategy than Porter, their typologies may be utilised to explain business level strategies (Segev, 1989).

5.3.3 Research Investigating Porter's and Miles' and Snow's Typologies

Literature abounds with theoretical and empirical investigations of Porter's generic strategies and Miles' and Snow's strategic typologies. Most research focuses on only one of the two typologies, however attempts to combine the two frameworks to form new hybrid typologies have been made and tests made on the implications of the new typologies (Walker and Ruckert, 1987b; Segev, 1989). Unlike Miles' and Snow's typologies or Porter's generic strategies, the new hybrid typologies have not become widely accepted in the literature.

Porter's generic strategies have been the subject of a great deal of empirical research (for example, Phillips *et al.* 1983; White, 1986). They have "*received more empirical support than other constructs have*" (Kim and Lim, 1988), however results from studies which have attempted to identify if actual businesses follow each of the three strategies are not comparable and sometimes do not arrive at similar conclusions (Murray, 1988). Therefore, some authors have been critical of Porter's generic strategies and suggested they do not adequately describe strategic behaviour within all industry sectors (for example Speed, 1989; Wright and Parsinia, 1988; Sharp, 1991, 1992).

The relative performance of each strategy has been measured with some findings suggesting that there are not consistent performance differences between strategies (for example Dess and Davis, 1984; Hambrick, 1983b; Miller and Friesen, 1986). The idea that Porter's generic strategies are mutually exclusive has been subject to both theoretical and empirical investigation, and it has sometimes been suggested that firms can successfully pursue both differentiation and cost leadership strategies simultaneously (for example Hill, 1988; Jones and Butler, 1988; Murray, 1988; Hambrick, 1983b; Dess and Davis, 1984; White, 1986).

Miles' and Snow's typology has also generated a great deal of investigation and support. By dividing competing businesses into these four categories many studies have monitored the performance of strategic types (for example Hambrick, 1983a; Smith *et al.* 1986; Segev, 1987). Most research has concluded that businesses following the first three strategies enjoy success, while pursuing the reactor strategy leads to failure. It has been shown that firms following different types of strategies utilise different marketing activities (McDaniel and Kolari, 1987; Walker and Ruekert, 1987a; Snow and Hrebiniak, 1980; Hambrick, 1983a). More detailed reviews of research investigating Miles' and Snow's strategic typology include those by Zahra and Pearce (1990) and Conant *et al.* (1990).

5.3.4 Approaches to Categorising Businesses into Existing Typologies

A great deal of research attempts to ascertain if theoretically developed typologies adequately describe actual business strategies. Other studies have categorised businesses into strategic types in order to examine the linkages between strategy and performance, or investigate the role of environmental variables as moderators of the relationship between strategy and performance. Snow and Hambrick (1980) describe four approaches which have been used to measure business strategies and indicate the strengths and weaknesses of each approach. The four approaches are:

1. **Self typing:** Managers are given descriptions of alternative business strategies and asked to indicate the strategic type which they perceive best categorises their business.
2. **External assessment:** Competitors, consultants, industry analysts, or industry experts are used to categorise firms according to the type of strategy they pursue.
3. **Investigator inference:** The researcher uses all information available to him/her to categorise businesses into strategic types.
4. **Objective indicators:** This approach does not use perceptual measurements of strategy but uses objective data describing strategic variables such as the number of product lines, or relative investment on research and development, to categorise businesses into strategic types.

These four methods and combinations of these approaches are frequently utilised to categorise firms into strategic types which have been identified in strategic typologies developed previously. Conant *et al.* (1990) review the approaches used to categorise businesses into each of Miles' and Snow's strategic types. Some studies classify businesses into groups which follow the same type of strategy

subjectively without statistical analysis, while others statistically classify businesses according to the type of strategies they follow by developing taxonomies which empirically operationalise existing typologies. Examples of studies using a taxonomic approach include Smith *et al.* (1986) who used cluster analysis to categorise businesses into four groups which correspond to Miles' and Snow's strategic typologies, and Dess and Davis (1984) who clustered businesses into each of Porter's three generic strategies, as well as a "stuck in the middle" strategy.

These studies take a similar approach to literature which identifies strategic groups of businesses that follow similar strategies (see section 5.6). However, many strategic group studies do not test existing typologies. Often groups are formed when little *a priori* evidence exists about the number of business strategies which exist, or their nature.

A potentially useful approach to evaluating the strategic positions adopted by farmers may be to develop a taxonomy by investigating strategic groups of farm firms which follow similar strategies. The following section reviews the concept of strategic taxonomies.

5.4 Strategic Taxonomies

The most widely utilised approach to forming strategic taxonomies has been taken by researchers who study strategic groups. Since the term strategic groups was first coined by Hunt in 1972, marketers, management scientists, and applied economists, have readily adopted the concept. The concept of strategic groups was originally developed by industrial organisational economists to help explain intra-industry differences in profitability (Cool, 1985), but more recently strategic management and organisational behaviour literature has subdivided industries into groups which follow similar strategies in an attempt to better understand patterns of strategic behaviour and competition (for example Douglas and Rhee, 1988; Kim and Lim, 1989). The alternative

approaches which firms utilise to gain competitive advantage have been empirically classified, often with little *a priori* evidence existing about the number of groups, what strategies their members follow, or how many members they have.

Although there is no well established criteria for describing groups, it is generally accepted that:

- a) each group is composed of firms (or businesses) that follow similar strategies;
- b) firms within a group resemble one another more closely than firms outside a group; and
- c) firms within a group are likely to respond similarly to a market opportunity (or threat) (Thomas and Venkatraman 1988).

Strategic group members often have similar characteristics, because businesses which deploy resources in a like manner and have similar capabilities are frequently suited to following equivalent strategies. Comprehensive reviews of strategic group literature are given by McGee and Thomas (1986), Cool (1985), Fiegenbaum (1987), and Thomas and Venkatraman (1988).

Before reviewing the theoretical and methodological issues found within the strategic group literature in more detail in section 5.6, discussion in the following paragraphs will briefly assess if existing typologies or taxonomies adequately describe farm businesses' strategic behaviour.

5.5 A Typology or Taxonomy of Farm Business Strategies?

It is clear that taxonomies and typologies are related, but take a fundamentally different approach to studying business strategy. Within this thesis a number of approaches could be used to investigate farm business strategies. It may be possible to:

1. test if existing typologies adequately describe the strategic behaviour of farm firms
2. test if existing taxonomies (developed elsewhere) adequately describe the strategic behaviour

of farm firms

3. develop a conceptual typology of farm business strategies
4. use a blend of a number of the above approaches to develop an empirical taxonomy of farm business strategies

Porter's, Miles' and Snow's, and other strategic typologies, would not appear to adequately describe the strategies farmers could follow in their endeavour to gain competitive advantage. Porter's typology appears to be limited to explaining the strategic behaviour of larger firms and needs refining when viewing industries with a large number of small firms such as the farming industry (Smith *et al.* 1989; Wright and Parsinia, 1988). Furthermore it is accepted that the nature of commodity goods is likely to make it difficult for firms in commodity based industries including commodity producers to be differentiated (Wright, 1987).

The peculiar nature of farm firms also means that it is unlikely that either Miles' and Snow's four types of strategies or those found in typologies developed by other authors adequately describe alternative farm business strategies. Existing typologies as well as statistically derived taxonomies are generally based upon research from businesses other than the farming industry. Therefore they are unlikely to adequately describe the strategic behaviour of farmers, although the underlying ideas could be used to develop and test a typology or taxonomy of farm business strategies.

While there has been the view that at the level of the primary producer, market structure has limited the only viable strategy to a low cost strategy (see Rogers and Caswell, 1988; Rasmussen *et al.* 1990), theoretical reasoning suggests farmers may successfully pursue one of a number of strategies. A simple hypothetical example portrays four possible strategies which may exist in the farm sector. These examples all have unique means of maximising profits and are to some extent mutually

exclusive and thus can be thought of as strategic typologies.

1. *Cost minimisation*

Farmers may utilise a *cost minimisation* strategy and produce maximum output at the lowest possible cost. Advantage is gained by selling high volumes of produce while having low input costs. A sacrifice in terms of quality premiums may result because a low cost structure may lead to relatively low crop prices through variable quality or lower crop yields.

2. *Quality driven*

Another group of farmers may follow a *quality driven* strategy and focus on achieving high quality price premiums rather than minimising production costs. They produce what the market wants with respect to quality and thus attract high returns per unit of output, although their cost structure is relatively high.

3. *Product changer or switcher*

A farmer could follow a *product changer or switcher* strategy and actively seek opportunities for new products with higher returns and thus switch products or try new varieties in order to capture these high returns. These farmers would be disadvantaged by relatively low experience curve benefits, but would benefit from receiving high market prices for the crops they grow.

4. *Boutique*

A *boutique* strategy would involve vertical integration and high commitment to marketing. Examples of firms following this strategy include stud breeders and organic farmers who sell produce to supermarkets or directly to consumers. Advantage would be gained through vertical integration and satisfying consumer demands, thereby increasing prices received per unit of produce.

Each hypothetical strategy is the result of decisions made with respect to important strategic variables. The strategic focus most suitable for an actual farm business is likely to depend on the external conditions the farm faces as well as internal business capabilities and constraints. Each strategic focus requires a farm business to interact with the market in specific ways. For example variations are likely to exist in the distribution channels utilised, the types and sources of market information required, or a business's ability to adapt to changing environmental conditions. Farmers utilising a product changer, quality driven or boutique strategy would have higher cost structures than low cost producers, but may be equally or more successful, if they obtain higher prices per unit of product sold.

Typologies have been criticised for their lack of statistical rigour (Harrigan, 1985). Despite these criticisms, within this thesis taxonomies are not deemed to be superior to typologies. However, because there is uncertainty regarding the strategic management processes of farmers developing a typology which describes the strategic positions available to farmers and testing if it adequately reflects reality would require considerable knowledge about the success factors for individual producers and the alternative strategic approaches which exist. A more direct procedure is to develop a taxonomy that does not prejudge the number or types of strategies followed by farm businesses, by investigating if strategic groups of farmers which follow similar strategies exist. The following sections review strategic group studies in order to gain a greater understanding of the issues these studies address, and as a first stage in developing a methodology for this study.

5.6 Strategic Groups

A review of empirical strategic group studies is presented in table 5.2. A close examination of table 5.2 shows that considerable diversity exists in the conceptual issues and problems addressed, and the methodological frameworks utilised by strategic group researchers. The following sections

briefly discuss some of the information presented in table 5.2 by reviewing the uses or purposes of strategic group studies, the variables used to describe strategy, the techniques used to identify patterns of strategic behaviour and to group businesses which follow similar strategies, and the industries in which strategic group studies have taken place.

5.6.1 Purposes of Strategic Group Studies

Although originally envisaged as a theoretical construct for explaining intra-industry variations in profitability the concept of strategic groups has been used in a wide variety of applications (Thomas and Venkatraman, 1988). Strategic group studies have enriched the structure-conduct-performance paradigm, and strengthened strategic management theory by providing a framework which assists researchers in understanding business strategy (Caves, 1984; McGee and Thomas, 1986). Strategic group studies can preserve information that would be aggregated in industry studies causing a loss of detail, provide more information than could be gained by investigating individual businesses, and aid in analysing the environment in which a business exists.

Recently strategic group researchers have focused attention on determining the strategic positions which firms utilise in their attempt to gain competitive advantage and have identified key success factors within an industry (for example Carroll *et al.* 1992, Kim and Lim, 1988; Douglas and Rhee, 1989). These appear to vary from industry to industry. Such research may aid the development of prescriptive models which help business managers define competitive boundaries, assist firms in establishing their strengths and weaknesses, and provide insights into the competitive environment within an industry. For example, strategic judgements could be made about the attractiveness of each strategic group and the assets and skills needed to compete successfully over time in each group. Knowledge of the differences that exist between strategic groups may aid managers who are making decisions to move from one strategic group to another.

Table 5.2 Empirical Studies of Strategic Groups

Study	Industry	Source of Data	Basis for strategy formation	Approach to Group Identification	Purpose/finding (contribution study made)
Hunt (1972)	Home appliances industry	Secondary (published accounts)	-degree of product diversification -product line -extent of vertical integration	<i>A priori</i> Rule of thumb (ad hoc)	There were strong conduct differences between the four strategic groups identified.
Hatten and Schendel (1977)	Brewing industry	Secondary data (Computstat)	7 Strategy variables reflecting manufacturing, marketing and finance and one environmental variable	<i>A posteriori</i> Cluster analysis	Examine the conduct of firms and explores the structure-conduct performance relationship in the brewing industry.
Newman (1978)	34 4-digit producer goods industries	Secondary data	Degree of vertical integration	<i>A priori</i> Rule of thumb (ad hoc)	Six strategic groups were identified. Performance differences existed across groups.
Porter (1979)	38 3 digit consumer goods industries	Secondary data	-size	<i>A priori</i> Rule of thumb (ad hoc)	Find differences in strategies over time despite profit rate differences between strategic groups and low intergroup mobility suggesting mobility barriers may be present.
Oyster (1982)	19 consumer goods industries	Secondary data (Computstat)	Product strategy: Advertising to sales ratio	<i>A posteriori</i> Rule of thumb (ad hoc visual inspection)	Examine the importance of intra-industry strategic differences in a number of industries. Explores the levels and consequences of mobility barriers based on advertising strategy.
Dess and Davis (1984)	Paint and allied products industry	Primary data (managers perceptions of the importance of various competitive methods)	21 competitive strategy variables (reduced through factor analysis to 3 strategic dimensions)	<i>A priori</i> Cluster analysis (K means)	Groups conformed weakly to Porter's strategies. No consistent patterns of performance. Additional perceptual data were used to corroborate group classifications.
Hawes and Crittenden (1984)	Retailing-supermarket	Primary data (perceptual information from mail questionnaire)	Marketing strategy variables relating to target market, product, promotion, price, buying and display	<i>A posteriori</i> Cluster (complete linkage method)	Four strategic groups emerged similar to those proposed by Miles' and Snow's strategic typology. Performance difference across groups.
Cool (1985)	Pharmaceutical industry	Secondary data (various data bases)	7 scope and 8 resource deployments variables	<i>A posteriori</i> Cluster analysis (Wards)	Determine the performance consequences and stability of strategic group membership. Performance differences exist across groups for market share measure; no risk adjusted differences; groups were relatively stable over time.
Harrigan (1985)	Retailers	Secondary data (Computstat)	-Inventory turnover ratio -Age of inventory -Average inventory -Employee productivity ratio -Advertising to sales ratio	<i>A posteriori</i> Cluster analysis (Wards algorithm)	Identify 7 strategic groups in an illustrative example of cluster for strategic group analysis.

Study	Industry	Source of Data	Basis for strategy formation	Approach to Group Identification	Purpose/finding (contribution study made)
Fiengenbaum (1987)	Pharmaceutical	Secondary data (Computstat)	5 scope and 12 resource deployment variables	<i>A posteriori</i> Cluster analysis (method not reported) check	Develop a method for determining stable strategic time periods. Members of strategic groups and the total number of strategic groups varied over time.
Harling and Funk (1987)	Grain elevator business	Secondary data	Variables relating to: -focus -differentiation -cost leadership -size	<i>A posteriori</i> Cluster (method not specified)	One of only two studies made in the agribusiness sector. Unique as the only published study which finds one strategic group, suggesting that all firms follow similar strategies.
Kim and Lim (1988)	Electronics	Primary data (personal interview-questionnaire utilising managers perceptions of the businesses competitiveness)	15 strategy variables reduced through factor analysis to 5 dimensions	Cluster analysis (Wards Algorithm)	Identify 4 strategic groups similar to those identified by Porter (1980) and Miller and Friesen (1986) and examine the linkages between strategy, the environment, and performance.
Namiki (1988)	Small exporters	Primary data (mail questionnaire asking managers their perceptions on the importance of various competitive methods)	11 variables relating to Porter's (1980) generic strategies reduced by factor analysis to form 4 strategic dimensions	<i>A posteriori</i> Cluster analysis (k means)	Explore competitive strategies employed by small businesses exporting to foreign markets. Some strategies outperform others.
Douglas and Rhee (1989)	A sample of industrial businesses	Secondary data (PIMS)	17 strategy variables which capture the complexity of competitive marketing strategy reduced to 7 factors through factor analysis	<i>A posteriori</i> Cluster analysis (k means)	Find similar strategic dimensions and types of strategies in European and US businesses and the influence of environmental factors and performance. There are differences in performance and business characteristics between strategic groups in different continents.
Mascarenhas and Aaker 1989a	Oil drilling	Secondary data (annual reports and World Rig locator)	3 mobility barriers based on the proportion of firm involvement in: -deep drilling -offshore drilling -international drilling	<i>A posteriori</i> Cluster analysis (nearest centroid non-hierarchical algorithm)	Determine if strategic group members adjust their strategies over the business cycle. Find that businesses adjust their strategies asymmetrically due to changes in business cycles. An optimal performance model developed from regression analysis showed that some strategies are better than others at various stages in a business life cycle and there are discrepancies between actual and optimal performance.
Mascarenhas and Aaker 1989b	Oil drilling	Secondary data (annual reports and World Rig locator)	3 mobility barriers based on the proportion of firm involvement in: -deep drilling -offshore drilling -international drilling	<i>A posteriori</i> Cluster analysis (nearest centroid non-hierarchical algorithm)	Identified 3 strategic groups based on mobility barriers and determine the performance implications of strategic group membership.

Study	Industry	Sources of data	Basis for strategy formation	Approach to group Identification	Purpose/finding (contribution study made)
Pegels and Sekar (1989)	Hospital	Primary data from personal interview-questionnaire asking physicians perceptions of hospitals	16 factors that influence physicians perceptions of hospitals	<i>A posteriori</i> Multidimensional Scaling (Rule of Thumb Ad-hoc visual inspection)	Determine factors which were strategic important when attracting physicians to send patients to hospitals. 3 groups of hospitals are identified and the results used to develop strategies to attract physicians and increase patient referrals.
Kuhl and Kuhl (1990)	Farm businesses	Secondary data	Rates of change of work force, cultivated land, and number of; milk cows, other cattle, hogs and sows during 4 time periods	<i>A posteriori</i> Non hierarchical clustering algorithm	The only strategic group study conducted at the farm level. Cluster farmers into groups who change their product line, farm area and workforce in similar ways over a ten year period.
Lewis and Thomas (1990)	UK retail grocery sector	Secondary data	3 scope and 4 resource deployment commitment variables	<i>A posteriori</i> Cluster analysis (Wards)	Form strategic groups based on size, key strategic variables, strategic factors and examine the relationship between strategy, performance and the environment.
Corsi et al. (1991)	Motor carrier	Secondary data Annual reports	-cost -price -efficiency -product focus -geographic focus	<i>A posteriori</i> K means (non-hierarchical clustering)	Measure the effect that a change in a major environmental factor (deregulation of the industry) has on strategy. Not all firms shifting rapidly in response to environmental change performed better than firms not shifting but some types of strategic shifts led to performance increases. (formed strategic groups at two diff time periods and examined the changes).
Carroll <i>et al.</i> (1992)	Supermarket retailing UK retail grocery sector	Secondary data	3 scope and 4 resource deployment commitment variables reduced to 5 strategic dimensions through factor analysis	<i>A posteriori</i> Cluster analysis: (Wards)	A continuation of the previous study which develops more theoretical underpinnings of the potential advantages and disadvantages of strategic group analysis. Suggests that strategic group analysis can be used to identify the distinctive strategies which groups of firms use to achieve competitive advantage and there may be a limited number of "reference points" or optimal strategies firms in an industry can position themselves against.

Source: Adapted from Thomas and Venkatraman (1988)

Because marketing is a principal component of business strategy it seems reasonable to infer that strategic group membership has marketing implications. Although most studies only make general reference to the relationship between strategic group membership and specific marketing elements or marketing oriented behaviour, marketing variables have been used as some of the strategic variables on which group formation is based in a number of studies (for example Lewis and Thomas, 1990; Hawes and Crittenden, 1984; Hatten and Hatten, 1985).

Additional uses of the strategic group concept and implications for further research are identified by Carroll *et al.* (1992), McGee and Thomas (1986), and Aaker (1984). Thomas and Venkatraman's (1988) review of strategic group literature indicates that a majority of studies measure the performance implications of strategic group membership. Within the following section the theoretical linkages between performance and strategic group membership and the concept of mobility barriers are discussed.

5.6.2 Strategic Groups, Performance and Mobility Barriers

The findings of studies using data collected from the PIMS (profit impact of a market share) data base indicate that a business's performance is dependent on three factors (Buzzel and Gale 1987):

1. *the characteristics of the market in which a business competes*
2. *a business's competitive position in that market*
3. *the strategy a business pursues.*

A similar explanation with equivalent ideas is given by Porter (1980) who explains the three major determinants of a firms' profitability from a perspective that is closely aligned with strategic group theory. Porter suggests that business performance depends upon:

1. *Industry structure characteristics* which influence the profitability of an industry. Five structural features commonly identified are the number of; existing firms in the industry, potential entrants to the industry, suppliers to the industry, buyers of the industry product, and product substitutes for the industry product.

2. *Strategic group characteristics* which influence the profitability of the strategic group. These characteristics include the height of mobility barriers (discussed in more detail below), the bargaining power of the strategic group relative to both suppliers and customers, the vulnerability of the strategic group to substitute products and the exposure of the strategic group to rivalry from other groups. The number of competitors within a strategic group is also likely to influence the performance of that group.

3. *The firm's position within the strategic group* of which it is a member. Variations in asset endowments, resources, market power, and abilities to implement strategies effectively lead to differences in within group business profitability.

In the strategic group literature the concept of mobility barriers has been developed in an attempt to explain intra-group performance differences. Originally, the concept of strategic groups was developed in an attempt to help explain intra-industry differences in business profitability (see Hunt, 1972; Newman, 1973; Hatten and Schendel, 1977; Porter, 1979). Researchers tested if firms following a particular strategy (businesses in a particular strategic group) performed better than those following other strategies. Caves and Porter (1977) describe how between group variations in performance can be explained by mobility barriers.

It has been argued that it may be costly for a firm to move between strategic groups because

mobility barriers between groups may isolate strategic groups. For an individual business, mobility barriers can be thought of as the transition costs associated with the exit from one strategic group and entry into another (for example the costs associated with developing management skills, brand recognition or economies of scale). They can also act as entry barriers for firms moving into the industry. High levels of mobility barriers may lead to above average profits for members of certain strategic groups. If the costs associated with the movement between groups (the height of mobility barriers) are greater than the gain in profit associated with moving to another group, firms will not move from low to high performing groups. Within the farm industry, mobility barriers are likely to be mainly rigidity costs associated with management skills including the distinctive competencies of farm managers. Mobility barriers only imply differences in profitability if the cost of moving from one strategic group to another or entering the industry is greater than the benefits, and it is likely that the differences in profits would be less than or equal to the cost of the transition.

Although researchers have continued to test if strategic group membership has performance implications, explaining intra-industry profit variations is not the principal aim of most recent studies. Reviews of literature examining the membership performance relationship indicate that not all studies find performance differences between strategic groups (see Cool and Schendel, 1988; Thomas and Venkatraman, 1988; Lawless *et al.* 1989). One explanation for a lack of between group performance differences is that each strategic group may be following a similarly performing type of strategy. Another is that researchers have not controlled for the influence that differences in firm capabilities and initial resource endowments have on performance. Even in a stable business environment these factors influence a firms ability to execute a strategy effectively and may mean that within group performance differences dominate between group effects.

In a study of farm business strategies there are a number of problems in measuring the relationships

between strategy and performance. Although most strategic group studies obtain performance data from secondary sources including published financial accounts and data bases, such data is not available for farm businesses. In addition, for small firms and especially farm businesses, lifestyle and other personal objectives influence a manager's perception of performance. Therefore while the rate of return and other financial measures can be used to measure large business performance, they may not be valid indicators of farm business success. In addition, in a cross sectional study it is difficult to measure long run profitability and a good strategic position may not be related with short run profitability. Therefore within this study detailed comparisons of performance will not be made. However, it can be argued that long term business survival is an indicator of the success of a strategy.

5.6.3 Strategic Groups and the Environment

Some strategic group researchers have attempted to control for environmental variables by restricting their study to firms competing in a relatively stable, homogenous environment (for example Lawless *et al.* 1989; Dess and Davis, 1984). Others have examined the linkages between strategy, and the environment by testing if strategic group membership is associated with different environmental profiles (for example Douglas and Rhee, 1989; Kim and Lim, 1988). In this study the industry census will be limited to a provincial region of New Zealand in order to limit the influence of non-controllable environmental factors. However, even within this region the environment may still have some influence on strategy. To test the association between strategic group membership and the environment, data relating to environmental variables will be analyzed.

5.6.4 The Dynamics of Strategic Group Membership

Until recently, most studies have been concerned with identifying strategic groups within one time period (Cool, 1985; Fiegenbaum, 1987). However recent research exemplifies the dynamic nature

of strategic group formation by illustrating that the number of strategic groups and their membership change over time, and by showing how strategies change as the result of variations in environmental conditions (for example Fiegenbaum *et al.* 1987b; Amel and Rhoades, 1988; Fiegenbaum and Thomas 1990; Corsi *et al.* 1991; Mascarenhas and Aaker, 1989a).

To determine if strategic group membership is stable over time it has been proposed that analysis should take place during stable strategic time periods (periods of homogeneity in strategic behaviour). Slightly different methodological procedures for identifying stable strategic time periods have been developed by Cool and Schendel 1987, Fiegenbaum *et al.* 1990, and others. Dynamic studies have a wider range of applications than cross sectional research, however limitations in data availability confine this study to an examination of business strategies during one time period. For New Zealand farmers, strategic group membership is likely to be relatively stable because there have been few major environmental changes since deregulation in the early to mid 1980's.

5.6.5 The Basis for Strategy Formation

Strategic groups are formed by allocating industry participants into groups which adopt similar strategic positions over a number of strategic variables. Theory which aids in identifying variables on which to base strategic group formation is not clear, and a source of continuing debate (Cool and Schendel, 1987, 1988; Mascarenhas and Aaker, 1989a; Fiegenbaum and Thomas, 1990; Kumar *et al.* 1990). Information presented in table 5 shows that great diversity exists in the variables used in strategic group studies, and the approaches employed to identify strategic groups.

Over the years researchers have formed strategic groups using an increasing number of strategic variables, reflecting a more complete understanding of the strategic management process, and the development of analytical computer power. Early strategic group researchers narrowly

operationalise strategy and focus on only a limited number of strategic variables such as the degree of vertical integration or the relative size of the firm (Newman 1973, 1978; Porter 1973, 1979). Narrow approaches are useful in graphically mapping strategic positions (see Porter, 1980; McNamee and McHugh, 1989), however simplistic schemes with limited variables reduce the validity and reliability of research. Use of one or a few variables does not capture the complexity of the strategic process, and therefore limits the usefulness of the strategic group concept, both as a descriptive and predictive tool (Thomas and Venkatraman, 1988).

More recent strategic group studies have formed strategic groups based on a larger number of variables which may represent sources of competitive advantage (for example Harrigan, 1985; Cool and Schendel, 1987; Lewis and Thomas, 1990). In accordance with a number of authors' suggestions in this study strategic groups will be formed, based on important success factors which farm businesses can use to out-perform competitors (Thomas and Venkatraman, 1988; McGee and Thomas, 1986; Cool and Schendel, 1988; Kumar *et al.* 1990; Hatten and Hatten, 1987).

These variables represent strategic choices that are a means of differentiating between business strategies. They usually consist of at least two sets of dimensions or activities that may be sources of competitive advantage and synergy and can be used to define a firm's competitive strategy (see Cool and Schendel, 1987; Hofer and Schendel, 1978; Fiegenbaum *et al.* 1990). These are:

1. *business scope commitments* which describe the target market segments of a business, the types of products and services offered by a business, and the geographic reach of the business; including variables describing diversification, vertical integration, geographic expansion, and strategic alliances (Kerin *et al.* 1990; Fahey and Christensen, 1986).

2. *business resource commitments* which can be measured by examining the allocation of resources to various functional areas of the firm including marketing, financial and research and

development commitments.

Table 5.2 indicates that most strategic group studies use secondary data that has been collected for other purposes to form and describe strategic groups. Variables used to form strategic groups have often owed more to the ease of data collection, than theoretical or empirical anchors. Researchers who use secondary data sometimes support their selection of variables by theoretical reasoning and/or the results from pilot studies with business managers (for example Lewis and Thomas, 1990; Mascarenhas and Aaker, 1989a). However strategic variables are limited to those for which data exists. An examination of secondary farm level data including MAF, Meat and Wool Board and Statistics Department statistics indicate that this data is not detailed enough to be useful for a study of New Zealand farm business strategies. Data from other sources such as accounting data collected by private accountants is also only available for a limited number of variables and varied from accountant to accountant and therefore is also not suitable. Therefore, it is necessary to collect primary data specifically for this study.

The limited number of strategic group studies which collect primary data have usually formed strategic groups using data which describes managers perceptions of strategy. Typically Likert-type scales are utilised and managers asked for their perceptions regarding the importance of competitive methods or the extent of competitiveness in certain areas (for example Kim and Lim, 1988; Hawes and Crittenden, 1984; Namiki, 1988). Because of the difficulty in collecting objective data which measures farm business strategy, such an approach seems suitable for this study.

Strategic variables depend upon industry characteristics (Cool and Schendel, 1987; McGee and Thomas, 1986; Mascarenhas and Aaker 1989a). Because multiple sources of information should be used to identify strategic variables (Snow and Hambrick, 1980), this study will identify key

strategic variables by examining the theoretical reasons for expected hypothetical groupings. These variables will be tested, complemented, and supported by, variables identified in discussions with practising managers and industry experts. The following section explores the approaches that have been used to identify strategic groups.

5.6.6 Approaches to Identifying Groups

The information presented in table 5.2 indicates that strategic groups can be identified *a priori* using theoretical constructs or *a posteriori*, after examining data. Many early strategic group studies classify businesses into *a priori* determined groups. Examples include Porter (1979), who categorises firms into two groups; industry leaders (the largest firms that's aggregated sales revenues accounted for 30% of industry revenue), and followers, (all other businesses). Dess and Davis (1984) cluster firms into groups which to some extent follow Porter's generic strategies using theoretical reasoning developed by Porter to determine the number of groups and their strategic variables.

More recent studies have determined the number of groups and the strategies *a posteriori*, usually by employing statistical techniques to identify groups. Because little strategic management research has focused on land based industries such as farming, theoretical constructs for determining the number or types of groups are not well developed. Therefore, this study will take an *a posteriori* approach to forming strategic groups and will not presuppose the existence, number, or nature of strategic groups of farm businesses.

5.6.7 Industries Studied

The information presented in figure 5.2 shows that strategic group studies have been analyzed in a wide variety of diverse industries, although only one published study appears to have been

conducted within a farm firm business sector. Kuhl and Kuhl (1990) cluster German farmers which change their product line, farm area and workforce in similar ways. However like the other studies of farm business strategies reviewed in chapter 3, no attempt is made to operationalise the complex nature of the farm business strategy process and the marketing implications of strategic group membership are not examined.

5.7 Summary

Within this chapter studies of strategic typologies and taxonomies have been reviewed. It has been argued that strategic group research could be used to statistically determine if there are significant differences among farmers patterns of strategic behaviour. In the following chapter the methodological approach used to identify strategic groups and describe the characteristics of strategic group members is discussed.

CHAPTER 6

METHODOLOGY

6.1 Introduction

The discussion in previous chapters suggested that within the literature it is frequently assumed there is only one optimal strategy a farm business should follow, and that the farm business marketing process has not been adequately described. It was argued that strategic group research could ascertain whether farm businesses with distinctive patterns of strategic behaviour exist, and provide a better understanding of the specific marketing activities undertaken by farmers. The methodological approach which was used to collect data and identify and describe strategic groups in the farming industry is outlined in this chapter.

In the previous chapter it was suggested that for this empirical study it would be necessary to collect primary data which describes the attitudes of individual farmers towards strategic variables. In order to describe strategic group members and their marketing behaviour, data from individual farmers was also required. The choice of the technique used to analyze this data is clearly going to influence the questionnaire's development and design. Therefore in this chapter, the alternative methods which have been used to identify and describe strategic groups are outlined before the exact nature of data collection is described.

The farm sector sampled in this study and the rationale for focusing on the intensive crop farming sector is described. Canterbury arable farmers seem a particularly suitable sample for this type of study because the range of products they produce and the deregulated environment they operate in means they are likely to select from a wider range of strategic and marketing alternatives than farmers in other systems.

The approach used to identify variables relevant to this analysis and the six types of variables on which data will be collected for this study are described. Finally, it is argued that a mail questionnaire is the best method of data collection and the questionnaire's development and design are discussed.

6.2 Method of Analysis

A number of stages are usually involved in strategic group analysis. Most researchers utilise the fundamental approach of grouping firms which behave similarly with respect to key strategic variables. However, a wide range of specific techniques have been used to identify relevant strategic groups and to categorise businesses into appropriate groups. In the following sub-section these alternative approaches are examined in order to discover the best analytical approach for identifying strategic groups and classifying businesses into these groups. Subsequent sub-sections describe in more detail, the stages that were involved in this analysis.

6.2.1 The Approach used to Identify Strategic Groups

Early strategic group studies classify businesses into *a priori* determined groups using only a limited number of variables, but such an approach is only justifiable if the grouping is accompanied by strong theoretical backing (see section 5.3.7). The literature review suggests that logical arguments for the *a priori* identification of strategic groups at the farm business level are not well developed, therefore such an approach was not considered appropriate for this study.

A limited number of studies have formed groups *a posteriori* after using ad hoc procedures that do not utilise statistical techniques to identify groupings of businesses following similar strategies. If only a small number of dimensions are used businesses can be graphically mapped and grouped by visual inspection. For example Oyster (1982), visually examined histograms before classifying

businesses into what she perceives to be groups of firms with similar advertising to sales ratios. However, it becomes increasingly difficult to use eyeballing or other non-statistical techniques when a large number of variables are involved. In section 5.3.6 it was suggested that the present analysis would form strategic groups by evaluating different firms' strategies by using a large number of strategic variables. Therefore rule of thumb techniques using visual inspection were not utilised because they rely on human perceptions, and may lack statistical validity.

Most recent investigations use multivariate statistical analysis to group firms, and when there are a large number of variables involved, the most commonly used grouping techniques are various forms of Q factor analyses and clustering algorithms.

Q type factor analysis has occasionally been used to group firms which have similar variance structures over a number of strategic variables (see Miller and Friesen, 1978; 1984)¹. Q factor analysis is similar to R factor analysis (described in section 6.2.3) but the raw data matrix has been transposed which means that businesses, rather than variables which have highly inter-correlated score patterns, are grouped together. Organisations which have similar factor loadings are combined into factors which represent groupings of companies with similar patterns of strategic behaviour. Miller (1978) gives a detailed discussion of the role of Q factor analysis in the study of organisational strategies.

Another type of Q factor analysis is the Q method which uses a Q sort. Fairweather and Keating (1990) use this analytical technique to group farmers who have similar management styles. Using this method business managers can be asked to rank a set of agree-disagree statements relating to management, marketing, or strategic activities into a specific order. Q type factor analysis is then

¹ It is worthwhile to note that more recent studies by these authors (for example Miller and Friesen 1986a, 1986b) use cluster analysis rather than Q type factor analysis.

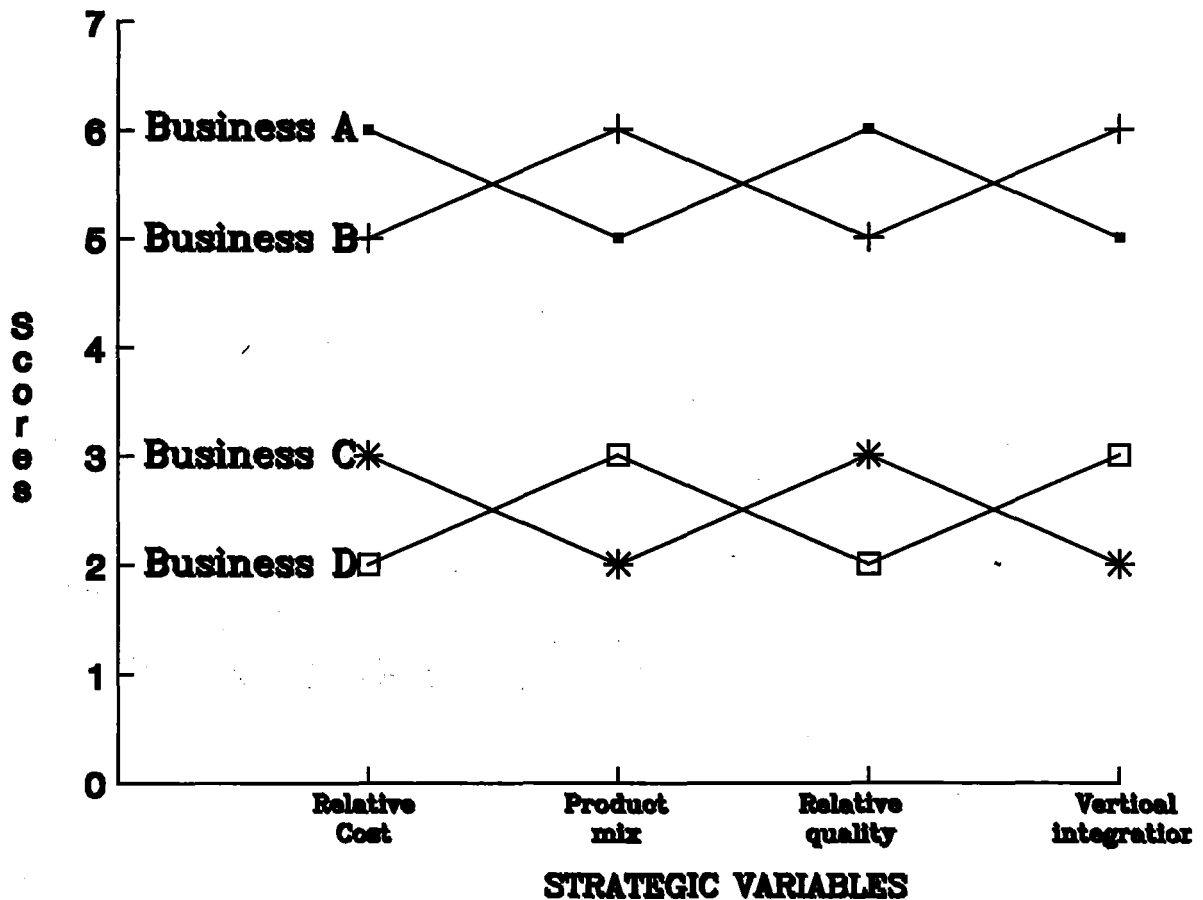
utilised to form groups of managers who order statements in a similar way. Thus, farmers who have a similar approach to management are grouped together.

Most strategic group studies use cluster analysis to categorise businesses into groups which follow similar strategies. Cluster analysis (described in detail in section 6.2.4) is a technique consisting of a series of algorithms or procedures especially designed to group similar objects or participants. In strategic group studies businesses are classified into groups or clusters which have high within cluster homogeneity and high between cluster heterogeneity, in terms of firms' scores or positions over a number of strategic variables.

The difference between using cluster and Q type factor analysis as grouping mechanisms can be shown diagrammatically. Both cluster and Q type factor analyses place businesses into groups according to their positions or responses with respect to a number of strategic variables. However, Q type factor analysis categorises firms based on inter-correlations between firms responses, while cluster analysis groups businesses according to the absolute differences between their scores, aggregated over the relevant strategic variables. Therefore Q type factor analysis groups firms which have similar patterns of response, rather than absolute similarities over all strategic scores.

Figure 6.1 illustrates the hypothetical scores of four business managers who were asked to rate how competitive their businesses were with respect to four strategic variables on a seven-point scale (a low score indicates a firm is not competitive while a high score indicates a business is extremely competitive). A Q type factor analysis groups firms A with C and B with D because their scores have similar variance structures. Business A and C score highly on the relative cost and quality variables and lower on the product mix and vertical integration variables while firms B and

Figure 6.1 Comparisons between Q type Factor Analysis and Cluster Analysis



Source: Adapted from Hair *et al.* (1990)

D score highly on product mix and vertical integration and lower on the other variables. However, cluster analysis clusters firms based on the difference between their scores and would usually group firm A with B (businesses that are highly competitive in regard to the variables being analyzed) and C with D (businesses that are not competitive in these areas).

Q type factor analysis categorises businesses which have similar patterns of strategic behaviour and although groupings are different to those formed by cluster analysis, it is arguably a technically correct way to form strategic groups. However cluster analysis has been preferred over Q type factor analysis in the majority of strategic group studies, and it has been suggested that Q factor analysis has not been utilised frequently because of computation difficulties (Hair *et al.* 1990).

This analysis used cluster analysis rather than Q type factor analysis to form strategic groups for a variety of reasons. Firstly, the statistical packages available to the researchers could only subject scores from a small number of firms (approximately fifty) to Q factor analysis, while cluster analysis can analyze data on a large number of businesses. In addition, with Q factor techniques some businesses may load highly on more than one factor meaning a firm can be classified into more than one group, while most clustering algorithms classify businesses into a specific category. The Q method using Q sorts was not considered because this technique does not show the proportion of businesses in each group (Fairweather, 1990).

6.2.2 Stages Involved in the Data Analysis

In chapter 5 it was suggested that a large number of strategic variables should be used to form strategic groups. The 42 strategic variables used in this study are described in detail in section 6.5. When a lot of strategic variables are involved, it is common to conduct strategic group analysis in three stages, the first of which collapses the strategic variables to a smaller set of dimensions (for example see Kim and Lim, 1988; Douglas and Rhee, 1988; Dess and Davis, 1984). Therefore this study analyzed data in three principal phases, as outlined in figure 6.2.

Because of high expected correlations between strategic variables the first stage of the analysis used R type factor analysis to reduce the strategic variables to a smaller more focused set of factors. In the second stage firms were clustered into groups which follow similar strategies. Finally multivariate statistical techniques were used to develop profiles of strategic group members. All analyses were carried out using SPSS/PC+, version 4.1. Each stage is briefly discussed below with more technical descriptions of the techniques involved given by Johnson and Wichren (1988) and Green and Carroll (1978).

Figure 6.2: Methodology used to Identify and Describe Strategic Groups

Stage 1:

Identify underlying strategic dimensions using R type factor analysis and save factor scores for each factor and business

Stage 2:

Subject factor scores for each business to cluster analysis to identify groups of businesses which pursue similar strategies

Stage 3:

Describe clusters and their marketing implications, using ANOVA multiple comparison, and chi-square tests to highlight inter-cluster differences

6.2.3 Stage 1: R Type Factor Analysis

R type factor analysis is a technique that can be used to identify a small number of underlying dimensions that are linear combinations of observed variables. It reduces variables to factors by analysing the independent nature of the variables. Because inter-correlations among some strategy variables were expected to be significant, factor analysis was used to reduce the number of strategic variables to a smaller more focused set of strategic dimensions (factors). Although factor analysis results in some loss of information this is compensated for by gaining variables which are uncorrelated, preventing double counting of similar variables and increasing statistical appropriateness.

There are a number of key decisions which must be made before and while using a factor model.

These include:

a. computing a correlation matrix and determining the appropriateness of a factor model:

Because variables must be related to each other to be suitable for factor analysis a correlation

matrix of all variables subjected to factor analysis was examined. If the correlations between individual variables are relatively high it is likely that they share common factors and there is a strong basis for factoring. *Bartlett's Test of Sphericity*, the *Measure of Sampling Accuracy test*, and an *Anti Image Correlation Matrix* are more formal tests recommended by Stewart (1981) and Norusis (1990) that were also used to determine if the data set was appropriate for factor analysis.

b. determining the method of factor extraction and the number of factors utilised:

Factor solutions can be obtained using a number of procedures which are known as factor extraction methods. Although a variety of extraction methods can be utilised to obtain factor solutions, in most cases the method of extraction has little effect on the results of an analysis (Stewart, 1981). The principal component method was used in this analysis because it appears to be the most popular extraction method for this type of study and has been used by a number of strategic group researchers (see Kim and Lim, 1988; Dess and Davis, 1984; Douglas and Rhee, 1988).

Using principal component analysis, factors which are linear combinations of observed variables are formed. The first principal component (factor) accounts for the largest amount of sample variance, while successive factors account for progressively smaller variations in the data and are uncorrelated.

While the extraction method is unlikely to have a crucial effect on the final solution, determining the number of factors extracted is critical to the outcome. The measure most commonly used to determine the most appropriate number of factors is the latent root criteria which selects factors which have eigen values² greater than one. The theoretical rationale behind this criteria is that any

² An eigen value represents the column sum of squares for a factor which is equivalent to the amount of variance accounted for by a factor

variable retained for interpretation should have at least the variance of a single initial variable (one). However a number of authors have argued that the use of only the latent root equals one criteria for selecting factors may be inappropriate (see Tucker *et al.* 1969; Stewart, 1981).

Another commonly used technique is the scree test developed by Cattell (1966) which involves plotting the factor number against the eigen value for each factor on a graph. The scree test does not search for a pre-determined value but examines the trade off between the reduction in variances accounted for by subsequent factors. This procedure involves placing a straight line across the bottom proportion of the eigen value graph and looking for a point where the plot curves above the line. The point on the line immediately after the curve starts to flatten indicates the maximum number of factors to extract (see Hair *et al.* 1990). Stewart (1981) references a number of authors who have supported the use of the scree test to determine the number of factors to utilise, however he suggests that it should be used in combination with other approaches.

The procedure utilised in this analysis followed the recommendations of a number of authors and used a combination of approaches to determine the number of factors to extract (see Cattell, 1978; Gorsuch, 1974; Harman, 1976; Stewart, 1981). Standard latent root equals one and scree test criterion were used as guidelines for the first rotations (factor rotations are described in subsequent discussion). These were followed by several different trial rotations where one less factor and two more factors, than were indicated by the eigen value and scree tests were examined for interpretability (Hair *et al.* 1990). Factor interpretability for each solution was compared and a choice made that provided factors which appeared to have the greatest interpretability.

To interpret factor analysis factor loadings (the correlations between each original variable and factor) for each factor were examined. Factors were named after examining all variables with significant loadings on a particular factor, with variables with the highest absolute factor loadings

having the greatest influence on the name and interpretation of a factor because they contribute the most to a factor. A negative factor loading means that the variable and factor are negatively related.

Hair *et al.* (1990) discuss several issues relating to the criteria for significance of factor loadings and suggest that a relatively acceptable criteria is to consider loadings of ± 0.30 significant, ± 0.40 more important and ± 0.50 as very significant. They indicate that sample sizes of greater than fifty and large numbers of variables in the analysis lower the acceptable level for considering a loading significant, however loadings on later factors need to be larger than earlier factors to be considered significant for interpretation. Because of its simplicity, the lack of statistical backing behind other rules, and recommendations by other authors factor loadings of ± 0.30 were considered significant in this analysis (Nunnally, 1978; Kim and Muller, 1978).

c. rotating the factor matrix:

To increase factor interpretability the second stage of the factor analysis involved transforming the initial matrix into one that was easier to interpret (factor rotation). Factor rotation is described in non-technical terms by Hair *et al.* (1990) and involves rotating the reference axis for factors around the origin. The SPSS package offers a choice of both orthogonal (factor axis remain at 90 degrees) and oblique rotation (the axes do not remain at right angles), techniques. The orthogonal approach was used in this investigation because it results in uncorrelated factors which can be used in subsequent statistical analysis.

A variety of algorithms can be used when conducting an orthogonal rotation. Each algorithm differs in the way it attempts to make values in the rows and/or columns in the factor matrix as close to zero as possible. The varimax method was utilised in this study, because it minimises the variables which have high loadings on a factor, enhancing factor interpretability (Norusis, 1990). Stewart

(1981) references a number of authors who suggest that the varimax algorithm is one of the best orthogonal rotation procedures.

d. estimating factor scores:

Within this study, factor analysis was utilised to reduce a large number of strategic variables to a smaller more focused set of strategic dimensions (factors). The measure used to represent these newly derived strategic dimensions is a composite of all of the original variables and is referred to as a factor score.

For every farm business, factor scores were computed using the following formula

$$f_i = a_{1i}z_1 + a_{2i}z_2 + \dots + a_{ji}z_j,$$

where a_{ji} was the factor score coefficient (a weighting mechanism) for strategic variable j ($j=1, \dots, k$) on factor i ($i=1, \dots, r$), and z_j was the standardised score on strategic variable j for a business. The standardised factor scores (mean 0, standard deviation 1) generated using this formula were saved for every business and factor and used as an input to cluster analysis. Thus, each business has a unique score for every factor determined in the analysis. These reflect the response of a business to a strategic dimension with high scores on a factor meaning that strategic dimension is important to a business.

6.2.4 Stage 2: Cluster analysis

In this study cluster analysis was used to identify groups of firms following similar strategies. Cluster analysis is a classification tool based on a family of algorithms which have been used to identify businesses and classify them into groups or clusters on the basis of similarity or alternatively, dissimilarity. It can be used when little is known a priori about the number of

categories formed and what or who the members of these categories will be (Green and Carroll, 1978, Dillion and Goldstein, 1984). Reviews of cluster analysis include those by Everitt (1980), Anderberg (1973), Sneath and Sonkal (1973), Hartigan (1975), Lorr (1983), and Punj and Stewart (1983).

When using cluster analysis there are a number of choices to be made. These relate to the selection of the clustering algorithm to be used (each of which uses a different set of procedures to place similar objects into groups or clusters), and determining the appropriate number of clusters. The following discussion examines each of these issues.

1. Choice of clustering algorithm

A number of different procedures known as clustering algorithms can be used to place similar businesses into groups. These algorithms can be classified into two categories; hierarchical, and non hierarchical techniques.

Hierarchical algorithms identify groups by forming a tree like structure. Agglomerative hierarchical clustering starts with every business in its own cluster and forms larger clusters by grouping businesses or clusters of businesses which are the most similar, until all businesses are members of a single cluster. For example, in the first step the two businesses which are most similar are grouped together, the second stage groups the next two most similar businesses and so forth. Divisive hierarchical clustering algorithms start with all businesses in one cluster and split clusters until each business forms a single cluster. Non hierarchical techniques work by selecting a number of cluster centres (seeds) and placing businesses which are closest to these seeds into groups.

Non hierarchical methods have been shown to be preferable to hierarchical clustering algorithms, but

have problems in that they require the specification of initial starting points (seeds) and the appropriate number of clusters. Punj and Stewart (1983) and Milligan (1980) suggest a two-stage clustering methodology which was used in this study to address this problem. A preliminary hierarchical clustering solution was used to select the number of clusters and identify cluster centroids and outliers. Remaining cases were subjected to a non hierarchical clustering algorithm. This approach has been used in a number of marketing studies including those by Lamb *et. al.* (1989), and Lawless and Tegarden, (1991).

The SPSS statistical package contains a number of hierarchical algorithms. In this analysis Ward's (1963) minimum variance algorithm (an agglomerative technique) using the squared euclidean measure of inter-object similarity was used to determine the initial clustering solution. Although there are a number of ways to measure distance-similarity, Ward's method should use the squared euclidean method (Norusis 1990). This method measures the distance between two clusters by adding the sum of the squares of the distances between each factor score for each cluster using the following formula:

$$d_{ab} = \sum_{i=1}^r (X_{ai} - X_{bi})^2$$

where d_{ab} is the distance measure, $X_{ai} - X_{bi}$ are distances between pairs of businesses or clusters, each measured on factor or strategic dimension i ($i = 1, 2, 3, \dots, r$). The two businesses or clusters which are closest together are then joined to form a new cluster. Ward's method is one of the most popular methods for selecting cluster seeds (Helsen and Green, 1991). It has been suggested that Ward's method achieves a better coverage of cases and handling of outliers than other methods (Aldenderfer and Blashfield, 1984; Milligan, 1980).

Researchers have argued that it is appropriate to test for outliers and omit them if it is practical (see

Hair *et al.* 1990; Harrigan, 1985; Punj and Stewart, 1983). In this analysis the businesses which had still not fused in the last 10% of clusters were considered outliers and dropped from subsequent analysis.

2. Determining the appropriate number of clusters

At the present time there is no statistically valid method for determining an appropriate number of clusters, however a number of rules of thumb have commonly been used (Everitt, 1980; Milligan and Cooper, 1985). One such rule that was used in this study is to look for an increase in the cluster coefficients as the algorithm successively combines clusters. A marked change suggests that two relatively dissimilar clusters have been combined, suggesting the number of clusters prior to the merger is the most probable solution (Aldenderfer and Blashfield, 1984; Hair *et al.* 1990). This approach is equivalent to one advocated by Hambrick (1984) who suggests looking for an increase in the tightness (in terms of mean square error) of the group structure as the clustering moves from one solution to the next. Such an approach has been used in a number of strategic group studies (eg. Cool, 1985; Fiegenbaum and Thomas, 1988; Kim and Lim, 1988; Douglas and Rhee, 1988; Lawless and Tergarden, 1991). This heuristic decision rule was supplemented by determining if clusters had external validity by examining if clusters varied significantly on descriptive variables that were not used to generate clusters (Aldenderfer and Blashfield, 1984). In addition a number of solutions were examined for interpretability by hypothesising if the strategies their members followed were logical.

6.2.5 Stage 3: Testing for Inter-Cluster Differences

A method which strategic group researchers frequently employ to identify the attributes of strategic group member's is to examine the mean values and standard deviations of the data for each variable by cluster. Statistical techniques are used to identify those variables which differ significantly from

one strategic group to another.

The validity of using the conventional approach of testing for differences between clusters over each of the variables (strategic dimensions) that were used to generate strategic groups should be questioned. Clustering algorithms form groups which minimise intra-group differences and maximise between group differences. Therefore by definition differences between cluster means for each factor would be expected to exist and it is not sensible to test the null hypothesis of equal cluster means for each factor. Although still reported, care should be taken in interpreting the results from these tests. Emphasis should be placed on the results from tests for inter-cluster differences over variables that were not used in the clustering procedures, which were used to develop profiles of strategic group members and ensure that the groups have "external validity".

F ratio comparisons of variances among the mean of the strategic dimensions and descriptive variables from a oneway ANOVA analysis (Johnson, 1967) were used to develop profiles strategic group members. Although a oneway ANOVA tests whether mean values over all cluster solutions differ significantly it does not pinpoint exactly which clusters are different. A range of techniques known as *multiple comparison tests* can be used to test between which strategic groups mean values differ significantly. The SPSS statistical package contains a number of different multiple comparison tests, most of which are discussed in detail by Winer *et al.* (1991). Each test has a number of advantages and disadvantages in comparison to other tests, but no one test appears to be optimal. This analysis used Duncan's (1955) multiple range test of homogeneity because of its wide use and ability to analyze differences between clusters which have different numbers of members.

Because of the qualitative way in which some of the descriptive variables were measured the

differences between clusters for some variables was tested using chi-square tests of independence rather than ANOVA techniques. Appendix 6.1 discusses the technical details of Anova tests and chi-square tests of independence and also describes some of the special properties of these tests when a large proportion of the population is sampled. Many of the test statistics may be conservative because the statistics have not been adjusted for the finite population correction factor (see appendix 6.1).

6.3 The Sample

Previous chapters have indicated that within all agricultural sectors farm businesses are assumed to be relatively homogenous in terms of their marketing activities and patterns of strategic behaviour. Although it is likely that farmers in different agricultural sectors encounter different marketing and strategic choices, analysis of just one farming sector will provide an illustrative analysis of strategic and marketing behaviour at the farm business level.

Relative to farmers in other farming systems, intensive crop farmers seem particularly suited to this type of study because of the wide range of diversity existing in the strategic and marketing decisions they make. Unlike many other farmers, arable farmers can choose from a wide variety of crops at planting date, with very little extra production cost that can be sold through a wide range of marketing channels. Factors in their marketing mix include; what to produce (crop type or varieties grown), how to produce (inputs used), the timing of planting of the product (crop), the method and timing of harvest, how long the producer will store the crop, and the distribution and pricing strategies utilised. While similar choices may exist for other farmers, changes in the strategies they could undertake would be likely to be more subtle. For example sheep farmers would make decisions on when and where to sell stock which may depend on a variety of factors including price levels, stock condition and the availability of feed. Long term strategic decisions

would include those which relate to the breeds and numbers of stock farmed.

The study is limited to the Canterbury province in order to minimise the influence of non-controllable environmental factors. Unofficial sources indicate that more than 70% of New Zealand's cropping area is in this region (Montgomery, 1992). Farmers in Canterbury are likely to operate within relatively similar climatic conditions and have similar growing conditions and soil types, even though they may sell through a large number of distribution channels and grow a relatively diverse range of crops. In recent years arable farmers have been growing less traditional cereals and replacing these crops with high value small seed and other specialty crops (Montgomery, 1992). Intensive crop farmers operate in a deregulated environment which is relatively free from government intervention and therefore make strategic decisions which are likely to be similar to those made by other small business managers.

Farms were identified from the New Zealand Department of Statistics, 1991 Agricultural Survey data. Intensive crop farms are classified as those farm businesses which receive more than 75% of income from cropping and all farms in the Canterbury region meeting this criteria were surveyed.

6.4 Variables and Measurements

Following the arguments presented in section 5.3.6, variables were selected using a multistage process. The first stage involved a survey of the measures used in a wide range of literature, and because it is necessary to have detailed knowledge of the industry being studied to specify correct strategic variables, the unique nature of farm businesses were kept in mind. Special attention was focused on examining existing conceptual strategic typologies including Porter's generic strategies and Miles' and Snow's strategic typologies as a starting point for identifying appropriate variables.

Taxonomic classifications of strategy including many strategic group studies were also reviewed.

In the second stage theoretical decisions which reflect the strategic choices necessary to implement the conceptual strategies described in section 5.4 were considered. Thomas and Venkatraman (1988) suggest that variables which managers perceive are strategically relevant should be used to form strategic variables, therefore subsequent stages involved detailed interviews with farm management academics and farm owners/managers.

Personal interviews with farm owner/managers which asked open ended questions took place during December 1991 in the Hororata area of Canterbury. Questions relating to the development and wording of a questionnaire and the most appropriate method of data collection were also asked.

Using this process a number of different types of variables were identified. Some of these variables were related to strategic activity and were used as inputs to factor and cluster analysis, while others were utilised to test the relationships between strategy, performance and the environment, or to develop profiles of strategic group members.

The variables used in the analysis can be separated into six categories. These are:

1. *strategic variables*. Following the arguments presented in section 5.3.6 the strategic variables used to form strategic groups represent the important strategic choices businesses make which may result in competitive advantage, or are associated with the distinctive competencies of a business.

2. *additional marketing variables*. Many marketing variables are also strategic variables. Marketing variables that have not already been categorised as strategic variables are included in this

category. They represent additional factors concerned with markets and satisfying final and intermediary consumers and are important to describe farmers marketing behaviour.

3. *performance variables*. Because of the difficulties associated with collecting accurate data on farm business performance that were described in section 5.3.3, multiple indicators of farm business performance were used in this study.

4. *environmental variables*, which measure the influence of the non-controllable environmental factors as moderators of business strategy and performance

5. *descriptive variables* relating to farm businesses and their owners which were utilised to develop profiles of strategic group members. Descriptive variables describe land area farmed, crop mix and storage utilisation, farm experience, manager age, off farm involvement, and other factors.

6. *information gathering variables*. Because interviews with farmers (discussed above) suggested that the information utilised by farmers is likely to change according to the strategy a farm business follows, data which describes the types and sources of information utilised by individual farmers was collected.

Forty two variables associated with business strategy, seven environmental variables, forty three information variables, and a number of additional marketing, performance, and descriptive variables were identified.

6.5 Method of Data Collection and Questionnaire Development

Because the method of data collection is dependent on the procedure used to form strategic groups

and develop profiles of their members, the questionnaire was developed so that coded answers could be analyzed using the procedures described in section 6.2. Most strategic group studies use secondary data from published accounts or COMPUTSTAT™ or PIMS data bases (Cool and Schendel, 1987), however because no such data is available for New Zealand crop farmers it was necessary to collect primary information for the purpose of this study. A literature review which considered a number of different viewpoints was used as the basis for the questionnaire development which involved four steps similar to those advocated by Churchill (1979). These steps are:

1. specify the information required.

Section 6.4 discusses the six types of information required for this study.

2. select the type of questionnaire and method of administration.

Three methods of data collection were initially considered; telephone interviews, personal interviews and mail surveys. Because of the large amount of information required, telephone interviews were not considered an appropriate means of data collection, and the wide dispersion of farmers meant that time and funding considerations ruled out personal interviews. Mail surveys were preferred because of their ease of use over a large geographical area, ease of administration, relatively low interviewer bias, high respondent convenience for the timing of questionnaire completion, and relatively high speed of data collection. Questions were designed so that the answers to questions relating to strategic variables were relatively standardised, and when coded could be subjected to factor and cluster analysis using the SPSS statistical package.

3. determine the content of individual questions and choose the form of response to each question, the number of questions and sequence of each question.

A number of questionnaires which have surveyed farm business marketing and management styles and been used to collect data by strategic group researchers were reviewed to aid questionnaire design (for example Barker, 1980; Fairweather and Keating, 1990; Namiki, 1988; Kim and Lim, 1988). In addition personal interviews with farmers (described in section 6.4) assisted in formulating and wording the questionnaire.

The questionnaire was divided into five parts: part one, (general farm and farmer characteristics); part two, (management activities and attitudes which asks questions relating to strategy and the environment); part three, (performance and personal questions); part four, (sources and types of information); and part five, (marketing and value added questions). Questions were placed in an order, so that those which require similar formats for answers were placed together in order to increase the respondents ease of answering.

Relevant factual information which farmers could easily remember was collected where possible, however objective data was not available on variables relating to a number of strategic activities, and the influence of environmental factors as moderators of business strategy. Farmers were therefore asked their attitudes towards these factors on a five-point Likert-type scale. Such an approach is in accordance with Thomas and Venkatraman's (1988) suggestion that strategic group studies should incorporate managers perceptions when developing groups and is equivalent to the approaches used by Namiki's (1988) and Kim and Lim's (1988) strategic group studies which are based on managers perceptions' of their competitive strategies.

These questions were broken into two blocks. The first block assesses sources of sustainable competitive advantage, distinctive competencies, and businesses' competitive positions by asking farmers the extent to which their business operations were orientated towards various competitive

activities. The second block contains more specific questions regarding tactical activities and environmental variables by asking farmers the extent to which they agreed with a number of statements.

4. pretest the questionnaire and revise if necessary.

The survey was pretested exhaustively by staff from Lincoln Universities Farm Management and Economics and Marketing Departments and twice by farm managers. After farm managers had completed the pilot survey they were visited by an interviewer and asked for suggested improvements and what they thought each question asked.

The final version of the questionnaire is contained in appendix 6.2. It contains 49 attitudinal questions relating to strategic and marketing activities, as well as farmers attitudes towards non controllable environmental factors. Similar questions asked farmers the perceived importance of 18 information sources and 15 information types to their business operation. Additional questions were aimed at describing land area farmed, crop mix and storage utilisation, farm experience, manager age, off farm involvement, business performance and other factors. In an effort to prevent order bias, two versions of the questionnaire were developed in which the order of the attitudinal questions varied.

The survey was designed in booklet form and data collected using an eight page questionnaire mailed to all 247 intensive crop farmers. The first mailing included a covering letter and postage paid return envelope. The covering letter explained the nature and significance of the proposed research and was developed using many of the 22 considerations which Erdos (1970) suggests are important (a copy of the covering letter is presented in appendix 6.3). Although there have been suggestions that pre-notification by telephone increases mail survey response rates (see Chiu and

Brennan, 1990) the extra time and expense and lack of information on telephone numbers meant that such an approach was unlikely to be effective for this study. Twenty one days after the initial mailout the non-respondents were mailed a reminder letter (a copy of this letter is contained in appendix 6.4).

6.6 Summary

In this chapter the methodological approach this study used to determine if strategic groups exist at the farm business level and to describe the characteristics associated with being a strategic group member was outlined.

A three-stage approach employing factor analysis to identify underlying strategic dimensions, cluster analysis to identify groups of businesses which follow similar strategies, and ANOVA, multiple comparison and chi square tests to highlight differences between strategic group members was described in detail and comparisons were made with other techniques that could have been used. The questionnaires design and development and rationale for sampling Canterbury Crop farmers was discussed. In the following chapter the results of this analysis are presented in detail.

CHAPTER 7

RESULTS AND DISCUSSION

7.1 Introduction

In the previous chapter the methodological approach taken in this analysis was outlined. This chapter reports on the results of the analysis of the marketing and strategic behaviour of crop farmers in Canterbury. First the adequacy of the response rate from the mail survey is discussed. Next, it is shown that results indicate that the data is appropriate for factor analysis, and the 13 strategic dimensions identified in the factor analysis are described. After this, the results from various stages of cluster analysis are presented and it is shown that five strategic groups of Canterbury arable farmers were identified. A profile of the strategy followed by each strategic group is developed after looking at the differences between factor scores for each strategic group and testing for significant differences between groups. These profiles are further developed using the responses to a range of descriptive questions.

7.2 Sample and Response Rate

Data was obtained from a mail questionnaire sent to all 247 intensive crop farmers in the Canterbury area of New Zealand. A total of 190 questionnaires were returned (62 after the reminder letter)¹. Of these, 24 were returned immediately because the farmers had moved since the statistics were collected or the incorrect addresses were supplied by the Department of Statistics. Ten farmers returned unanswered questionnaires because they no longer grew crops or because of the small scale or part time nature of their farming enterprise. A further 14 farmers were no longer farming because of death (4), or the sale (5), or leasing (5) of their properties. Therefore the effective mail-out was reduced from 247 to 199. One hundred and forty-four completed surveys were returned

¹ ANOVA and chi-square tests indicated that for most variables there were no significant differences between respondents who replied after receiving the reminder letter and other respondents.

(1 was unusable due to missing information) giving an effective response rate of 72%.

This response rate was considered to be very satisfactory for the purposes of this survey and compares favourably with other strategic group researchers who used mail surveys and obtained responses of 38% (Hawes and Crittenden 1984), 26% (Namiki 1988), and the results reported by Ambler (1977) who cites mail response rates for New Zealand farmers at between 53% and 68%. The response rate is considerably higher than the 35% obtained in Harling's (1992) mail survey which assessed the applicability of strategic management to North American farmers.

To assess if the respondents differed significantly from the population of Canterbury intensive crop farmers, the sample farm areas, crop areas and stock numbers were compared to the New Zealand Department of Statistics data supplied with the farm addresses. No other up to date secondary information is available to describe the land areas and crop/stock mixes of Canterbury intensive crop farmers. These results are presented in table 7.1 and indicate that the sample has slightly larger farm areas and considerably higher areas sown in crops than the population defined by the Department of Statistics. This is not surprising considering the number of farmers who returned unanswered questionnaires stating they were not growing significant areas of crops. The differences between the areas sown in different crops do not seem to be great when the different years in which the data was collected is taken into account. Similar numbers of sheep and small numbers of cattle are farmed by both the sample and population.

Table 7.1

Comparison of Sample and Population Statistics

	Population	Sample
	(Dept. of Statistics)	(This Study)
	1991	1992
Total Land Area (ha)	198.94	226.62
Area sown crops	99.90	159.73
Average Area sown: (ha)		
Wheat	30.21	34.03
Oats	2.65	1.87
Barley	43.00	33.98
Field Peas	13.51	19.67
Maize	0.40	0.13
Number sheep (head)	579	545
Number beef (head)	6	15

Some of the farmers which the Department of Statistics classify as intensive crop farmers are not involved with cropping or are part time farmers which means the statistics for the population are inaccurate. Because the population statistics appear to be mis-specified and not every farmer in the sample returned a questionnaire, little can be said about the effects of non respondent bias. However the high proportion of returns indicates the sample is a good one. In addition, because of the exploratory and illustrative nature of this research it is not essential to make inferences about the population.

7.3 Identifying Strategic Dimensions

In section 6.2.3 it was explained that because of high expected correlations between strategic variables a R-type factor analysis would be used to reduce the original strategic variables to a smaller set of strategic dimensions that are more appropriate for subsequent analysis. Answers from 42 of the 49 attitudinal questions related to strategic behaviour were initially considered as inputs

for an initial factor model. Questions 2d, 2e, 2i, 2j, 2k, 2o and 2u² measured the influences of environmental factors and were not considered strategic variables. Three of these variables were dropped from the subsequent model because initial rotations indicated they resulted in unstable factor loadings (questions 1l, 2g and 2v).

Before the factor model was used, the appropriateness of the data set for such an analysis was tested. A correlation matrix of all relevant variables is presented in appendix 7.1. It indicates that for many variables the correlations are relatively high which means that these variables share common factors and are suitable for factor analysis. The results from three more formal tests also indicate the data set is appropriate for factor analysis. Bartlett's (1950, 1951) test of sphericity was used to test if the correlation matrix is an identity matrix (the correlation matrix comes from a population of variables that are independent). As the test value is large (2049.579), and level of significance is low (0.00000), it is unlikely the population matrix is an identity and variables are independent. Therefore, the data is likely to be suitable for a factor model. The second test involves examining the anti-image correlation matrix which is presented in appendix 7.2 (Stewart, 1981; Norusis, 1990). A large proportion of high off-diagonal values would normally mean that the use of a factor model should be reconsidered. Inspection of the anti-image correlation matrix indicates that most off-diagonal values are low and the correlation matrix is appropriate for factoring. Finally a Kaiser-Meyer-Olkin (KMO), measure of sampling accuracy was used to measure the extent to which variables belong together (Kaiser, 1970). Kaiser and Rice (1974) suggest that sampling accuracy measures of 0.90+ are marvellous, 0.80+ meritorious, 0.70+ middling, 0.60 as mediocre, 0.50+ as miserable and below 0.50 as unacceptable for factor analysis. The calculated KMO statistic of 0.77 also indicates the correlation matrix is suitable for factor analysis.

² A 1 in front of the question letter means the question came from block A on the survey while a 2 indicates the question came from block B. For example question 2d is question d in block B.

By testing whether the latent root (eigen value) was equal to one the results indicated a model containing 11 factors should be used (see table 7.2), while a scree test indicated a 14-factor model was suitable (see figure 7.1). Therefore solutions containing between 10 and 16 factors were subjected to trial rotations and the factors were interpreted. Thirteen factors explaining 69.2% of total variation appeared to give the best representation of underlying relationship among variables.

Unstable factor loadings may result from the small number of cases (n=143) relative to the number of variables subjected to factor analysis (n=39). However the ratio is close to the conservative estimate indicated by Hair *et al.* (1990) of four to five as many cases as variables and should not present a limitation.

Table 7.3 presents the principle factor solution obtained after a varimax rotation of responses from the 39 relevant strategic variables. Factors are ranked in order according to the proportion of variance explained, while questions are sorted so that those with high loadings on the same factor appear together. After examining factor loadings the factors have been named to reflect the strategic dimensions they represent. Variables with high factor loadings had the most influence on the naming of a factor. Eleven of the 13 factors were easily interpretable and appear to represent distinctive strategic dimensions, however factor 11 and 13 were harder to interpret. The following paragraphs describe the strategic dimensions which each of the 13 factors appear to represent.

7.3.1 Description of Factors

1. *Differentiation*

The first factor is related to activities concerned with differentiating produce, either by growing niche crops or involvement in further processing and value adding activities. This factor has high loadings on questions relating to growing crops which are different from those produced by other

Table 7.2 Eigen Values and the Percentage of Variation Explained by Factors

Factor	Eigenvalue	Pct. of Var.	Cum. Pct.
1	8.03720	20.6	20.6
2	2.62633	6.7	27.3
3	2.29280	5.9	33.2
4	1.97396	5.1	38.3
5	1.92842	4.9	43.2
6	1.85299	4.8	48.0
7	1.50692	3.9	51.8
8	1.36010	3.5	55.3
9	1.25018	3.2	58.5
10	1.15719	3.0	61.5
11	1.07585	2.8	64.3
12	.98793	2.5	66.8
13	.94622	2.4	69.2
14	.86213	2.2	71.4
15	.82906	2.1	73.6
16	.79045	2.0	75.6
17	.73168	1.9	77.5
18	.71702	1.8	79.3
19	.68293	1.8	81.0
20	.65611	1.7	82.7
21	.58330	1.5	84.2
22	.55856	1.4	85.7
23	.52326	1.3	87.0
24	.50260	1.3	88.3
25	.46070	1.2	89.5
26	.43988	1.1	90.6
27	.43673	1.1	91.7
28	.40331	1.0	92.8
29	.37692	1.0	93.7
30	.33856	.9	94.6
31	.32389	.8	95.4
32	.29763	.8	96.2
33	.28283	.7	96.9
34	.23816	.6	97.5
35	.23284	.6	98.1
36	.21278	.5	98.7
37	.19603	.5	99.2
38	.17706	.5	99.6
39	.14950	.4	100.0

Figure 7.1 Scree Plot

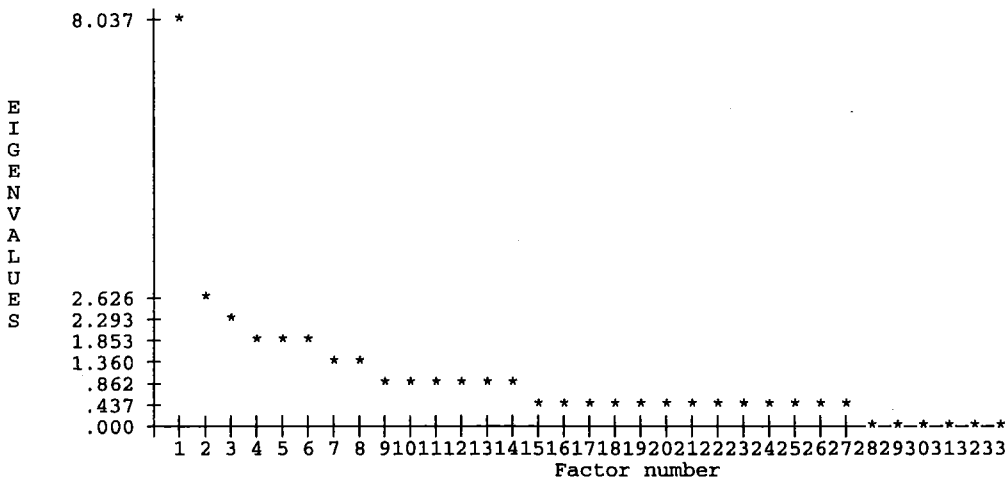


TABLE 7.3
Results of Principal Components Analysis of Strategy Variables
Factor loading

Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8	Factor9	Factor10	Factor11	Factor12	Factor13
Strategy Questions												
Factor 1: Differentiation												
I own or manage facilities that are normally owned by middlemen further down the distribution chain.												
.742	.146	.084	.026	.205	.065	.147	.122	.044	.029	.000	.071	.039
I own specialised plant, equipment, machinery or facilities, that most farmers do not.												
.738	.115	.113	.107	.141	.089	.081	.075	-.131	-.085	.144	-.088	.240
I grow crops which are different from those produced by other farmers.												
.650	.410	-.037	.085	-.088	.042	-.218	.062	-.008	-.028	-.022	-.237	.155
I grow crops on a trial basis for companies or merchants.												
.622	.157	.167	.062	-.180	.158	-.030	-.213	-.073	.336	-.018	.084	-.201
I grow crops which require specialised knowledge other local farmers do not have.												
.612	.377	.101	.113	-.088	-.058	-.120	-.026	.093	-.145	-.049	-.193	.286
I am personally involved with off-farm marketing activities.												
.605	-.024	.119	.173	.269	-.119	-.132	.060	.143	.202	-.358	.134	-.119
I always set aside a proportion of my farm, to experiment with crops or techniques I know little about.												
.504	.157	.233	.107	-.135	.235	-.297	-.092	-.025	.219	-.123	.193	-.109
Factor 2: Production flexibility												
I have extremely flexible crop rotations and production plans.												
.235	.791	-.031	-.011	-.061	.013	.0216	.004	-.075	.156	-.067	-.026	.061
I meet market requirements by continually changing my crop mix.												
.225	.728	.137	.156	-.025	.213	-.097	-.011	.149	.026	-.028	.071	.007
I plan my production decisions by continually monitoring market prices.												
.111	.540	.320	.300	.024	.166	-.016	.041	-.071	.199	-.068	-.010	.076
I plan my production decision by continually monitoring market signals other than price.												
.177	.468	.211	.314	.364	-.171	.038	-.054	.294	.161	-.008	.012	.106
Factor 3: Product focus												
The most important production activity I undertake is continually monitoring my crop.												
.100	.223	.703	-.015	-.144	-.078	.163	.048	.219	-.041	-.019	.125	.140
I continually update the production techniques or technologies, I use to produce my crops.												
.250	.185	.656	.194	.087	-.048	-.119	-.204	-.147	-.053	-.050	-.116	.040
I maximise yields for every crop I produce, by using specialist techniques.												
.229	.001	.615	.218	.081	.035	.024	-.153	.213	.138	-.086	-.105	.340
Maximising farm profits is my most important farming goal.												
.005	.035	.541	-.013	.121	-.048	-.008	.311	.168	.333	.041	-.281	-.104
I am aware of the exact costs and returns for each crop I produce.												
-.058	.194	.403	.399	-.135	.154	-.069	.256	-.005	-.035	-.014	.116	.360
Factor 4: Market knowledge												
For every crop I produce, I understand detailed market requirements.												
.010	.196	-.015	.813	.069	.065	.033	-.001	.108	-.058	-.097	-.044	.085
I have detailed knowledge of the distribution channels my produce moves through after it leaves the farm.												
.462	-.070	.131	.627	-.034	-.087	.015	.032	.021	-.204	-.172	.055	-.080
I am highly aware of new crops and crop varieties.												
.347	.054	.376	.519	-.112	.148	-.097	-.009	-.111	.123	.139	-.193	.038
I simultaneously plan production and sales decisions.												
.181	.395	.199	.481	-.168	.116	-.138	.148	-.176	.294	.070	.000	.022
I continually monitor market prices, to plan sales decisions.												
.109	.247	.208	.426	.401	.108	-.014	-.173	.057	.371	-.190	-.067	.233
Factor 5: Sales flexibility												
I mainly produce crops which I can grow or sell by contract.												
-.078	.091	.029	-.009	-.755	-.100	.198	-.047	.033	.139	.100	-.011	-.013
I mainly produce crops which I can grow or sell on the free market.												
-.099	-.102	-.250	-.064	.581	-.124	.149	.186	-.016	.340	.122	.131	-.011
I obtain high crop prices by holding crops in storage, so I can sell them at the best time of year.												
.098	.135	.182	-.153	.566	.010	.110	.026	-.511	-.008	.032	.185	-.005
I continually monitor market signals other than price to plan my sales decisions.												
.168	.306	.236	.335	.411	.050	.175	-.193	.394	-.189	.016	.020	-.062
Factor 6: Market flexibility												
I deal with a minimum number of agents or market outlets, so I can maintain a good relationship with these channel members.												
-.031	-.082	.118	.024	-.091	-.822	.089	.050	.018	.065	.073	.103	.053
I continually seek new merchants and market outlets to sell produce to.												
.193	.138	.059	.175	-.113	.700	.227	-.054	.157	.160	-.021	-.014	.130
I work out the differences in returns resulting from selling each crop to each potential company or agent available.												
.047	.438	.258	.190	.245	.438	-.096	-.010	-.116	.095	-.071	-.101	-.058
Factor 7: Stability												
Planning my crop mix to minimise risk, is my most important production activity.												
-.055	.094	-.085	-.141	-.115	.019	.811	.178	-.069	.081	.015	-.029	.003
I have a stable crop mix which I know I can grow best on my farm.												
-.039	-.336	.132	.135	.034	.030	.687	.045	-.031	.000	.111	.149	.112
I grow crops which best meet long term market requirements.												
.153	.058	.135	.164	.302	-.336	.371	-.105	-.263	-.096	.055	-.174	-.317
Factor 8: Low cost focus												
I have the lowest possible input costs.												
.161	-.110	-.036	-.009	.132	.026	.034	.832	.037	-.065	.020	.084	-.043
Budgeting and planning to obtain the lowest farm costs is the most important management activity I undertake.												
-.059	.141	-.009	.060	-.048	-.125	.186	.711	.107	.115	-.169	-.075	-.028
Factor 9: Financial imperative												
I can not afford to store crops and wait for the price to improve.												
-.007	.025	.181	-.010	-.045	.068	-.089	.164	.753	-.021	.016	-.069	-.012
Factor 10: Commercial sensitivity												
Keeping knowledge I have from other producers is essential to my farm business operation.												
.055	.240	.057	-.062	-.024	.054	.065	.037	-.029	.712	.025	-.120	.121
Factor 11: Financial focus												
I have no influence over the price I receive for my produce.												
-.143	-.188	-.009	-.096	-.119	-.020	.037	-.075	.155	-.048	.761	-.067	-.054
As I have easy access to capital I farm in a less constrained way than other cropping farmers.												
.116	.067	-.054	-.032	.112	-.150	.083	-.058	-.178	.116	.691	.315	-.005
Factor 12: Off-farm financial focus												
I invest money of farm, rather than into the farm.												
-.033	-.018	-.090	-.046	.104	-.109	.037	.023	-.088	-.117	.109	.835	-.014
Factor 13: Short term returns focus												
I use special techniques to gain the highest possible quality premiums for my crops.												
.252	.114	.310	.105	.056	-.012	.139	-.140	-.056	.171	-.045	-.029	.734

farmers and therefore require specialised knowledge. It involves growing crops on a trial basis, having specialised knowledge that other farmers do not have and being involved with off farm marketing activities including owning and managing facilities that are normally owned by middlemen further down the distribution chain.

2. Production flexibility

Farmers who have high factor scores on the strategic dimension named production flexibility are likely to have flexible production plans, regularly change their crop mix and to plan production by monitoring a number of market signals including prices.

3. Production focus

This factor has high loadings on questions relating to production activities. Farmers with high scores on this strategic dimension would be expected to place high levels of emphasis on monitoring their crops and updating production techniques. They are likely to use specialist techniques to maximise crop yields, be aware of crop costs and returns, and feel that maximising farm profits is their most important farming goal.

4. Market knowledge

This factor or strategic dimension is associated with understanding market requirements and the distribution channels that the product moves through after it leaves the farm gate. Questions which load highly include those which are concerned with high levels of awareness of new crops and crop varieties, monitoring market signals to plan sales and production decisions, and simultaneously planning production and sales activities.

5. *Sales flexibility*

The sales flexibility factor has a significant negative factor loading on the question relating to selling crops by contract and a positive factor loading on selling crops on the free market. Emphasis is placed on having flexible sales plans and not having sales decisions limited because of involvement in sales contracts. The high factor loadings on the questions which relate to storing crops so they can be sold when the price is highest and monitoring market signals to plan sales decisions are consistent with this interpretation.

6. *Market flexibility*

The market flexibility factor differs from the sales flexibility factor as it is associated with having flexible market outlets rather than being flexible in the method or timing of sales activities. A high negative loading on the question associated with dealing with a minimum number of market outlets and highly positive loadings on questions relating to seeking new merchants and market outlets and being aware of the differences in returns from selling to different market outlets, indicates farmers with high factor scores on this strategic dimension would be likely to continually seek new market outlets and sell to a large number of market outlets.

7. *Stability*

This dimension has high factor loadings on questions associated with planning crop mixes to minimise risk, having a stable crop mix which grows well on the farm and meeting long term market requirements. Therefore farmers with high scores on this factor are likely to grow a stable mix of crops which are perceived to have low levels of production and/or sales risk.

8. *Low cost focus*

The low cost focus strategic dimension has high factor loadings on questions associated with having

low input costs. Farmers with high factor scores would be likely to have low input costs and budget and plan in order to obtain these low costs.

9. *Financial imperative*

Factor loadings indicate farmers with high factor scores on this factor feel they can't afford to store crops and wait for the price to improve. The negative factor loading on the question asking if farmers obtain high crop prices by holding crops in storage until the price improves also indicates these farmers are unlikely to store crops.

10. *Commercial sensitivity*

The commercial sensitivity factor is associated with keeping knowledge from other farmers. Significant loadings on questions relating to growing crops on a trial basis, selling crops on the free market, maximising farm profits and monitoring market prices indicate farmers with high factor scores on this strategic dimension are likely to be commercially sensitive.

11. *Financial focus*

The eleventh factor appears to relate to the perception that the farm gate is the boundary of the business and viewing the farm operation with a simple financial focus. Farmers scoring highly on this dimension are likely to be financially secure and feel that there is little they can do to influence the price of their produce.

12. *Off-farm financial focus*

This factor is associated with investing money off-farm, rather than into the farm. Farmers with high scores on this dimension are likely to farm in a relatively unconstrained manner and have easy access to capital that they are prepared to invest off-farm.

13. *Short term returns focus*

An examination of the factor loadings for the thirteenth factor indicates that farmers with high scores on the short term returns focus factor are likely to be involved in a number of activities associated with maximising short term returns. This factor has significant loading on questions relating to using specialist techniques to gain quality premiums and maximise yields, and being aware of crop costs and returns. A possible explanation for the significant negative loading on the question relating to growing crops which meet long term market requirements is that farmers with a high factor score on this dimension perceive they meet short term rather than long term market requirements.

7.4 Identifying Strategic Groups

After completing the factoring procedures, orthogonal or uncorrelated standardised factor scores (mean 0, standard deviation 1) for each farmer and factor were saved for subsequent cluster analysis. The cluster analysis was carried out using the two stage methodological procedure described in section 6.2.4. In the first stage a Ward's method hierarchical algorithm was utilised to identify initial cluster centroids (presented in table 7.4). These were used as seeds for a second stage clustering procedure employing the non-hierarchical algorithm, SPSS quick cluster. Two businesses were considered outliers using the arbitrary rule of failure to fuse within the last 10% of clusters, and dropped from subsequent analysis.

Table 7.4 Initial Cluster Centroids (seeds)

Cluster number.	Factor number												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0.111	0.558	0.405	0.209	-0.581	-0.651	-0.700	0.318	-0.228	-0.119	-0.184	-0.335	-0.244
2	0.184	-0.359	-0.565	-0.347	0.159	-0.249	0.384	-0.143	0.026	-0.130	0.368	-0.374	0.089
3	-0.406	-0.434	0.629	0.206	-0.176	0.740	0.046	-0.103	-0.387	0.175	-0.078	-0.212	-0.101
4	1.959	0.527	0.056	0.409	0.129	0.458	0.193	0.190	0.528	0.226	-0.086	0.685	-0.297
5	-0.840	0.421	-0.313	0.002	0.567	-0.099	-0.128	-0.006	0.396	0.032	-0.310	1.02	0.381

The preliminary clustering solution indicated a large change in the increase in cluster coefficients as clusters 5 and 6, and 2 and 3 were merged, indicating either a 5 or 2 cluster solution was appropriate (see section 6.2.4 and figure 7.2). Therefore solutions containing between 2 and 5 clusters were examined for interpretability and external validity, by testing if there were significant differences between clusters over descriptive variables that were not used to generate the clusters. A 5 cluster solution was deemed most meaningful as this solution was highly interpretable and appeared to have external validity. Solutions with less than 5 clusters forced groups of farmers together which seemed to follow relatively different business strategies. Figure 7.3 illustrates the percentage of businesses in each cluster. Strategic group members and the strategies they follow are described in the following section.

Figure 7.2

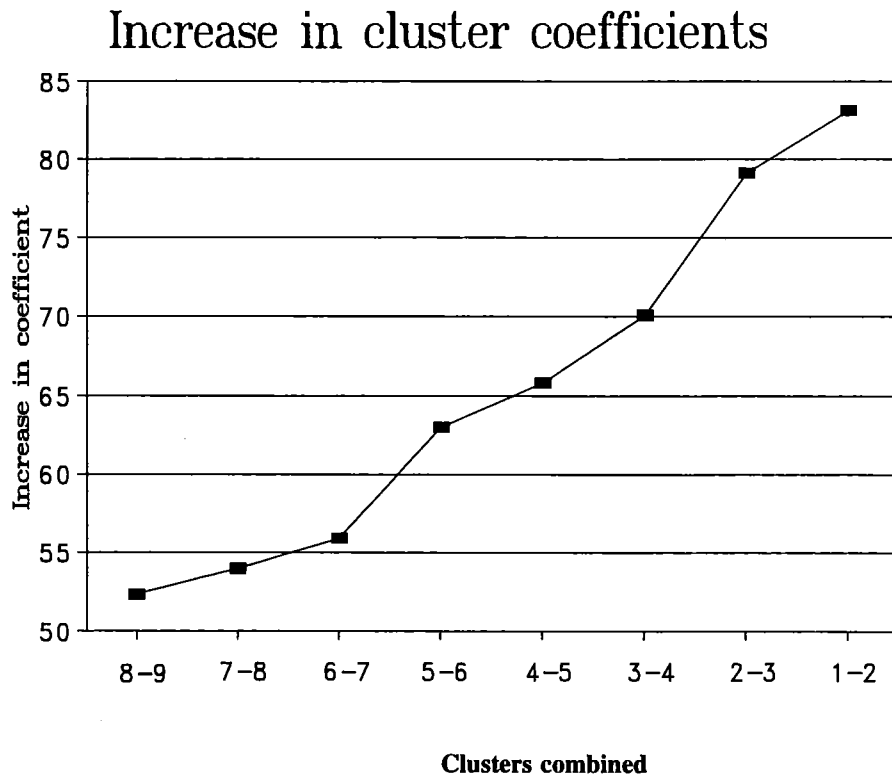
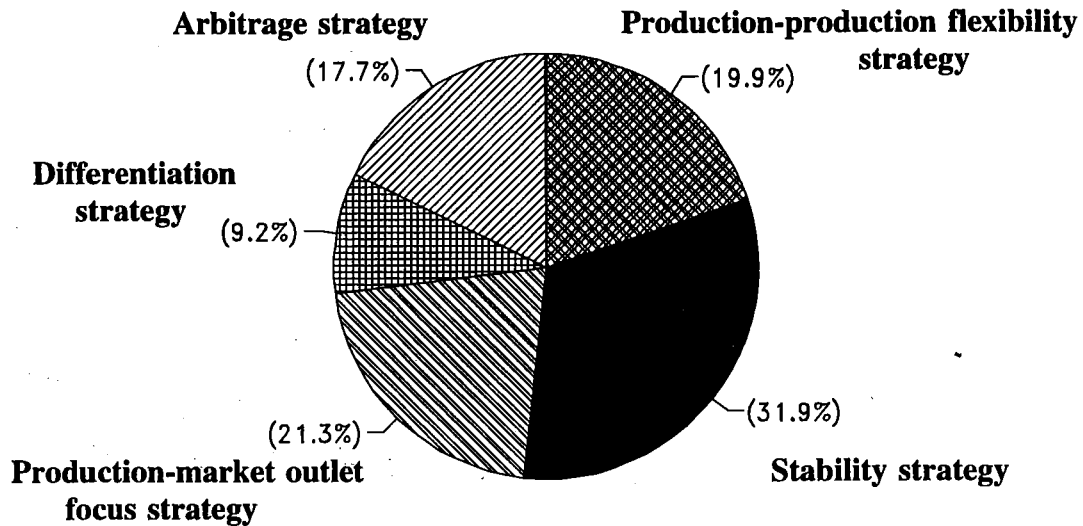


Figure 7.3

Proportion of Businesses in each Cluster



7.5 Describing Strategic Group Members and the Strategies they Follow

In section 6.2.4 it was described how it is possible to identify the differences between strategic groups by testing for significant variations between clusters on factor and descriptive variables using ANOVA analysis, chi square tests of independence, and Duncan's multiple range tests of homogeneity. In this section profiles of the strategies followed by members of each strategic group are developed and the management and personal characteristics of their owner/managers are described. The test results indicate that for many variables there are significant differences between strategic groups, suggesting that clusters have external validity. It is important to remember that the tests for inter-group differences may be conservative because the test statistics have not been adjusted with the finite population correction factor (see appendix 6.1).

Clusters are named and described according to the strategies their members follow after examining

the differences between factor scores for each strategic group on each strategic dimension. Profiles of group members are further developed after examining the differences between descriptive variables relating to farm and farmer characteristics, in order to ascertain if the personal and management characteristics of members are consistent with the strategies they follow.

7.5.1 The Strategy Followed by Members of each Group

Mean factor scores and standard deviations for farmers in each strategic group and each strategic dimension are presented in table 7.5. High mean scores indicate that a particular dimension is important to a business. For most strategic dimensions the small F probabilities indicate that cluster scores differ significantly between groups. Duncan's multiple range tests show the significant differences which exist between individual clusters (strategic groups) for each strategic dimension. The graphical representation of mean strategic group scores for each strategic dimension presented under table 7.5 is also useful as an aid in illustrating the differences between strategies. In appendix 7.3 the scores and inter-cluster differences for each individual question rather than individual factors are presented. The following paragraphs briefly describe the business strategy followed by each cluster.

1. Production/production flexibility strategy

This group contains 28 farmers or 20% of the sample. Cluster members score highly on the strategic dimensions associated with having production flexibility, a production focus, high levels of market knowledge and low costs. The low loading on the stability dimension is consistent with high levels of production flexibility while low scores on sales and market outlet flexibility factors indicates businesses following this strategy are concerned with the costs and efficiency of production rather than sales concerns. These farmers appear to be flexible in their production plans and focus

TABLE 7.5
Characteristics of Five Strategic Groups Derived from Cluster Analysis¹

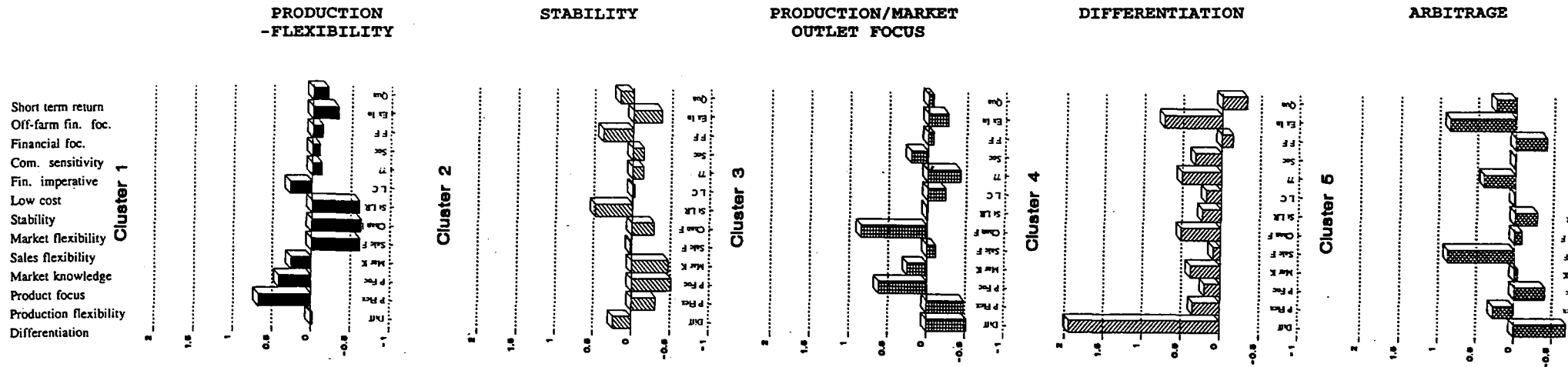
Strategic Dimensions	Strategic Groups					Duncan's Multiple Range Tests for Intergroup Differences ²											
	1	2	3	4	5	F ratio	F prob	1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-4	3-5	4-5
Differentiation	-0.0266 <i>0.2324</i>	0.2324 <i>0.7126</i>	-0.4982 <i>0.7087</i>	1.9443 <i>0.5972</i>	-0.7577 <i>0.6150</i>	36.98	0.000		**	***	***	***	***	***	***		***
Production flexibility	0.6765 <i>0.7949</i>	-0.3651 <i>0.9993</i>	-0.4821 <i>0.6940</i>	0.3451 <i>0.8082</i>	0.2980 <i>1.0938</i>	9.02	0.000	***						**	***	**	***
Product focus	0.4150 <i>0.5789</i>	-0.5030 <i>0.9942</i>	0.5969 <i>0.8142</i>	0.1996 <i>0.7886</i>	-0.3940 <i>1.1208</i>	9.73	0.000	***			***	***		**	***		***
Market knowledge	0.2598 <i>0.8169</i>	-0.4094 <i>1.0341</i>	0.2431 <i>1.0287</i>	0.3800 <i>0.6049</i>	-0.0282 <i>1.0109</i>	3.57	0.008	***				***		**			
Sales flexibility	-0.6203 <i>0.7994</i>	0.0890 <i>1.0029</i>	-0.1135 <i>0.7900</i>	0.0887 <i>0.6321</i>	0.6735 <i>1.1575</i>	6.69	0.001	***	***	**	***			**			***
Market flexibility	-0.6338 <i>0.7069</i>	-0.3146 <i>0.8743</i>	0.9007 <i>0.7367</i>	0.5034 <i>0.7743</i>	-0.0591 <i>1.0702</i>	15.14	0.000	***	***	***	**	***		***			***
Stability	-0.6125 <i>0.9186</i>	0.4473 <i>0.8854</i>	0.0247 <i>0.6549</i>	0.2373 <i>0.9729</i>	-0.2769 <i>1.0991</i>	6.34	0.000	***	**	**				***			
Low cost focus	0.2762 <i>0.0715</i>	-0.1088 <i>1.1895</i>	-0.2557 <i>0.7283</i>	0.1892 <i>0.5060</i>	0.1137 <i>0.9925</i>	1.36	0.251		*								
Financial imperative	-0.1258 <i>0.9290</i>	-0.0394 <i>1.1022</i>	-0.4594 <i>0.7862</i>	0.5079 <i>0.7081</i>	0.4163 <i>0.9458</i>	4.04	0.040			*	*			*	*	***	***
Commercial sensitivity	-0.1040 <i>1.1943</i>	-0.1244 <i>0.9179</i>	0.2155 <i>0.9283</i>	0.3313 <i>1.1178</i>	-0.0727 <i>0.9416</i>	0.98	0.420										
Financial focus	-0.1353 <i>0.9637</i>	0.3784 <i>0.9754</i>	-0.1234 <i>0.7942</i>	-0.1487 <i>1.0471</i>	-0.2719 <i>1.1685</i>	2.44	0.050				**			**			
Off-farm financial focus	-0.3309 <i>0.7645</i>	-0.3849 <i>0.8310</i>	-0.2979 <i>0.7065</i>	0.7448 <i>0.6455</i>	1.0321 <i>1.1015</i>	16.59	0.000			***	***			***	***	***	***
Short term return focus	-0.1986 <i>1.0282</i>	0.0789 <i>1.2602</i>	-0.0570 <i>0.7814</i>	-0.3199 <i>0.6669</i>	0.3080 <i>0.7712</i>	1.30	0.274				*						
Number of businesses ³	28	45	30	13	25												

¹ Means are reported, standard deviations in italics

² * p < 0.10
 ** p < 0.05
 *** p < 0.01

³ n=141

Graphical Representation Strategic Dimensions Associated with Strategic Group Membership



on production technology and concerns rather than marketing activities associated with distribution channels.

2. Stability strategy

The second cluster is the largest of all containing 32% of the sample. Farmers in this strategic group have significantly higher scores on the stability and financial focus factors than most other group members. The low score on the production flexibility factor is consistent with high scores on the stability factor indicating that these farmers consistently plant a standardised crop mix which they feel grows well on their farm. High scores on the strategic dimension relating to financial focus and low scores on the off-farm financial focus dimension signifies these farmers are likely to operate with a simple financial focus and view the farm gate as the boundary of the farm business. The low score on the market knowledge factor may be explained by low factor scores on the production flexibility, production focus and market outlet flexibility strategic dimensions. Because these farmers are unlikely to grow new crop types or varieties, or change production or sales techniques they may not need to monitor market signals to the same extent as other farmers.

3. Production/market outlet focus strategy

The production focus/market outlet focus strategic group contained 21% of the sample. An examination of table 7.5 indicates these businesses place emphasis on production activities, but have an inflexible crop mix and a high degree of channel flexibility. The high scores on the market outlet flexibility factors indicates they sell to a large number of different agents or market outlets, are continually searching for new market outlets or agents and are likely to weigh up the costs and returns of selling to different market outlets.

4. Differentiation strategy

Differentiators are members of the smallest strategic group and represent just 9% of the sample. Members scores are significantly higher than other firms on the strategic dimension relating to differentiation, suggesting these farmers are likely to differentiate their produce by; growing niche crops, further processing and marketing, or involvement in other value adding activities. They score positively on all strategic dimensions except those associated with having a short term returns focus and viewing the farm with a simple financial focus. High levels of off-farm investment activity may be explained by involvement in further processing and marketing activities and through vertical integration. The relatively flexible production focus is consistent with growing niche crops. A high score on the market outlet flexibility dimension may be associated with producing non traditional crops that are sold through market outlets that are different from those for traditional crops, or farmers developing their own markets for produce. Differentiators are likely to have high levels of market knowledge and score highly on the financial imperative dimension.

5. Arbitrage strategy

The fifth strategic group contains 18% of the sample. Businesses are characterised by their high level of sales flexibility which means they are likely to sell crops on the free market rather than by contract. They will also store crops and wait for the price to improve. These farmers have a short term returns focus and concentrate on sales and investment opportunities (including off-farm investments), rather than production concerns. It appears that they obtain satisfaction either by obtaining high crop prices through gaining quality premiums, selling produce at an optimal time of year, or by involvement in off-farm financial activities. The high scores on the financial imperative dimension are hard to interpret because a sales focus indicates that these farmers would be likely to store crops and wait for the price to improve.

In summary, members of each group appear to operate their businesses in a distinctive manner and follow clearly defined but seemingly different business strategies. The first group follows a production focus-flexibility strategy and appears to concentrate on the costs and efficiency of production rather than sales concerns. The second group is concerned with stability and growing a stable crop mix which has been grown previously on their farm. Farmers following a production-market outlet focus strategy place emphasis on production activities, but have an inflexible production mix and high degree of channel flexibility. Differentiators concentrate on making crops different from those of other producers while arbitragers are characterised by their focus on sales and investment opportunities, both on and off-farm. The following sub-sections further develop profiles of strategic group members and the strategies they follow.

7.5.2 Farm and Farmer Characteristics

In this section profiles of group members are further developed by examining the differences between descriptive variables relating to farmer and farm characteristics. Table 7.6 presents the means, standard deviations and statistical tests associated with determining the differences between clusters for many of these descriptive variables while tables 7.7 to 7.9 present the results for variables where chi-square tests of independence were used to test for inter-cluster differences. For some variables the results of ANOVA tests should be interpreted with caution because the assumptions of normal distribution and equal variance may have been broken. In other cases the results of these tests may be conservative because the test statistics have not been adjusted with the finite population correction factor (see appendix 6.1). The following paragraphs describe farm size and crop areas, stock numbers, financial characteristics and personal characteristics of farm owners/managers and their work experience.

Table 7.6
Farm and Farmer Characteristics

	Strategic Group						Duncan's Multiple Range Tests for Intergroup Differences ¹											
	1	2	3	4	5	Av	F ratio	F prob	1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-4	3-5	4-5
FARM CHARACTERISTICS																		
FARMING AREAS (hectares)																		
Farm area	271.9 <i>205.2</i>	228.5 <i>322.0</i>	221.8 <i>130.8</i>	318.1 <i>167.4</i>	130.3 <i>62.3</i>	226.6 <i>224.0</i>	2.04	0.091				**			*			**
Effective cropping area	244.1 <i>153.6</i>	170.6 <i>89.5</i>	204.0 <i>119.3</i>	294.8 <i>155.7</i>	106.1 <i>53.4</i>	192.3 <i>124.9</i>	8.15	0.000	**			***		***	**	**	***	***
Area cropped during 1991/92	203.9 <i>127.8</i>	142.5 <i>83.3</i>	147.7 <i>108.7</i>	274.5 <i>170.3</i>	95.1 <i>47.9</i>	159.6 <i>114.6</i>	7.92	0.000	**	**	***	***		***	*	***	*	***
Irrigated area	125.6 <i>152.8</i>	53.8 <i>82.1</i>	62.3 <i>79.8</i>	85.6 <i>94.4</i>	32.9 <i>44.4</i>	69.1 <i>100.1</i>	3.69	0.001	***	**		***						
Area managed for another farmers	4.1 <i>21.9</i>	0.0 <i>0.0</i>	0.0 <i>0.0</i>	0.0 <i>0.0</i>	0.0 <i>0.0</i>	0.8 <i>9.8</i>	1.01	0.405										
Area rented or leased to others	16.2 <i>75.8</i>	1.1 <i>7.2</i>	2.3 <i>8.8</i>	2.7 <i>7.3</i>	0.6 <i>1.7</i>	4.4 <i>34.3</i>	1.05	0.386	*									
Area rented or leased from others	74.2 <i>216.4</i>	21.4 <i>57.0</i>	18.1 <i>41.1</i>	55.4 <i>74.6</i>	11.8 <i>38.3</i>	32.6 <i>108.1</i>	1.70	0.153	*	*		*						
OWNER/MANAGER CHARACTERISTICS																		
FARMING EXPERIENCE (years)																		
Involvement with crop farming	23.14 <i>10.22</i>	29.78 <i>10.87</i>	24.75 <i>13.73</i>	23.85 <i>7.89</i>	16.72 <i>10.60</i>	24.53 <i>11.87</i>	5.70	0.000	*			*	*		***		**	*
In charge of making crop farm decisions	17.14 <i>12.32</i>	24.31 <i>12.02</i>	18.90 <i>11.84</i>	19.23 <i>10.22</i>	12.64 <i>9.83</i>	19.20 <i>12.09</i>	4.46	0.002	**				*		***			
Working on present farm	17.77 <i>12.68</i>	25.69 <i>12.20</i>	20.91 <i>11.32</i>	17.62 <i>7.89</i>	13.24 <i>11.22</i>	20.14 <i>12.32</i>	5.24	0.001	***				*	**	***		***	
In charge of making decisions on present farm	14.26 <i>11.93</i>	21.06 <i>10.65</i>	16.12 <i>10.04</i>	15.54 <i>9.39</i>	11.76 <i>10.04</i>	16.50 <i>10.99</i>	3.69	0.007	**				*		***			
WORK AWAY FROM FARM (days per month)																		
Working at farm related activities	4.05 <i>5.56</i>	1.73 <i>1.37</i>	3.86 <i>5.84</i>	3.92 <i>2.50</i>	1.86 <i>1.75</i>	2.87 <i>3.98</i>	2.72	0.322	**			*	**					*
Earning income at another job	0.39 <i>1.50</i>	0.63 <i>1.79</i>	0.75 <i>2.15</i>	2.15 <i>2.61</i>	4.16 <i>5.83</i>	1.38 <i>3.28</i>	7.25	0.000				***			***		***	*

Means are reported, standard deviations in italics

¹ * p < 0.01

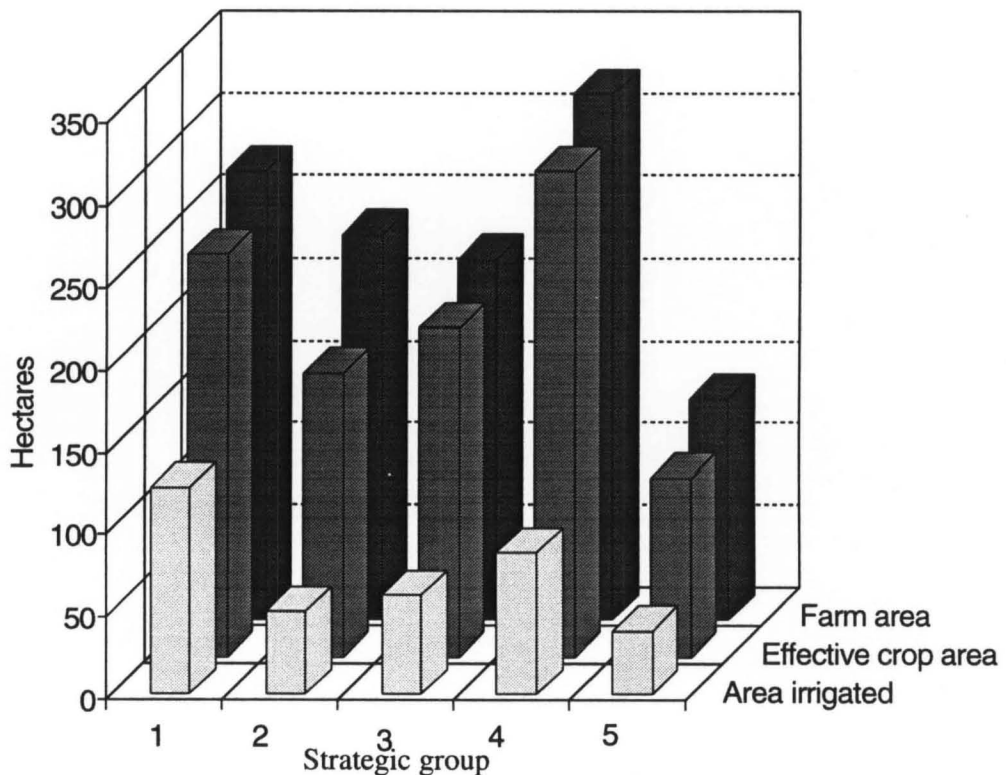
** p < 0.05

*** p < 0.1

Farm Size and Crop Areas

The detailed relationships between crop areas and strategic groups are presented in the top part of table 7.6 and some of the key results are graphically illustrated in figure 7.4. Results show that farmers following a differentiation strategy have the highest land and effective crop areas, and planted the largest areas of crops in the 1991/92 season, followed by farmers utilising a production focus/production flexibility strategy who also have the largest areas of irrigated land. Members of both of these strategic groups have high scores on the production focus and production flexibility strategic dimensions. Farmers following an arbitrage strategy have significantly smaller effective crop areas and irrigated areas than all other farmers. No significant differences were found in the land areas managed for other farmers, however farmers in the production focus/flexibility cluster are slightly more likely to rent or lease land to, or from, other farmers, than some other strategic group members. This may be associated with their focus on production activities and emphasis on having flexible production plans.

Figure 7.4 Farm Area Statistics



Stock Numbers

The second part of table 7.6 shows the number of ewes, other sheep and cattle which members of each strategic group over-winter. There are no significant differences between the number of ewes which group members over-winter, however differentiators appear to over-winter high numbers other sheep and cattle which can possibly be explained by their large farm areas. Table 7.7 presents the percentage of farmers in each cluster who breed their own ewes. Chi square tests of independence could not be correctly used because some cells had a very small number of cases, however similar percentages in each cell of the contingency table indicate the decision to breed replacement ewes does not appear to be associated with strategic group membership.

Table 7.7

Percentage of Strategic Group Members who Breed their own Replacement Ewes
Strategic group

Production focus/flexibility	Stability	Production/market outlet	Differentiation	Arbitrage	Average
23	21	13	15	17	18%

Financial characteristics

Table 7.8 contains two contingency tables which show the percentage of farmers in each strategic group who have certain levels of debt servicing³ and earn specific percentages of gross farm income from crop farming. Because of the small number of observations in some cells of the contingency table, the differences between every cell could not be accurately tested. In order to obtain a significant number of observations in all cells, the chi square tests (described in appendix 6.1) were based on a contingency table where a number of rows in the first column were combined. For example, the chi square statistic which analyzed differences in the percentage of farm income from crop farming tested if there were differences between strategic group members who receive 80% or more of their income from crop farming and those who receive less than 80% of their income

³ defined as interest and principal payments as a proportion of gross farm income for the 1991-1992 financial year

from this source. The level of significance for the tests are presented in brackets after the chi square statistic. A significant chi square statistic indicates that differences between the percentage of strategic group members who earn more and those that earn less, than 80% of their farm income from crop farming. Some differentiators earn a relatively low amount of farm income from this source, possibly because some of their income is obtained through further processing, value adding, or other marketing activities which they do not classify as crop farm income.

Table 7.8

Financial characteristics

	Strategic group					
	Production focus/flexibility	Stability	Production/market outlet	Differentiation	Arbitrage	Average
% Farm Income from Crop Farming						
50-59%	7	2	0	0	8	4%
60-69%	4	11	3	15	0	6%
70-74%	4	7	7	15	0	6%
75-79%	7	9	10	15	12	10%
80-84%	14	13	13	0	32	16%
85-89%	5	18	17	0	8	16%
90-94%	18	13	20	23	24	19%
95+%	21	14	20	23	24	19%
Expected value	68%	72%	77%	73%	84%	

Chi-square = 4.308 (0.036) for less than 80%, greater than 80% income from crop farming

Debt servicing

0-4%	14	27	24	0	36	23%
5-9%	11	7	3	0	4	6%
10-14%	21	20	7	23	12	17%
15-19%	14	18	35	31	16	22%
20-24%	25	18	24	23	12	20%
25-29%	14	2	3	8	12	7%
30-34%	0	7	0	8	0	3%
35-39%	0	0	0	0	4	1%
>40%	0	0	3	8	4	2%

Chi-square in 2.229 (0.694) for under 20% /over 20% debt

Chi-square = 5.945 (0.203) for under 15% /over 15% debt

To test if there were differences between farmers debt servicing requirements two separate chi square tests were carried out. The first tested if there were differences between strategic group members who spent less than 15% of their gross farm income servicing debt and those who spent more than this amount servicing debt. The second test was based on testing if there were differences between cluster members who spent less, compared with more, than 20% of their income on debt servicing. Chi-square statistics for both tests indicate there are not significant differences between strategic group members debt servicing requirements, however all differentiators spend more than 10% of their gross farm income servicing debt, indicating all farmers following this strategy have some debt. This may help explain why differentiators score highly on the financial imperative strategic dimension.

Personal characteristics of the farmer

Some of the personal characteristics of intensive cropping farmers are presented in table 7.9 which shows the percentage of farmers in each cluster who fall into specific age categories and the number of years strategic group members have spent at tertiary institutions. A chi-square value of 16.636 indicates that highly significant inter-group differences exist between the proportion of farmers aged under 50, and those aged over 50. The majority of farmers following a stability strategy are over 50, while most farmers in other strategic groups are younger than this. Although most farmers have not attended tertiary institutions, there are differences between the number of farmers with more, and less than, one years tertiary education because most farmers following a differentiation strategy (61%) have spent one or more years gaining higher education qualifications. A relatively high proportion of farmers utilising a differentiation (23%) and arbitrage (20%) approach have spent between 3 and 4 years at tertiary institutions indicating these farmers may have obtained university degrees.

Table 7.9
Personal Characteristics of Farmers

	Strategic group					Average
	Production focus/flexibility	Stability	Production/market outlet	Differentiation	Arbitrage	
	Age (years)					
Age						
20-29	14	7	7	8	12	9%
30-39	29	13	33	39	32	27%
40-49	36	20	27	23	36	28%
50-59	21	42	23	31	16	28%
60-69	0	18	10	0	4	9%
Expected Age	42	50	39	42	42	

Chi square = 16.636 (0.002) for under 50/over 50 years old

Years	Years attended university or tertiary institutions					
<1	71	87	72	39	56	71%
1	14	2	7	8	16	9%
1-2	0	2	7	8	16	6%
2-3	7	2	3	8	0	4%
3-4	7	4	7	23	20	10%
4+	0	2	3	0	0	1%
Expected Value	0.5	0.3	0.5	1.2	1.1	

Chi square = 14.721 (0.005) for less than one/ more than one years tertiary education

Work experience

The discussion in the following paragraphs provides a profile of strategic group members work experience by describing both on-farm and off-farm work experience and positions of responsibility.

The farming experience section of table 7.6 presents results from the analysis of a number of variables relating to farm experience and some of the mean values are graphically illustrated in figure 7.5. An examination of the results shows that farmers following a stability strategy have spent the most time involved with crop farming, working their present crop farm and in charge of

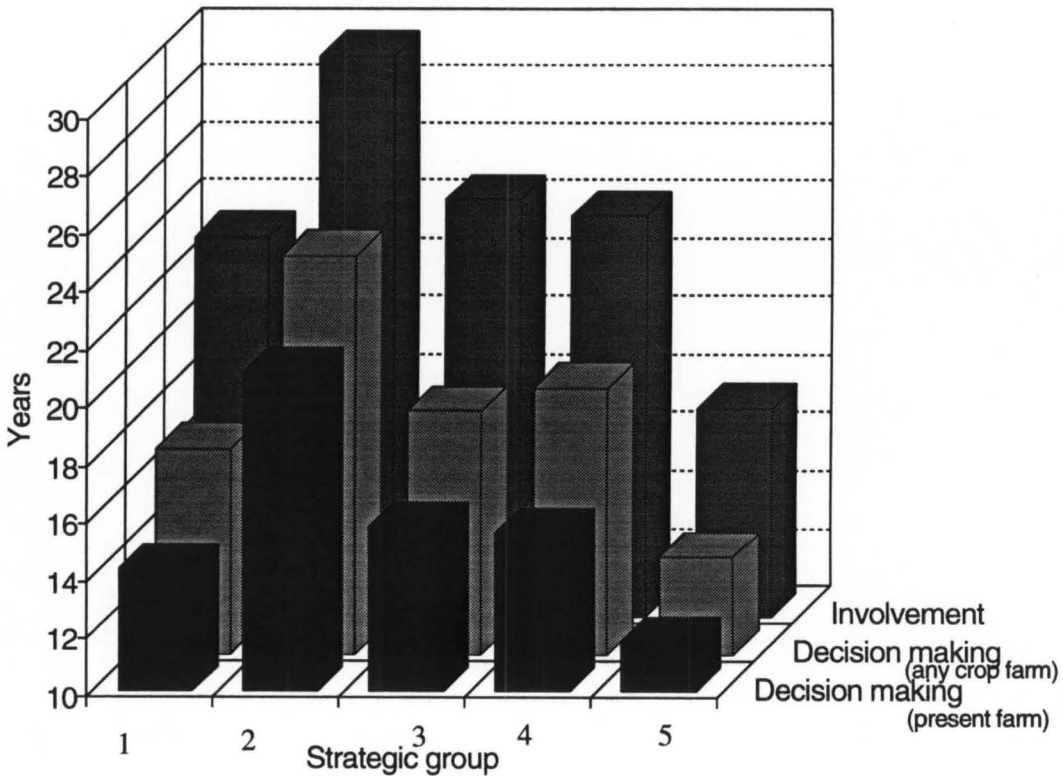
making decisions on both their present and another crop farm. Farmers following an arbitrage strategy have spent significantly less time gaining this type of experience signifying they have been intensive crop farming for a shorter period of time than many other strategic group members. The information contained in table 7.10 indicates that these farmers are also more likely to have worked at a non-farm job.

Table 7.10 Percentage of Strategic Group Members who have Worked at a Non-Farm Job

Strategic group					
Production focus/flexibility	Stability	Production/market outlet	Differentiation	Arbitrage	Average
29	18	21	31	60	31

Chi square = 15.321, (0.004)

Figure 7.5 Farmer Experience



Farmers were asked if they occupied positions with more responsibility than a normal voting member with marketing cooperatives and farmer organisations and if they owned or managed a non-farm business. Statistical tests could not be carried out to assess if there were significant inter-group differences because many cells of the contingency table contained a low number of cases, however clear inter-cluster variations appear to exist. Results shown in table 7.11 and graphically illustrated in figures 7.6 and 7.7 clearly demonstrate that a high proportion of differentiators are involved in both farm and non-farm related organisations and business. These farmers do not appear to view the farm gate as the boundary of the business operations, which is indicated by the low score on the financial focus factor and high scores on the off-farm financial focus dimension. The high percentage of differentiators owning, managing or directing non-farm businesses may be associated with vertical integration and their involvement in further processing, value adding and marketing activities. A relatively high proportion of farmers following a production focus/flexibility strategy are likely to occupy positions of responsibility in farmer organisations and marketing cooperatives, however unlike differentiators they limit their involvement to business activities directly related to the farm.

Figure 7.6 Positions of Responsibility within a Non-Farm Business

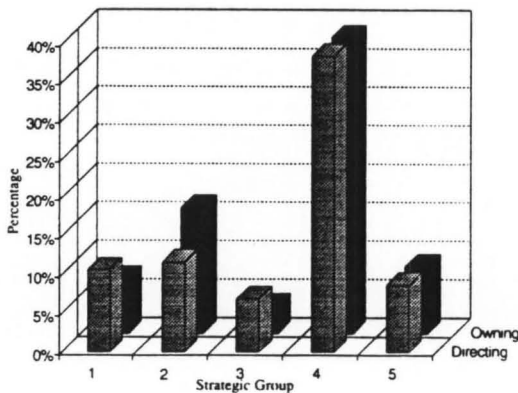


Figure 7.7 Position of Responsibility (Farm Related)

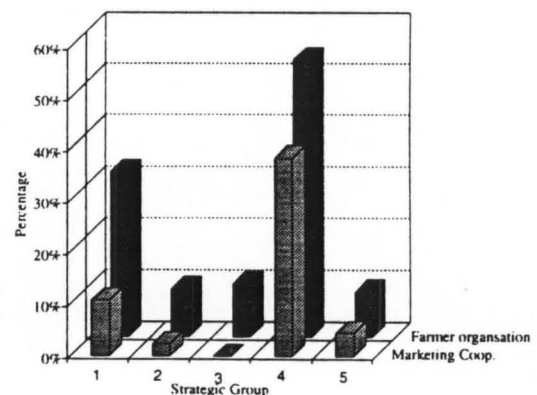


Table 7.11
Positions of responsibility

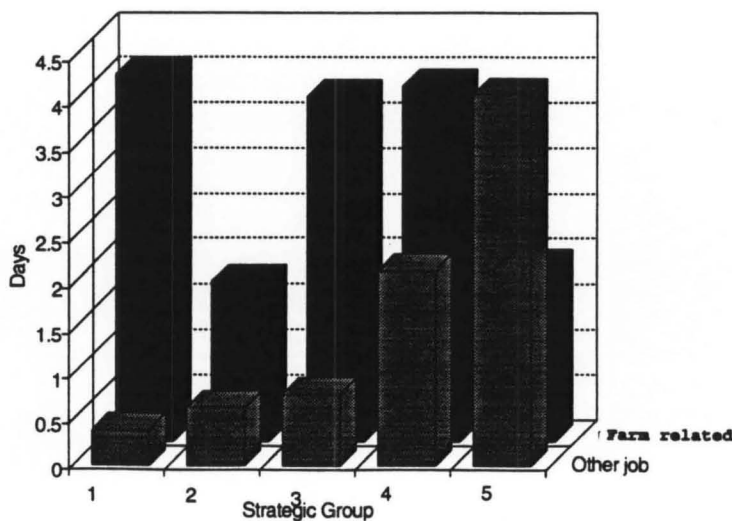
(% of strategic group members with more responsibility than normal voting members)

	Strategic group					Average
	Production focus/flexibility	Stability	Production/market outlet	Differentiation	Arbitrage	
Marketing cooperative	11	4	0	39	0	7%
Farmer organisation	32	11	11	54	8	19%
Owning Non-farm business	7	16	4	39	13	13%
Directing/managing non farm business	11	11	7	39	8	12%

Work away from Farm

Figure 7.8 illustrates the differences in the time cluster members spend working away from the farm while the bottom section of table 7.6 presents the statistical results from this part of the analysis. Farmers following a stability and arbitrage strategy spend less time working away from the farm on farm related activities than farmers whose strategies generally focus more on production activities and/or having flexible crop mixes. Arbitrators spend significantly more time than other group members earning income at another job which means that they are more likely to have part time employment away from the farm. Members of the stability group do not spend many days working away from the farm.

Figure 7.8 Time spent Working away from the Farm
(days per month)



7.5.3 Crop Mix

The diverse range of crops grown in the Canterbury area and the small number of farmers growing some crops make it difficult to obtain an overall picture by examining data relating to individual crops. Therefore, the crops were divided into niche, vegetable, specialty¹ and traditional crop types in order to increase the interpretability of the results. The individual crops which were classified into each crop type are presented in table 7.12, while the proportion of strategic group members growing each individual crop are listed in appendix 7.4.

Analysis of crop areas or a concentration index based on relative areas is unlikely to indicate the importance of niche, vegetable, or specialty crops to a farm business. Therefore in the first part of the analysis the differences in crop mixes between clusters were examined by analysing the numbers of each type of crop which strategic group members grew. The average numbers of each type of crop produced by strategic group members is illustrated in figure 7.9. Although there were no differences in the number of traditional crops grown by farmers, results from an ANOVA analysis indicate that there are significant differences in niche, vegetable, specialty and total crop numbers (see table 7.13). Differentiators and farmers in the production/production flexibility group grew a significantly higher total number of crops and niche crops than other strategic group members. These results are consistent with the strategies these farmers are following because they are the only strategies for which farmers have high scores on both the production flexibility and production focus dimensions. Differentiators grow significantly higher numbers of vegetable crops than all other strategic group members, while farmers following a production/production flexibility grow the highest numbers of specialty type crops.

¹ Specialty crops are not vegetable or niche crops but are traditional crops that require specialised techniques to produce or harvest.

Figure 7.9 Number of Different Types of Crops Grown

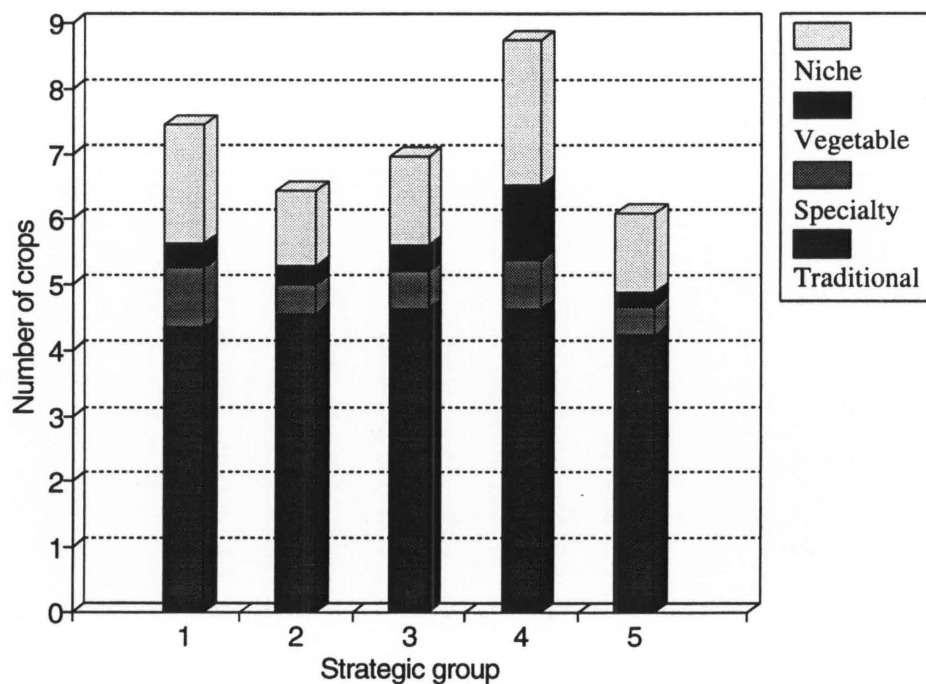


TABLE 7.12 Crops making up each Crop Type

Traditional crops

Wheat
 Barley
 Clover
 Peas
 Lentils
 Potatoes
 Oats
 Malting barley
 Ryegrass
 Fescue

Specialised crops

Seed barley
 Garden-freezer peas
 Garden freezer beans
 Hay-silage
 Linseed
 Kale
 Triticale
 Lotus
 Rye-corn
 Oilseed rape

Niche crops

Broom
 Chicory
 Evening Primrose
 Coriander
 Sunflowers
 Chinese Celery
 Celery Seeds
 Lupins
 Turf Grass seed
 Borage
 Unspecified Niche Crops

Vegetables

Carrots
 Chinese Cabbage
 Radish
 Sweet Corn
 Squash
 Onions

Table 7.13
Crop Mix

	Strategic Groups					Av	F ratio	F prob	Duncan's Multiple Range Tests for Intergroup Differences ¹									
	1	2	3	4	5				1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-4	3-5	4-5
NUMBER OF VARIOUS TYPES OF CROPS GROWN																		
CROPS																		
Traditional	4.36 1.37	4.56 1.62	4.63 1.30	4.62 1.66	4.24 1.56	4.48 1.49	0.340	0.851										
Niche	1.82 1.02	1.16 0.43	1.37 0.67	2.23 1.09	1.20 0.41	1.44 0.81	8.814	0.000	***	**	*	***		***		***	***	
Vegetables	0.36 0.56	0.29 0.69	0.40 0.72	1.15 1.21	0.24 0.44	0.40 0.71	4.373	0.002			***			***		***	***	
Specialty	0.93 1.22	0.47 0.73	0.57 0.68	0.77 0.83	0.44 0.65	0.62 0.84	1.744	0.144	**			*						
Total	7.46 2.49	6.47 2.20	6.97 1.92	8.77 2.62	6.12 1.81	6.92 2.28	4.095	0.004	*		*	**		***		**	***	
% OF EFFECTIVE CROP AREA GROWN IN INDIVIDUAL CROPS																		
Wheat	21 11.5	21 10.3	24.7 9.3	19.7 7.9	30.5 21.5	26.1 12.2	1.105	0.358										
Clover	18.0 13.1	23.3 10.9	24.2 12.2	14.6 6.1	24.4 11.7	22.3 12.9	2.304	0.063	*	*				**		**	**	
Barley	14.7 9.7	21.6 12.9	20.7 13.8	14.5 12.7	25.2 13.0	19.0 12.5	1.201	0.314										
Pea	14.0 8.1	16.0 9.1	16.5 9.4	15.3 13.3	19.1 6.1	17.1 13.4	0.909	0.416										
Lentils	8.3 6.9	7.7 3.8	9.6 7.7	9.5 6.9	12.3 7.5	9.0 6.3	0.410	0.800										
Oat	6.0 3.6	5.6 3.6	6.1 6.0	1.6 1.7	13.7 12.2	7.6 7.8	2.060	0.116							**		*	
Malting Barley	26.0 14.1	20.8 15.5	21.8 13.7	2.4 13.9	27.7 13.6	23.0 14.2	0.796	0.541										
Rye	12.4 6.4	11.9 4.6	14.8 8.3	18.6 10.9	16.1 9.9	13.9 7.5	0.984	0.426										
Fescue	26.5 14.6	12.4 8.8	11.7 8.7	25.1 20.3	11.3 5.2	14.6 10.9	2.836	0.041	**	**		**		**		**	**	

Means are reported, standard deviations in italics

¹ * $p < 0.01$ ** $p < 0.05$ *** $p < 0.1$

Note: For the crop mix data Anova tests must be interpreted with caution because the data is not normally distributed

Variations in the percentage of effective crop areas planted in frequently produced crops (wheat, clover, barley, peas, lentils, oats, malting barley, rye and fescue) were also examined (see table 7.13). The only crops for which significant differences existed were clover and fescue. Farmers in the production focus/flexibility and differentiation groups had low proportions of their effective crop areas planted in clover, but produced high proportions of fescue. Because fescue is a less traditional crop than clover it could be expected that farmers with flexible production plans would be more likely to grow fescue than other farmers.

7.5.4 Sales Methods

The percentage of strategic group members selling ten of the most frequently grown crops using a particular sales method is shown in appendix 7.5. As expected, the sales method utilised appears to vary according to the type of crop grown. For example most farmers growing wheat use a forward price contract, while clover and ryegrass are more likely to be sold on the free market. Differences also appear to exist between the sales methods used by members of different strategic groups, although the large amount of data available makes it hard to quantify inter-group differences without further statistical analysis.

7.5.5 Miscellaneous Marketing Characteristics

The results of testing for differences between strategic group members' answers on questions relating to a number of miscellaneous marketing characteristics are presented in table 7.14. These statistics describe the number of agents or market outlets which cluster members sell to, the number of crops they were presently growing, which they had not grown previously and the marketing orientation of cluster members.

Farmers following a production/market outlet focus and differentiation strategy sell their produce to more agents or market outlets than other strategic group members, as is illustrated by examining the darker column of bars at the back of figure 7.10. Production/market outlet focusers have high scores on the market outlet flexibility strategic dimension which indicates they actively seek new market outlets and sell to a large number of market outlets. Differentiators grow many different types of non-traditional crops which may necessitate the utilisation of non-traditional market outlets, or lead to farmers developing their own markets for these crops.

Table 7.14
Miscellaneous Marketing Characteristics

	Strategic Group					Av	F ratio	F prob	Duncan's Multiple Range Tests for Intergroup Differences ¹								
	1	2	3	4	5				1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-4	3-5
Number of agents or market outlets crops were sold to last year	3.64 1.79	3.84 1.75	5.76 3.47	5.85 2.79	3.48 2.46	4.32 1.58	6.211	0.000	***	***		***		***		***	***
Number of this years crops not grown previously on farm	1.64 1.81	0.68 0.97	0.66 1.01	1.85 1.68	0.64 0.91	0.97 1.32	5.062	0.001	**	**		**		**		**	*
Buyer orientation ²	3.29 0.71	2.93 1.11	2.77 1.01	3.31 0.63	3.04 1.10	3.02 0.98	1.376	0.246		*							
Final consumer orientation ²	2.71 1.08	2.59 1.07	2.47 0.94	3.23 0.83	2.40 0.94	2.61 1.05	1.641	0.168						*		**	**

Means are reported, standard deviations in italics

¹ * $p < 0.01$ ** $p < 0.05$ *** $p < 0.1$

Farmers were asked the extent to which they agreed with the statement that they increased their farm business success by satisfying the needs and wants of either the buyers or final consumers of their produce on a scale from 0 (strongly disagree) to 4 (strongly agree)

The front row of lighter coloured bars in figure 7.10 illustrates the number of crops which strategic group members are growing which they had not grown previously. Differentiators and members of the product/production flexibility cluster are significantly more likely than other cluster members to be growing crops which they had not grown previously. This appears to be associated with their flexible production plans and the large number of crops they grow.

The degree of marketing orientation was assessed by asking farmers if they agreed with the statement that they increase their farm business success by satisfying the needs and wants of either the buyers or final consumers of their produce. This was evaluated on a five-point Likert type scale coded from 0 (strongly disagree) to 4 (strongly agree), with the results from these questions illustrated in figure 7.11. Differentiators scored highest on both questions indicating they have the highest marketing orientation of any strategic group.

In addition farmers were asked if they grew specialist or niche crops, or further processed, marketed or added value to their produce. The information presented in table 7.15 suggests that there were significant differences in the way that farmers in different clusters answered this question. As

expected, most differentiators (85%) were involved in these activities. Almost half of the farmers following a production focus/ production flexibility strategy were involved in further marketing or value adding activities, while no more than 20% of the members of any of the other 3 strategic groups were involved in these activities.

Table 7.15 Percentage of Farmers Involved with Marketing, Growing Niche Crops or other Value Added Activities

Strategic group					
Production focus/flexibility	Stability	Production/market outlet	Differentiation	Arbitrage	Average
46	20	20	85	16	35%

Chi square = 27.693 (0.000)

Figure 7.10 Number of Agents Sold, to and Crops which had not been Grown Previously

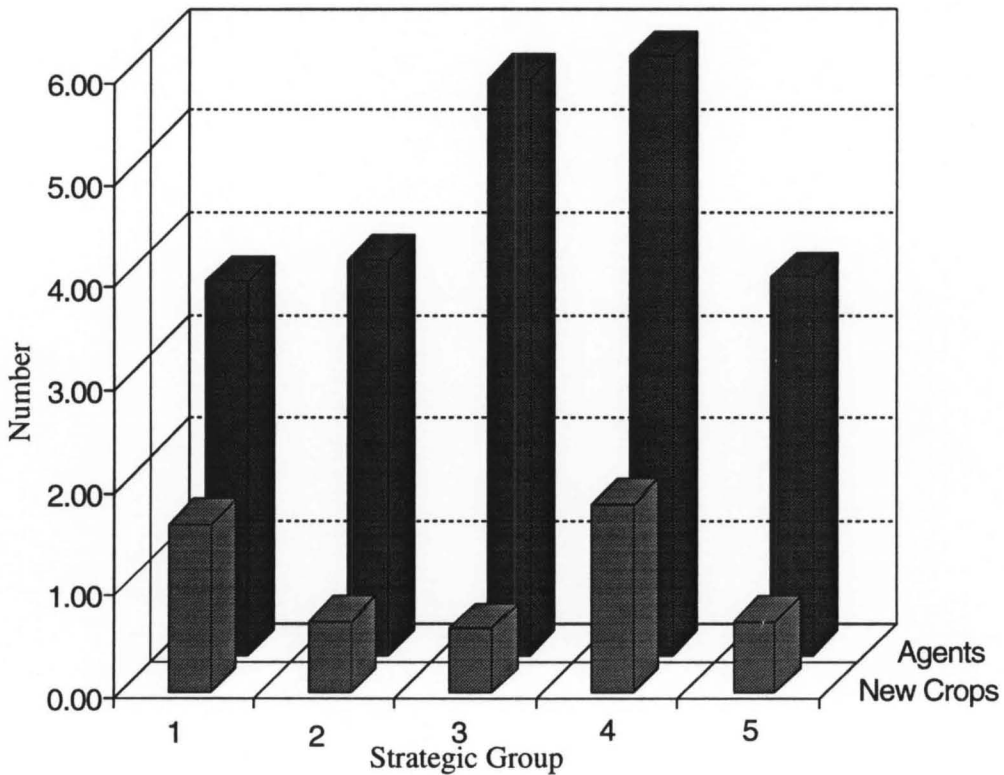
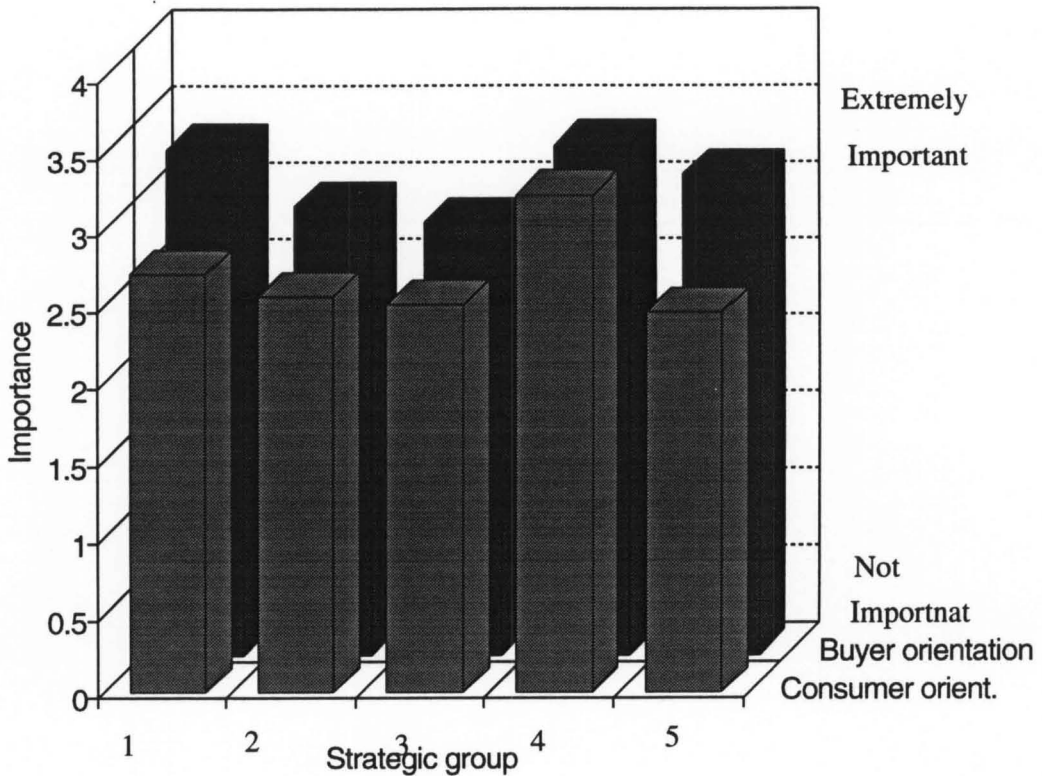


Figure 7.11 Marketing Orientation



7.5.6 Information gathering

Results from the analysis of the sources and types of information which strategic group members perceive to be important are presented in tables 7.16 and 7.17. The results from ANOVA analysis and Duncan's tests are presented in table 7.16 with each information type and source presented in decreasing order of diversity. ANOVA statistics show there are significant differences ($p < 0.05$) between the perceived importance of overseas newspapers and magazines, agents, farmer group meetings, crop field days, farm workers, personal records, farm advisors and A and P shows as information sources. Similarly, contrasts were found for the value of management practices, crop costs and returns, overseas crop prices, New Zealand crop yields, overseas crop stockpiles and new crops and varieties, as information types. Results from Duncan's multiple range tests indicate there are significant differences between members of every strategic groups' perceived importance for at

Table 7.16
Information Utilised by Strategic Groups Members

	Strategic Group					ANOVA			Duncan's Multiple Range Tests for Intergroup Differences ¹										
	1	2	3	4	5	Av	F ratio	F prob	1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-4	3-5	4-5	
Information sources																			
Overseas Newspapers /magazines	2.00 1.14	0.89 1.05	0.97 1.05	2.77 1.24	1.08 1.19	1.33 1.26	10.769	0.000	***	***	**	***		***		***		***	
Agents	2.75 1.00	3.15 0.93	3.03 1.02	1.77 1.09	2.80 0.96	2.86 1.04	5.358	0.001			***			***		***		***	
Farmer group meetings	2.44 1.12	1.71 1.31	2.45 1.35	2.77 1.09	1.68 1.31	2.10 1.31	3.705	0.007	**			**	**	**				**	**
Crop field days	3.25 0.80	2.51 1.26	3.28 0.79	2.92 1.26	2.56 1.29	2.86 1.32	3.667	0.007	***			**	***					**	
Farm workers	1.00 0.98	1.02 1.03	1.06 1.08	2.15 1.41	1.08 0.91	1.14 1.09	3.343	0.012			***			***		***		***	
Personal records	2.79 0.88	2.22 1.40	3.17 0.95	2.85 0.80	2.44 1.36	2.63 1.20	3.374	0.012					***					**	
My farm advisor	2.21 1.62	1.18 1.59	1.47 1.66	2.46 1.33	1.40 1.76	1.60 1.66	2.843	0.026	**	*		*		**		*		*	
A and P shows	0.79 0.69	1.18 1.05	1.47 1.22	0.77 0.73	0.80 0.87	1.06 1.00	2.761	0.030		**						**	**	**	
My budget	2.43 1.20	2.00 1.46	2.27 1.36	3.08 1.04	2.36 1.38	2.31 1.36	1.729	0.147						**					
Machinery field days	2.11 1.31	1.69 1.20	2.14 1.19	1.62 0.96	1.52 1.26	1.83 1.22	1.491	0.208											
Family members	1.82 1.16	2.09 1.38	2.40 1.45	2.77 1.09	2.20 1.29	2.18 1.32	1.438	0.225			*								
Radio	1.39 0.83	1.27 1.12	1.57 1.22	1.69 0.85	1.88 1.36	1.50 1.12	1.396	0.238											
Other farmers	2.50 0.79	2.56 0.99	2.90 0.72	2.92 0.76	2.76 0.83	2.69 0.86	1.335	0.260											
Magazines	2.25 0.89	1.82 0.86	1.93 1.23	2.31 0.95	1.96 1.10	2.00 1.01	1.130	0.344											
Newspapers	1.82 0.86	2.07 0.96	2.13 1.01	2.23 0.93	2.32 0.95	2.09 0.95	1.025	0.397											
My bank manger	1.64 1.22	1.07 1.27	1.23 1.38	1.08 0.95	1.24 1.23	1.25 1.25	0.990	0.415	*										
Television	0.96 0.84	0.76 0.91	1.00 0.91	0.54 0.52	0.92 1.00	0.92 0.88	0.901	0.466											
My accountant	2.25 1.21	2.22 1.54	2.13 1.53	2.38 1.04	2.20 1.15	2.22 1.35	0.081	0.988											
Information types																			
Management practices	3.61 0.57	2.11 1.37	3.60 0.85	3.46 0.87	2.84 1.14	2.98 1.23	13.346	0.000	***				**	***	***	***		**	*
Crop costs and returns	3.54 0.69	1.93 1.30	3.17 1.09	3.54 0.78	3.36 0.76	2.91 1.22	15.715	0.000	***				***	***	***				
Overseas crop prices	2.21 1.03	1.69 1.22	2.37 0.93	3.00 1.08	2.40 1.32	2.18 1.19	4.243	0.003	*		*		**	***	**				
New Zealand crop yields	1.82 1.06	1.36 1.11	1.73 0.98	2.69 1.11	1.79 1.22	1.73 1.14	3.914	0.005			***			**		***		***	
Overseas crop stockpiles	2.14 1.08	1.53 1.14	1.93 1.05	2.46 0.77	1.76 1.23	1.87 1.12	2.515	0.044	**					**				*	
New Crops and Crop varieties	2.75 0.84	2.16 1.13	2.60 1.00	2.92 0.95	2.21 1.29	2.45 1.09	2.512	0.045	**		*	*		**				*	
Production techniques	3.39 0.83	2.67 1.19	3.03 0.93	3.08 0.76	2.88 1.16	2.96 1.05	2.251	0.067	***										
Quality discounts and premiums	2.11 1.10	2.00 1.37	2.30 1.09	2.08 1.26	2.84 1.18	2.24 1.24	2.242	0.082				**			**			*	
Machinery	2.97 0.92	2.49 1.14	2.70 0.88	2.38 0.77	2.38 0.92	2.60 0.99	1.669	0.161	*			*							
Financial	3.14 0.93	2.73 1.14	2.93 1.05	2.92 0.86	3.32 0.85	2.98 1.02	1.591	0.180							**				
Pests and diseases	3.21 0.79	3.09 1.07	3.56 0.63	3.07 0.95	3.13 0.85	3.22 0.89	1.559	0.189					*			**			
Consumer information	1.89 0.99	1.80 1.07	1.93 0.98	2.54 1.13	1.79 1.25	1.91 1.08	1.298	0.274			*			*		*		*	
Stock prices	3.07 0.81	2.49 1.35	2.90 1.13	2.62 0.87	2.67 1.34	2.74 1.17	1.298	0.274	*										
Local growing conditions	3.07 1.09	3.20 0.97	3.17 0.91	2.77 0.93	3.25 0.99	3.14 0.98	0.620	0.649											
New Zealand Crop prices	3.14 0.85	3.08 1.00	3.10 0.80	3.00 0.91	3.28 0.84	3.13 0.89	0.278	0.892											

Means are reported, standard deviation in italics

¹ * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Farmers were asked to indicate the importance of each type and source of information on a scale from 0 (not important to 4 (extremely important).

Table 7.17
Information Sources and Types Ranked by Level of Importance

Information sources
Strategic group

Production/Flexibility	Stability	Prod. /market outlet foc.	Differentiation	Arbitrage	Average						
Crop field days	3.25	Agents	3.15	Crop field day	3.28	Budget	3.08	Agents	2.80	Crop field days	2.86
Personal records	2.79	Other Farmers	2.56	Personal records	3.17	Crop field days	2.92	Other farmers	2.76	Agents	2.86
Agents	2.75	Crop field days	2.51	Agents	3.03	Other farmers	2.92	Crop field days	2.56	Other farmers	2.69
Other farmers	2.50	Personal records	2.22	Other farmers	2.90	Personal records	2.85	Personal records	2.44	Personal records	2.63
Farm group meetings	2.44	Family members	2.09	Family mem	2.40	Family members	2.77	Budget	2.36	Budget	2.31
Budget	2.43	Newspapers	2.07	Frmer group mtngs	2.45	Farmer group mtngs	2.77	Newspapers	2.32	Accountant	2.22
Accountant	2.25			Budget	2.27	Overseas newspapers	2.77	Accountant	2.20	Family	2.18
Magazines	2.25			Machinery field days	2.14	Farm advisor	2.46	Family	2.20	Farmer group meetings	2.10
Farm advisor	2.21			Newspapers	2.13	Accountant	2.38	Newspaper		Newspaper	2.09
Machinery field days	2.11			Accountant	2.13	Magazines	2.31				
Overseas magazines	2.00					Newspapers	2.23				
						Farm workers	2.15				

Information types
Strategic group

Production/Flexibility	Stability	Prod. /market outlet foc.	Differentiation	Arbitrage	Average						
Management practices	3.61	Local growing cond.	3.20	Management pract.	3.61	Crop costs & returns	3.54	Crop costs-returns	3.36	Pests & Diseases	3.22
Crop costs & returns	3.54	Pests & diseases	3.09	Pests & diseases	3.56	Management pract.	3.46	Financial	3.32	Local growing cond.	3.14
Production techniques	3.39	NZ crop prices	3.08	Local growing cond.	3.17	Prod. techniques	3.08	NZ crop prices	3.28	NZ crop prices	3.13
Pests and diseases	3.14	Financial	2.73	Crops costs & returns	3.17	Pests and diseases	3.07	Local growing cond.	3.25	Management practices	2.98
NZ crop prices	3.14	Production techniques	2.67	NZ crop prices	3.10	NZ crop prices	3.00	Pests and diseases	3.13	Financial	2.98
Stock prices	3.07	Machinery	2.49	Production techniques	3.03	Overseas crop prices	3.00	Production tech.	2.88	Production techniques	2.96
Local growing cond.	3.07	Stock prices	2.49	Financial	2.93	New crops-varieties	2.92	Quality discounts	2.84	Crop costs-returns	2.91
Machinery	2.97	New crops/varieties	2.16	Stock prices	2.90	Local conditions	2.77	Management pract.	2.84	Stock prices	2.74
New crops & varieties	2.75	Management practices	2.11	Machinery	2.70	NZ crop yields	2.69	Stock prices	2.67	Machinery	2.60
Overseas stockpiles	2.14	Quality discounts	2.00	New crops/varieties	2.60	Stock prices	2.62	Overseas crop prices	2.40	New crops-varieties	2.45
Quality discounts	2.11			Overseas crop prices	2.37	Consumer info	2.54	Machinery	2.38	Quality discounts	2.24
				Quality discounts	2.30	Overseas stockpiles	2.46	New crops-varieties	2.21	Overseas crop prices	2.18
						Machinery	2.38				
						Quality discounts	2.08				

Scores are based on a scale from 0 (not important) to 4 (extremely important)

least some information sources. The types of information utilised by farmers following a production/production flexibility strategy and production/market outlet focus strategy, do not differ significantly, possibly because members of both groups focus on production concerns.

In table 7.17 the information gathering activities that are seen to be more important than average, are ranked in decreasing order of importance. Farmers following a stability strategy do not feel that a great deal of information is valuable. This contrasts with producers utilising a differentiation approach. Results indicate that the information gathering activities which farmers perceive to be important change according to the strategic group they are in and appear to be consistent with the strategy that members of each group follow.

7.5.7 The Environment

In order to determine the influence of non-controllable or environmental variables on strategy, farmers were asked the extent to which they agreed with statements relating to the influence of these variables on their business operation. The results from this part of the analysis are presented in table 7.18. The original sample was limited to the Canterbury province in an effort to limit the influence of the external environment and as was expected, for most environmental variables the differences between clusters were not significant. However, unlike other farmers, differentiators felt their main competitors were a small number of specialised producers, probably because of the specialised nature of the crops they grow and the distinctive way in which they market their produce. Farmers following a production/production flexibility strategy perceive that crop disease is less likely to influence farm returns than farmers in either the stability or arbitrage strategic groups. A possible explanation is that because these farmers have a production focus they feel they can control crop disease.

TABLE 7.18

Environmental Factors

	Strategic Groups					Av	F		Duncan's Multiple Range Tests for Intergroup Differences ¹									
	1	2	3	4	5		ratio	prob	1-2	1-3	1-4	1-5	2-3	2-4	2-5	3-4	3-5	4-5
My main competitors are a small number of specialist producers	1.4 1.3	1.0 0.9	0.7 0.8	2.7 1.2	0.7 0.9	1.1 1.1	10.703	0.000		**	***	**					***	***
Crop disease is the major cause of fluctuations in my farm returns	1.3 1.0	2.0 1.1	1.7 0.9	1.5 1.1	1.4 1.3	1.6 1.1	2.326	0.060	**			**						
I do not compete with overseas crop farmers	1.9 1.1	1.7 1.4	1.1 1.2	1.5 1.3	1.8 1.5	1.6 1.3	1.392	0.240		*								
Other countries governments' policies have the most important influence on my farm profitability	2.4 1.1	2.1 1.3	1.9 1.0	1.7 1.3	2.2 1.3	2.1 1.2	1.081	0.368										
New Zealand crop farmers are my main competitors	1.8 1.2	2.1 1.0	1.9 1.2	2.4 1.3	1.8 1.4	2.0 1.2	0.810	0.521										
New Zealand government policies have little influence on my farm profitability	1.5 1.2	1.6 1.2	1.4 1.1	1.9 1.4	1.5 1.3	1.6 1.2	0.421	0.793										
Variable weather is the major cause of fluctuations in my farm returns	3.0 1.0	3.2 1.0	3.0 0.9	3.1 0.8	3.1 1.1	3.1 1.0	0.361	0.836										

Means are reported, standard deviations in italics.

¹ * $p < 0.01$ ** $p < 0.05$ *** $p < 0.1$

Farmers were asked the extent to which they agreed or disagreed with the above statements on a scale from 0 (strongly disagree) to 4 (strongly agree)

7.5.8 Performance Implications of Strategic Group Membership

To assess the performance implications of strategic group membership farmers were asked if they perceived that they obtained higher than average, average or below average financial performance, crop yields and quality premiums (see table 7.19). Because almost no farmers perceived or were willing to admit they performed below average, the analysis was limited to differences between farmers who perceived they performed better than average or average. Significant differences did not exist between strategic group members over any of the three performance measures. However, for farmers following the arbitrage strategy perceptions of all performance measures were low. Because the question measured "perceived" rather than actual performance and farmers in each group have been farming for a relatively long time in an industry where there has been considerable change and hardship, it seems reasonable to assume that each strategy is relatively successful.

Table 7.19 Percentage of Farmers who were Performing Better than Average

Strategic group					
Production focus/flexibility	Stability	Production/market outlet	Differentiation	Arbitrage	Average
Financial Performance					
50	41	66	62	35	49%
Chi square = 7.583 (0.101)					
Crop Yields					
39	31	39	50	12	33%
Chi square = 7.665 (0.105)					
Quality Premiums					
36	30	23	54	25	32%
Chi square = 4.740 (0.315)					

7.6 Summary of Strategic Groups

In summary, members of each group operated their businesses in a distinctive manner and followed clearly defined but seemingly different business strategies.

Members of the *production focus/flexibility* strategic group concentrated on the costs and efficiency of production rather than sales concerns. This cluster had large farm and crop areas and the largest area of irrigated land. Members spent more time working away from the farm at farm related activities than other farmers and utilised many types and sources of information, especially those associated with production planning, production techniques and management practices. Their flexible production focus was driven by external market signals.

The second group was concerned with *stability* and growing a stable crop mix which had been

grown previously on their farm. Owner/managers were relatively older than other farmers and had the greatest experience in terms of the years they had spent crop farming. Because they were usually financially secure they believed that there was little they could do to influence the price of their produce. They viewed their business operation with a relatively simple financial focus and appeared to perceive the boundary of their business is the farm gate. Little attention was paid to market signals or other types of information and participants felt they had low market knowledge.

Farmers following a *production/market* outlet focus strategy placed emphasis on production activities, but had an inflexible production mix and high degree of channel flexibility. They sold to a large number of different agents or market outlets and were continually searching for new market outlets. Relatively high levels of information regarding management practices, crop costs and returns, personal records and crop field days were utilised.

Differentiators concentrated on differentiating their produce from that of other producers by growing specialty or niche crops, or being involved with adding value, further processing or marketing activities. Differentiators were most likely to be owners, managers or directors of non-farm businesses and occupy positions of responsibility in marketing cooperatives and farmer organisations. Compared with members of other strategic groups, differentiators were more likely to have attended university and had the largest farms and highest levels of debt. They utilised a wide variety of types and sources of information.

Arbitragers were characterised by their focus on sales and investment opportunities, both on and off-farm. Their high sales flexibility meant these farmers were more likely to sell crops on the free market than by contract and would store crops and wait for the price to improve. It appears that farmers in this group gained satisfaction by obtaining high crop prices either by receiving quality

premiums or selling produce at an optimal time of year. They spent more time working at non-farm jobs than members of other groups and had the smallest farms and cropping areas. This cluster felt that information regarding quality discounts and premiums and crop prices was most important to them.

7.7 Summary

The empirical findings reported in this chapter clearly show that a Canterbury crop farmer can be categorised as following one of five different business strategies, each of which has specific marketing implications. Because the results from testing for differences between strategic groups have not been adjusted for the finite population correction factor, the differences between strategies may be even greater than the statistical tests suggest (see appendix 6.1). Although there is not conclusive evidence that strategic group membership has performance implications, and the fact that farmers following each of the five strategies have managed to survive the upheavals in the industry since deregulation suggests that each of the five strategies may be successful. Therefore it is likely that logical reasons exist as to why farmers pursued each strategy, including that individual farmers may have distinctive competencies or business objectives that are different from members of other strategic groups. Although these factors were not specifically analyzed in this study some inferences can be made relating to hypothesised sources of advantage.

Farmers following a *production focus/flexibility* strategy gained advantage by addressing production rather than sales concerns. They focused attention on the production side of their business, had a flexible production mix, and utilised information relating to production concerns and management practices. A high level of knowledge regarding crop prices and the costs and returns of growing different crops is likely to be useful when making the decision to grow new crops which provide high market prices. A good knowledge of production practices would allow input costs to be

relatively low or alternatively, costs to be higher but crop yields or quality to increase for all crops. Investing resources in production activities and learning to grow new crops, which command price premiums both seem to be important areas for investment.

Farmers in the *stability* group were the most standardised and produced a stable crop mix which they had grown previously. Because they were older and had spent more time farming than other farmers it is likely that they would have considerable experience curve benefits. These benefits, and gains through taking a relatively simple and standardised approach to management means this is a relatively low cost approach. These farmers do not spend a great deal of time or energy collecting information or making decisions and they have low levels of debt, leading to low opportunity costs, although easily measurable costs may be similar to those for other farmers. Because these farmers are relatively old, their business and personal objectives may be more to do with family and lifestyle factors than other farmers. It is possible that farmers may change to this strategic group as they become older and this strategy could be the end point of a farmers' lifecycle when lifestyle considerations are important.

Farmers following a *production/ market outlet focus* strategy invested into production activities and like farmers in the production/production flexibility group, were likely to gain advantage through having high levels of production skills. These farmers had a stable crop mix and did not gain premiums from changing their product mix. Instead they were likely to invest resources into gaining knowledge of premiums which can be obtained from selling to different middlemen or market outlets. High crop prices are gained by selling produce through the marketing channel which offers the highest returns.

Differentiators actively seek opportunities for new products or ways of differentiating their present

produce in order to capture high returns. These farmers were more highly educated and appeared to have entrepreneurial skills. Although disadvantaged by relatively low experience curve benefits, success would be achieved through "first mover" advantages, vertical integration and commitment to marketing by satisfying specific consumers and obtaining high prices per unit of produce.

Arbitragers were involved with sales and investment opportunities rather than production concerns. Although these farmers' cost structure is likely to be relatively high, advantage is gained through producing what the market wants with respect to quality, selling at a time when prices are at their peak, or using a sales method that offers high returns, and thereby obtaining high returns per unit of output. Off-farm investment opportunities are likely to present a further source of income.

The five strategies identified in this study all represent unique means of achieving success and are to some extent mutually exclusive. Developing the skills to follow each strategy successfully is likely to involve considerable investment including that associated with human capital. Because most farmers are unlikely to have distinctive competencies in all areas of strategy making it appears they concentrate in the areas they are good at. For example while some farmers are skilled at gaining knowledge and growing new crops which command price premiums, others are more successful at achieving quality premiums or investing their money away from the farm. Farmers can only acquire a limited amount of knowledge and therefore are unlikely to be able to develop the skills required to follow all strategies at once.

There are some parallels between the differentiation strategy identified in this study and Porter's differentiation strategy. However the strategies have a distinctive agricultural flavour and the differences between the strategies are more subtle and complex than those described by either Porter, Miles and Snow, or in previous studies of strategic typologies and taxonomies. There are

some parallels with the hypothetical farm level strategies identified in chapter 5, but in general the differences between the strategies are more subtle and more to do with marketing, possibly because the groups were formed with a focus on marketing variables.

The results indicate that for Canterbury arable farmers, marketing is much more than an activity which occurs after the product leaves the farm gate, and suggest that the marketing approach and mix of marketing variables utilised by individual businesses vary according to the business level strategy a firm is following. The farm business marketing strategy process involves more than sales tactics and each strategic group interacts with the market in different ways.

From a simple marketing perspective only differentiators can be considered totally marketing orientated because they pay a great deal of attention to market signals, differentiate their produce from that of other farmers and attempt to satisfy the needs and wants of both the buyers and final consumers of their produce. Only a small proportion of farmers followed this strategy, whereas a larger percentage follow a stability strategy and had low levels of market orientation, while other farmers fitted between these extremes.

Although the behaviour of farmers following the stability strategy is close to what agricultural economists would perceive to take place in a competitive market, the majority of farmers exhibit more sophisticated marketing behaviour. Some farmers change their crop mix and plan production by monitoring market signals. Others have an inflexible crop mix, sell to a large number of market outlets and are continually searching for new sales opportunities. Another group of farmers monitor sales and marketing opportunities and sell when prices are at their peak or attempt to gain quality premiums, while others utilise a number of approaches to differentiate their produce from that of other farmers. All strategies except one require the business to be intricately involved with

interpreting market information.

The results from this study indicate that farmers do not usually utilise textbook marketing principles but take an approach to marketing which is unique to them and their capabilities. Because each of the five strategies appears to be successful, the lack of a marketing orientation for farmers following a stability strategy should not be construed as a lack of strategic sophistication.

Within the following chapter of this thesis the implications of these results are discussed in more detail and subsequently conclusions developed regarding the role of marketing management, strategic management and strategic groups in agriculture.

CHAPTER 8

SUMMARY AND CONCLUSIONS

8.1 An Overview

Within this chapter the main problems addressed in this study are summarised, the implications of this research are further developed, and some of the studies shortcomings and possible areas for further research are identified.

This thesis is developed around the perceived problem that agricultural marketing is frequently distinguished from business marketing. Agricultural marketing theory focuses on policy, distribution channel, and efficiency issues and has not evolved with the management or strategic orientation found within the business marketing literature. Within this thesis the extent of the apparent gap between the two disciplines, and the role which marketing management and strategic management play in agricultural marketing, both in theory and in practice is reviewed. It is argued that at the farm level marketing management and strategic management processes are not adequately described by either the business or agricultural marketing disciplines. This is an area which requires further research, in order to increase researchers knowledge of the marketing strategies utilised by farmers. The empirical component of this thesis investigates these issues, and it is hoped the findings from this thesis will contribute to a greater understanding of producer's marketing and strategic management behaviour and the role that marketing management and strategic management processes have in agricultural marketing theory.

The conclusions developed from the literature review suggest that the business and agricultural marketing disciplines have originated from similar theoretical underpinnings, but they differ in the way they define marketing terms and concepts, the theories they use to examine problems, and their subject matter. Agricultural marketing theory has not developed the interdisciplinary or strategic

approach of business marketing theory. Instead it relies heavily on concepts that originate from economics and is usually recognised as a division of agricultural economics, not business marketing. Within the agricultural marketing literature there continues to be a focus on aggregate distribution channel and policy issues rather than business level marketing studies of individual firms. In the business literature marketing is seen to be an essential component of business management, and the marketing management process is often modelled in a strategic manner that illustrates the interactions with other functional areas of the firm, as well as non controllable environmental factors.

It is argued that researchers have traditionally taken the view that for farmers, marketing is a process which occurs after the product leaves the farm gate, or with a change of ownership, meaning farmer marketing decisions are frequently limited to sales decisions, and production planning is excluded from the marketing process. Most detailed studies have only examined individual elements of the marketing process, often using operations research techniques to identify one optimal solution, and this implicitly assumes that farmers should follow one pattern of strategic behaviour. Within the business literature however, marketing strategy is seen as part of an integrated process with complex and often synergistic relationships between a number of business and marketing operations. It is frequently shown that a business may take a variety of strategic approaches in its quest for competitive advantage. Because each approach may have specific marketing implications it is suggested that a study which investigates patterns of strategic behaviour at the farm business level will allow a greater understanding of producers' marketing management behaviour.

Although research into this area is perceived to be important by agribusiness professionals, such research has been limited. The majority of the small number of small business and farm level

strategic management studies attempt to prescribe formal strategic planning models similar to those prescribed for large businesses. However there is little empirical or anecdotal evidence to show if these techniques will help farm managers achieve their objectives. At the farm level, strategic management may not be easily observed because it may be informal and performed intuitively or instinctively. Little is known about the strategic management processes of farmers and in particular, the strategic decisions and strategic alternatives available for farmers, and the resulting strategic outcomes. Within this thesis an empirical study is used to examine the strategic management and marketing processes of farmers. This is used to identify the strategic choices farmers make, determine if farmers follow different strategies, and operationalise the complexity of the farm business marketing management and strategic management processes.

Within the general business literature a number of alternative approaches have been used to study business strategy. The most commonly used approach has been utilised by strategic group researchers who empirically identify groups of businesses following similar strategies, often when little *a priori* evidence exists about how many strategic groups exist or how many members they have. Groups are formed where members make similar strategic decisions with respect to key strategic variables, but patterns of strategic behaviour differ from group to group.

The quantitative analysis in this thesis involves a strategic group investigation which measures the marketing and strategic behaviour of Canterbury crop farmers in order to delineate farm business strategies. The results identify the strategic dimensions which are important for these farmers and suggest that arable farmers can choose from a range of alternative business strategies, each of which has specific marketing implications and descriptive characteristics.

8.2 Implications

A number of issues have been investigated in this study and although the empirical analysis focuses on the activities of Canterbury crop farmers the findings have wide ranging implications.

Although it is often implicitly assumed that farmers lack sophisticated marketing skills and strategic capabilities the results from this study show that for Canterbury arable farmers business strategy is a complex process involving interactions and relationships between many strategic components. Traditionally, farm firms have been viewed as thousands of small businesses producing a uniform product, and farmers are perceived to act in a homogenous manner and utilise only limited marketing alternatives. There have been suggestions that this has meant that the only viable approach to business is a low cost strategy. However, the results from this thesis show that even in an area where economists have regarded competition as near perfect, farm businesses follow markedly different business strategies. Each strategic approach involves a unique mix of activities that result from choices made from within a network of strategic variables which may be used in an attempt to gain competitive advantage. Each has specific marketing implications.

Although most strategic group members do not follow the marketing theorists approach by adhering to classical textbook marketing principles, farmers successfully utilise a wide variety of alternative marketing techniques. The range and complexity of marketing activities identified in this study suggests that traditional agricultural marketing approaches to analysing farmers' management and marketing behaviour can benefit from studying the marketing behaviour of farmers using an integrated approach similar to that which is frequently utilised within the business literature. Marketing behaviour can be much more than sales decisions and an undue focus on this behaviour leads to the exclusion of other activities such as production planning and product differentiation. Similarly a view of farm management which excludes marketing and integrated strategic behaviour

is restrictive.

It appears that the management styles of farmers may have more in common with small business management than general business management theory, which has in general, developed from the study of large firms. It is possible that these patterns of strategic behaviour are even more complex than those at the corporate level because of the overriding influence of small business owners' management competencies and skills. In a large business a number of individuals with specific skills are involved in decision making and staff are likely to be more tradable than in a small firm. Within small firms management competencies are likely to be less flexible and therefore have an exaggerated influence on strategic behaviour. Small firm level decision making is not controlled by firm policies but by an individual, and it is difficult to separate out the functional areas of the firm.

If agricultural economists, agricultural marketers or farm management specialists are interested in designing programmes to aid farmers' marketing and strategic decision making, it is of central importance that researchers clearly understand the strategic and marketing behaviour of farmers. Research of this nature is a useful starting point for understanding the integrated nature of farmers' decision making because it identifies the key strategic dimensions which are important to farmers and gives a clear understanding of the profiles of strategic group members and the strategies they follow. Ultimately, the results of this type of research may help managers make strategic choices that may enhance their competitive positions and could enable predictions to be made about the strategic direction a firm should take.

The incorporation of some marketing management and strategic management concepts into agricultural marketing texts, syllabuses and research projects may aid managers decision making

and enhance the value and relevance of the profession. However it is important that paradigms from within the business literature are not embodied into agricultural marketing and farm management theory in a naive and uncritical manner. The unique nature of farm businesses, their produce, and the environment they operate in, continue to make farm enterprises different from other businesses.

From a policy perspective, the results of this research have both efficiency and equity implications because businesses in specific strategic groups are likely to be affected by government policy in different ways. If farmers in a particular group are following the strategy that is best suited to their internal business competencies and resource endowments, as well as the external environment in which they operate, policy makers should treat the members of each group separately. For example the provision of information regarding management practices is likely to be highly valued by farmers following a production focus, production flexibility or differentiation strategy, but not by members of other strategic groups. Businesses following an arbitrage strategy would be likely to gain the highest relative benefits from a government introducing compulsory grading regulations that increase quality premiums and discounts if they are best suited to increasing their profits by obtaining quality premiums.

Knowledge of the distinctive strategic approaches utilised by farmers and profiles of these strategic group members provides valuable marketing research information for businesses buying from, or selling to farmers. Firms supplying goods to farmers could view different strategic group members as different market segments whose needs and wants could best be met by providing them with alternative marketing mixes. Similarly, businesses buying farm produce could analyze the requirements of the members of each strategic group separately in order ensure that their sales arrangements or contracts, are suited to farmers specific needs and capabilities.

In summary, this research has identified a range of alternative business strategies which are used by farmers and their marketing implications. No one strategy is likely to be optimal for all farmers with the strategy most suitable for a particular business being the one which best aligns the distinctive competencies, resource endowments, and objectives of a business with environmental opportunities and threats.

8.3 Limitations and Areas for Future Research

The conclusions developed within this thesis present a number of avenues worthy of further research. This study has intentionally studied a farming sector where there appears to be high levels of strategic diversity. While similar patterns of strategy may exist for other farm types, the changes in the strategies they could undertake would be likely to be more subtle and further research which examines if strategic groups exist in other farming sectors would be valuable. Developing more comprehensive measures which relate strategy to performance would allow a better understanding of the strategy/performance relationship and the role that environmental variables have in moderating this relationship. A longitudinal study may provide information regarding how farmers strategic approaches vary over time and ascertain whether farmers move from one strategic group to another. Further replicative studies including cross sectional and time series research will enhance the value of these research findings.

If it is accepted that alternative approaches could be equally profitable it is necessary to examine the issue of why alternative strategies have been chosen by individual farmers. Mobility barriers which make it costly for farmers to move from one group to another may include managers' distinctive competencies and other barriers to imitation, as well as a firms initial resource endowments. Because most farm managers are owner operators, it is possible that management competencies are less tradable than they would be for larger businesses and therefore may have a

relatively large influence on the strategic approach most suitable for a business.

Because it appears that farmers can make a choice between a number of seemingly different, but relatively successful business strategies, normative models which use operations research techniques to identify the best combination of a small number of strategic variables may arrive at a sub-optimal solutions. They usually consider only one strategic alternative although more than one may exist, and do not take account of the synergistic relationships which exist between strategic variables or the distinctive competencies of farm managers or owners. An alternative approach which may be equally useful is to utilise techniques from the strategic management literature. After further analysis which more accurately identifies the performance potential of alternative strategies, studies such as this one could aid in prescribing an optimal strategy for an individual business.

In conclusion, the previous discussion illustrates that further research questions still need to be addressed before a complete understanding of the marketing management and strategic management processes of farmers is developed, and the role that marketing management and strategic management processes should play in agricultural marketing theory is fully understood. Although only a limited number of issues were addressed in this study it is hoped that the theoretical discussions and research findings have improved the current understanding of the role of marketing management, strategic management, and strategic groups in agriculture. The disciplines of agricultural marketing and farm management will be enriched by viewing farmers management and marketing behaviour with this strategic perspective.

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Appendix 6.1 ANOVA and the Chi-Square test of Independence

In this appendix ANOVA and Chi-Square tests are described and some of the special properties of these tests that should be considered when a large proportion of the population is sampled are outlined.

Analysis of Variance (ANOVA)

The following paragraphs briefly outline ANOVA (analysis of variance) as it was used for this study. A oneway (univariate) ANOVA tested the hypothesis that the cluster means are equal for a number of variables (X_{ij}). Formally the following hypothesis is tested:

$$H_0: \mu_1 = \mu_2 = \dots = \mu_k$$

against

$$H_1: \text{not all } \mu_j \text{ are equal}$$

where μ_j is the population mean for cluster or strategic group j and k is the number of clusters or strategic groups.

To test these hypothesis the following test statistic is constructed:

$$F = \frac{\sum_j n_j (\bar{X}_j - \bar{\bar{X}})^2 / (k-1)}{\sum_i \sum_j (X_{ij} - \bar{X}_j)^2 / (N-k)} = \frac{MS_B}{MS_W} \quad [1]$$

$$\text{where } \bar{X}_j = \frac{1}{n_j} \sum_i X_{ij} \text{ (the sample mean for each cluster)}$$

$$\bar{\bar{X}} = \frac{1}{N} \sum_i \sum_j X_{ij} \text{ (the grand sample mean)}$$

$$j = 1 \dots k \text{ (the number of clusters)}$$

$$i = 1, \dots, n_j \text{ (the number of observations per cluster)}$$

In essence [1] tests whether the cluster populations are equal by testing if each of the clusters or groups populations have the same common value for their variance. ANOVA compares two independent estimates of the variance in the dependent variable. One is sensitive to within group effects while the other is not.

The between group mean square, (MS_B) is often called the explained variation. It summarises the differences between clusters that may be due to differences between group populations rather than by chance alone. MS_W is sometimes referred to as error variance. It is based on the deviations of individual scores from their respective group means. While MS_W is influenced by random respondent variability, it is not affected by differences between group means. If the null hypothesis of no group differences is true MS_B and MS_W represent independent estimates of the population variance.

The ratio of the between groups mean square (MS_B) to the within groups mean square (MS_W) gives a value for the F-statistic. It can be shown that the F statistic follows an F distribution with $k-1$ and $N-k$ degrees of freedom. Between group differences inflate MS_B and lead to large values of the F statistic. H_0 is rejected when F_{cal} exceeds F_{crit} meaning the means of all clusters or groups are not equal at the appropriate level of statistical significance. More extensive explanations of ANOVA are given in many statistical textbooks including those by Hamburg (1970), Lappan (1987), and Winer *et al.* (1991).

The underlying assumptions required for the correct application of ANOVA include that random samples from a normally distributed population with equal variances must be selected. However Hair *et al.* (1990), citing Meyers (1975) and Winer (1962), argue that apart from in extreme cases, the F-statistic is relatively insensitive to violations of these assumptions.

The Chi-Square test of Independence

It is not statistically valid to subject non-metric data to ANOVA analysis. Therefore to analyze if qualitative questions were answered differently by members of various strategic groups a Chi-Square test was utilised. The null hypothesis being tested was that the questions were answered independently of strategic group membership. The following discussion of the Chi-Square test closely resembles that by Lapin (1987).

In tables 7.7 to 7.11 and table 7.15 and 7.19 results from each of the questions where answers were subjected to Chi-Square analysis were presented in contingency tables. Columns consisted of strategic groups while rows contained categories under which each individual question could be answered. Each contingency table was comprised of cross tabulations between each possible answer to a question, and membership of each of the five strategic groups. Therefore the value presented in each cell of the contingency table was the number of sample members in a particular strategic group who answered a question in a certain way. These numbers are referred to as actual frequencies and are depicted by the symbol f_{ij} . Expected frequencies (f_e) are calculated in a manner consistent with the null hypothesis of independence.

The Chi-square statistic is based upon individual differences between actual and expected frequencies summed over each cell in the contingency table. The following expression is used to calculate the Pearson Chi-square test statistic which was used in this analysis:

$$\chi^2 = \sum \frac{(f_{ij} - f_e)^2}{f_e}$$

$$\text{where } f_e = \frac{\text{Row total} \times \text{Column total}}{N}$$

Large calculated values occur when the ratio of the difference between actual and expected results vary considerably. The calculated Chi-square value is compared to a critical table value with the appropriate degrees of freedom (number of rows minus one, times number of columns minus one) and the desired level of significance. If the calculated Chi-Square statistic is higher than critical (table) value sample results differ from what would be expected if independence was true and the null hypothesis of independence between clusters is rejected. Chi square tests are not accurate if some cells contain a small number of observations (Mendenhall *et al.* 1989).

The Finite Population Correction Factor

For this study, an interesting aspect of the results from testing for inter-cluster differences is that the Chi-square and F-test statistics have not been adjusted with the finite population correction factor. Because this study sampled a large percentage of the population, statistics can be adjusted with a finite population multiplier which has the effect of shrinking the variance of the sample mean. Therefore the null hypothesis may be rejected less often than it should be increasing the chance of type two errors. Because of this the test statistics presented in the results may be conservative.

Discussion of the finite population correction factor (also known as the finite population multiplier) occurs in many standard statistical textbooks including Neter *et al.* (1982) and Hamburg (1970). The following paragraphs closely follow these authors discussion.

It is well known when sampling from a large population, estimated deviation of the sample mean \bar{x} is s_x which is equal to s_x / \sqrt{n} . When sampling from a finite population the standard deviation (standard error of the mean) is adjusted by the finite population multiplier which is defined as $\sqrt{(N-n)/(N-1)}$. Therefore the standard error of the mean for finite populations is given by the

formula:

$$s_{\bar{x}} = \sqrt{\frac{N-n}{N-1}} \frac{s_x}{\sqrt{n}} \quad [2]$$

When the population size, N is large the finite population multiplier is approximately equal to one, and therefore can be ignored. However this research takes a census and the sample comprises of a large proportion of the population.

With a relatively large population such as that used in this study the factor $\sqrt{\frac{N-n}{N-1}}$ is approximately equal to $\sqrt{\frac{N-n}{N}}$ because subtracting 1 from the denominator has a negligible effect. Therefore

$$\sqrt{\frac{N-n}{N}} = \sqrt{1 - \frac{n}{N}} = \sqrt{1-f} = \sqrt{g}$$

where f is the fraction of the population sampled and g is defined as the residual of the fraction of the population sampled, or $1-f$. Therefore equation two can be rewritten as:

$$s_{\bar{x}} = \frac{s_x \sqrt{g}}{\sqrt{n}}$$

with the variance of the sample mean

$$s_{\bar{x}}^2 = \frac{s_x^2 g}{n}$$

which can be rewritten as

$$s_{\bar{x}}^2 = \frac{s_x^2}{n g^{-1}}$$

Because g is always less than one the variance of the sample mean shrinks when adjusted with the finite population correction factor. This is intuitively logical because a large sample is likely to be more representative of a population. The reciprocal of g is g^{-1} which is always a number greater

then one.

The effect of the finite population correction factor on a t test is well known. The unadjusted value of the t test is conservative. Although the implications on more sophisticated tests such as Chi-square and F tests are not known, it appears that these results may also be conservative. Firstly the effect of the correction factor on the chi-square statistic will be examined, followed by its impact on the F-statistic.

Winer *et al.* (1991) describe a ratio for a random variable which is useful for testing hypothesis about population variances and has a chi squared distribution.

$$\chi_{n-1}^2 = \frac{(n-1)s^2}{\sigma^2} \quad [3]$$

This ratio can be used to explain the effect that the finite population multiplier has on Chi-square and F statistics. Because the correction factor shrinks the variance of the sample mean, in effect it increases the confidence levels for tests of variance. This has the same effect as increasing the degrees of freedom for the critical value of a test statistic. Therefore it appears that [3] can be adjusted to form

$$\chi_{(n-1)g^{-1}}^2 = \frac{(n-1)g^{-1} s^2}{\sigma^2} \quad [4]$$

To prove that in [4] the finite population correction factor has the effect of shrinking the variance of the sample mean [3] and [4] can be rewritten respectively as:

s^2 , does not have a chi square distribution but $(n-1)s^2/\sigma^2$ does. Empirical examples indicate that as expected the sample variance adjusted with the finite population correction factor (s^{2*}) is less

$$s^2 = \frac{\chi_{(n-1)}^2 \sigma^2}{(n-1)} [5]$$

$$s^{2*} = \frac{\chi_{(n-1)g^{-1}}^2 \sigma^2}{(n-1)g^{-1}} [6]$$

then the unadjusted s^2 for all but very low levels of statistical significance.

A special form of this relationship where the data is in frequency rather than metric form is given in the contingency table. This result clearly indicates that the chi square statistics presented in the contingency tables are likely to be conservative.

Winer *et al* (1991) show how the F statistic may be defined as the ratio of two independent chi-square variables, divided by their respective degrees of freedom.

$$F_{(n_1-1)(n_2-1)} = \frac{\chi_1^2/n_1-1}{\chi_2^2/n_2-1} [6]$$

which reduces to:

$$F = \frac{s_1^2}{s_2^2}$$

Equation [6] can be rewritten as:

$$F_{(k-1)(N-1)} = \frac{\chi_1^2/k-1}{\chi_2^2/N-1} [7]$$

where $k-1$ and $N-1$ are respectively the degrees of freedom for the between and within mean squares.

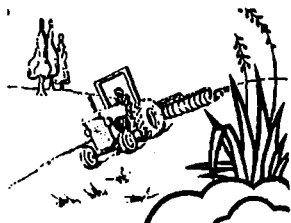
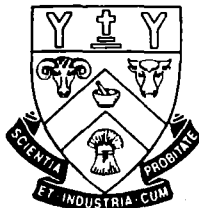
It is unclear if the finite correction factor adjusts the degrees of freedom for the numerator in equation 7. Under the assumption that the degrees of freedom for the numerator do not change,

the degrees of freedom for the denominator increase by the scalar g^{-1} which is always greater than one. This has an effect of decreasing the critical value of the F statistic (the right hand side of [7]). The calculated value (left hand side of [7]) will increase as the denominator becomes smaller because the (N-1) part of the denominator becomes relatively larger after adjustment with the finite population correction factor multiplier. Therefore F_{crit} has dropped and F_{calc} has risen. To reject the null hypothesis requires F_{calc} to be greater than F_{crit} therefore there is an increasing chance of accepting the null hypothesis when it false and creating a type two error.

If the degrees of freedom for the numerator are also increased because of the finite population correction factor F_{calc} may not vary however F_{crit} will drop even more than before. Again the non corrected F tests presented in the results are conservative.

Appendix 6.2 Questionnaire

A copy of the 8 page mail survey sent to all cropping farmers in the Canterbury area of New Zealand is presented in the following pages.



INTENSIVE CROPPING MANAGEMENT SURVEY

Please answer each of the following questions by placing answers in the **BOXES** provided.

PART 1: General farm and farmer characteristics:

	Hectares
1. How many hectares of land do you farm? <i>(print the number of hectares)</i>	<input style="width: 100px; height: 20px;" type="text"/>
2. What area: <i>(print the number of hectares)</i>	
a. is suitable for cropping?	<input style="width: 100px; height: 20px;" type="text"/>
b. was cropped in the 1991/92 season?	<input style="width: 100px; height: 20px;" type="text"/>
c. is irrigated?	<input style="width: 100px; height: 20px;" type="text"/>
d. is irrigated and suitable for cropping?	<input style="width: 100px; height: 20px;" type="text"/>
e. do you manage for somebody other than yourself?	<input style="width: 100px; height: 20px;" type="text"/>
3. What area of land do you: <i>(print the number of hectares)</i>	
a. rent or lease to others?	<input style="width: 100px; height: 20px;" type="text"/>
b. rent or lease from others?	<input style="width: 100px; height: 20px;" type="text"/>
4. How many stock do you carry over winter: <i>(print the number of stock)</i>	Stock
a. breeding ewes?	<input style="width: 100px; height: 20px;" type="text"/>
b. other sheep?	<input style="width: 100px; height: 20px;" type="text"/>
c. cattle?	<input style="width: 100px; height: 20px;" type="text"/>
d. others? <i>(please state)</i>	<input style="width: 100px; height: 20px;" type="text"/>

5. Do you breed your own replacement ewes: <i>(tick one box)</i>	
a. Yes	<input style="width: 30px; height: 20px;" type="checkbox"/>
b. No	<input style="width: 30px; height: 20px;" type="checkbox"/>

6. How many working days a month do you usually spend away from the farm:

(print the number of days)

Days

a. doing farm related activities?

(eg. at federated farmers meetings, visiting agents, or others)

b. working and earning income at another job?

(eg. for other farmers, in a business, or others)

7. Approximately how many years have you:

(print a number)

Years

a. been involved with crop farming?

b. been in charge of making decisions on a crop farm?

c. worked on your current farm?

d. been in charge of making decisions on your current farm?

8. If you have previous non-farm work experience please state:

(print details of your main non-farming jobs)

Type of Job

Years worked

9. Please tick if you hold positions of more responsibility than normal voting members, with:

(eg. Chairman, secretary or director, tick any or all which apply)

a. a marketing cooperative? eg. Cropmark or other

b. a farmer organisation? eg. Federated farmers or others

c. owning a non-farm business?

d. directing or managing a non-farm business you do not own?

10. Compared to other local crop farmers, do you consider your crop yields to be: (tick one box)

Above average?

About average?

Below average?

11. How many agents or markets did you sell crops to last year?

(indicate a number)

12. How many of this years crops have you not grown previously on this farm?

(indicate a number)

No
extent
0

1

moderate
extent
2

3

High
extent
4

I own or manage facilities that are normally owned by middlemen further down the distribution chain.

I use special techniques to gain the highest possible quality premiums for my crops.

I plan my production decisions, by continually monitoring market signals other than price.

I own specialised plant, equipment, machinery, or facilities, that most crop farmers do not.

I continually seek new merchants and market outlets to sell produce to.

I work out the differences in returns, resulting from selling each crop to each potential company or agent available.

Question two:

Please print a number in the box beside each question to indicate the extent to which you agree with following statements:

Strongly
Disagree
0

1

2

3

Strongly
Agree
4

(print a number in each box)

Maximising farm profits is my most important farming goal.

I have no influence over the price I receive for my produce.

I grow crops which are different from those produced by other farmers.

Other countries government policies have the most important influence on my farm profitability.

I do not compete with overseas crop farmers.

Planning my crop mix to minimise risk, is my most important management activity.

By satisfying the buyers of my produce, I increase my farm business success.

As I have easy access to capital, I farm in a less constrained way than other cropping farmers.

My main competitors are a small number of specialist producers.

Crop disease is the major cause of fluctuations in my farm returns.

New Zealand government policies have little influence on my farm profitability.

Budgeting and planning to obtain the lowest possible farm costs is the most important management activity I undertake.

Strongly
Disagree
0

1

2

3

Strongly
Agree

- m. I can not afford to store crops and wait for the price to improve.
- n. I always set aside a proportion of my farm, to experiment with crops or techniques I know little about.
- o. New Zealand crop farmers are my main competitors.
- p. I mainly produce crops which I can grow or sell on the free market.
- q. The most important production activity I undertake is continually monitoring my crop.
- r. I mainly produce crops which I can grow or sell by contract.
- s. I grow crops on a trial basis for companies or merchants.
- t. Keeping knowledge I have from other producers, is essential to my farm-business operation.
- u. Variable weather is the major cause of fluctuations in my farm returns.
- v. I increase my farm-business success, by understanding the wants and needs of the final consumers of my produce.

PART THREE:

1. What is your age? (tick one box)

20-29	30-39	40-49	50-59	60-69	70+ years
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. For how many years have you attended university or tertiary institutions? (tick one box)

<1	1	1-2	2-3	3-4	4+ years
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. What is your approximate debt servicing (interest and principal payments) as a proportion of gross farm income for 1991/92 financial year? (tick one box)

0-4%	5-9%	10-14%	15-19%	20-24%	25-29%	30-34%	35-39%	40+ %
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Approximately what percentage of your gross farm income comes from crop farming: (tick one box)

0-49%	50-59%	60-69%	70-74%	75-79%	80-84%	85-89%	90-94%	95+ %
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. Compared to other similar sized local crop farmers, do you consider your financial performance to be:

Above average?	About average?	Below average?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ART FOUR: Information:

A. Please indicate the relative importance of the information sources you use.

Not Important 0	1	Moderately Important 2	3	Most Important 4
<i>(print a number between 0 and 4 in each box)</i>				
Agents	<input type="checkbox"/>	Other farmers	<input type="checkbox"/>	
A. and P. shows	<input type="checkbox"/>	Newspapers	<input type="checkbox"/>	
Magazines	<input type="checkbox"/>	Television	<input type="checkbox"/>	
Machinery field days	<input type="checkbox"/>	Crop field days	<input type="checkbox"/>	
Radio	<input type="checkbox"/>	Records I keep	<input type="checkbox"/>	
Farm workers	<input type="checkbox"/>	Farmer group meetings	<input type="checkbox"/>	
My farm advisor	<input type="checkbox"/>	My accountant	<input type="checkbox"/>	
My bank manager	<input type="checkbox"/>	My budget	<input type="checkbox"/>	
Family members	<input type="checkbox"/>	Overseas Newspapers/Magazines	<input type="checkbox"/>	
Other <i>(please state)</i> _____				

B. Please indicate the relative importance of the types of information you use.
(print a number between 0 and 4 in each box)

Crop costs and returns	<input type="checkbox"/>	Stock prices	<input type="checkbox"/>
New Zealand crop prices	<input type="checkbox"/>	Overseas crop prices	<input type="checkbox"/>
Overseas crop stockpiles	<input type="checkbox"/>	Total New Zealand crop yields	<input type="checkbox"/>
Production techniques	<input type="checkbox"/>	New crops and crop varieties	<input type="checkbox"/>
Machinery	<input type="checkbox"/>	Financial	<input type="checkbox"/>
Consumer information	<input type="checkbox"/>	Pests and diseases	<input type="checkbox"/>
Local growing conditions	<input type="checkbox"/>	Management practices	<input type="checkbox"/>
Quality discounts and premiums	<input type="checkbox"/>		
Other <i>(please state)</i> _____			

PLEASE TURN OVER.

C. Compared to other local crop farmers, do you consider your crop quality premiums to be:
(tick one box)

Above average?

About average?

Below average?

PART FIVE: Marketing or Value added questions:

If you grow specialist or niche crops, or further process, market, or add value to your produce, please give brief details.

You have now completed the survey. Thank you very much for your time and effort.

Please add any further comments you have:

Tick this box if you would like to receive a summary of the studies results:

Appendix 6.3 Covering Letter for Questionnaire

The following page is a copy of the covering letter which was sent to farmers with the questionnaire.

Lincoln University



Te Whare Wānaka O Aoraki

**Department of Economics
and Marketing**

PO Box 84
Lincoln University
Canterbury
New Zealand

Telephone: Christchurch (03) 325 2811
Fax: (64) (03) 325 3847

4 July 1993

Mr John Smith
No 1 RD
ASHBURTON

Dear Mr Smith

I am a Lincoln University doctoral student studying the marketing activities and business strategies which farmers undertake. An essential part of my research involves surveying Canterbury intensive crop farmers. Recently farmers have been criticised for not paying enough attention to marketing. However I recognise that farmers are no different than other business people. With this in mind I want to study how crop farmers differ in the way they go about their business and marketing activities.

As there are only a small number of intensive crop farmers, your participation is very important if my research is going to be successful.

Enclosed is a confidential questionnaire which asks for information about your farm management and marketing activities. It also asks some questions about you and your farm. There are no right or wrong answers to the questions asked. Your answers will be kept strictly confidential and only published in aggregate form. All participants will be eligible to receive a summary of my findings.

The questionnaire should not take longer than twenty minutes to complete. All questions should be answered by the person who makes the most farm business decisions. I would be grateful if you could answer the following questionnaire immediately. When you have done this please place the completed questionnaire in the enclosed self addressed envelope and post it to me. Postage is prepaid. If you have any problems regarding this questionnaire do not hesitate to contact me. Thank you for your time and effort in responding.

I look forward to hearing from you.

Yours sincerely

Fraser McLeay
DEPARTMENT OF ECONOMICS AND MARKETING

Appendix 6.4 Reminder Letter

The following page is a copy of the reminder letter sent to all farmers who had not replied to the mail survey after twenty one days.

Lincoln University



Te Whare Wānaka O Aoraki

Department of Economics
and Marketing
PO Box 84
Lincoln University
Canterbury
New Zealand

Telephone: Christchurch (03) 325 2811
Fax: (64) (03) 325 3847

24 July 1993

Mr John Smith
No 1 RD
ASHBURTON

Dear Mr Smith

I recently wrote to you asking if you would kindly help me with my PhD research. I asked you to complete a questionnaire relating to the management decisions of Canterbury intensive crop farmers. As there are only a small number of intensive crop farmers in Canterbury your participation is essential if my research is going to be successful.

If you have already sent your questionnaire back to me, I would like to thank you very much and apologise for troubling you again. So far I have had a very good response, however I still require more returns. If you have not yet filled in and returned the completed questionnaire I hope you can find the time to answer the questions and return it to me.

I would be most grateful for your help.

Yours sincerely

Fraser McLeay
DEPARTMENT OF ECONOMICS AND MARKETING

Appendix 7.1

Correlation Matrix of Variables used in Factor Analysis¹

	1a	1b	1c	1d	1e	1f	1g
1a	1.00000						
1b	-.01892	1.00000					
1c	.01461	.49972	1.00000				
1d	.06945	.33542	.38263	1.00000			
1e	.14066	-.09524	-.09116	.03667	1.00000		
1f	-.00029	.07058	.01605	-.03539	.17040	1.00000	
1g	-.16349	.32526	.31889	.28034	-.00337	.14056	1.00000
1h	-.06849	.44897	.38919	.16575	-.21830	.05700	.23398
1i	.00766	.40374	.49108	.27805	.00939	.07210	.42450
1j	-.04456	.48390	.44141	.28614	-.24028	-.04731	.32999
1k	.07240	.17007	.24788	.25711	.02914	.20988	.30271
1m	.03039	.31549	.32110	.20157	-.12430	.05983	.36482
1n	-.03085	.30921	.35078	.28968	.03969	.06348	.21332
1o	.08196	-.08878	-.10882	-.04451	.13456	.02821	-.19351
1p	-.06518	.25292	.14498	.16274	.08241	.12530	.29675
1q	.06492	.11518	.03248	-.05835	.06705	.26280	.14499
1r	.15381	.24563	.18352	.04087	-.09261	.12580	.25664
1s	-.08477	.46084	.31970	.31501	-.03923	.14602	.34198
1t	-.13902	.33370	.22339	.29916	.05924	-.00524	.53172
1u	.02018	-.14174	-.08738	-.02213	.08542	.20442	-.02275
1v	.18586	.24774	.22242	.11762	.02075	.15932	.21223
1w	-.11722	.33261	.21586	.32413	.11353	.04556	.30399
1x	.01521	.42298	.33480	.21537	-.02119	.13907	.33976
1y	.11875	.25231	.27954	.13804	.02563	.17903	.27559
1z	-.04806	.26271	.28763	.25296	.05764	-.13647	.05432
1aa	-.02453	.45230	.28641	.26051	-.14585	.05539	.25174
2a	.13300	.22255	.19478	.21123	.01807	.05376	.21669
2b	-.05617	-.18067	-.19338	-.10834	.10187	-.01416	-.18780
2c	.05165	.31596	.33645	.18262	-.26096	-.01879	.28921
2f	.10949	-.00171	-.08964	-.04824	.38750	.12535	-.16878
2h	-.01675	-.05151	.02570	-.07718	.11488	.11056	.05749
2l	.42749	.06278	.08119	.11498	.01518	-.05523	-.08826
2m	.11285	.06681	.00915	.14839	-.06224	-.09099	-.02074
2n	.00575	.30236	.30260	.16561	-.18442	-.09254	.31413
2p	.20381	-.13113	-.10679	-.12671	.16315	.15850	-.17842
2q	.03183	.28190	.22494	.33704	.10945	.06101	.41100
2r	-.10516	.03688	.09264	.08828	.08467	-.14016	-.11224
2s	-.14022	.26600	.35538	.07722	-.12637	.07982	.31121
2t	-.01766	.23125	.27322	.06019	.01189	-.02151	.07684

¹ Note: A 1 in front of the question letter means the question came from block A on the survey while a 2 indicates the question came from block B. For example question 2d is question d in block B.

Correlation matrix (continued)

	1h	1i	1j	1k	1m	1n	1o
1h	1.00000						
1i	.20280	1.00000					
1j	.60318	.29509	1.00000				
1k	.09421	.35127	.16692	1.00000			
1m	.39340	.33336	.36222	.28346	1.00000		
1n	.14766	.33546	.29810	.47956	.22572	1.00000	
1o	-.07934	-.17893	-.06806	-.03592	-.14450	-.08890	1.00000
1p	.13937	.26034	.35161	.28598	.28532	.34855	-.01264
1q	.09548	.00566	.04954	-.04125	-.07204	-.06989	.19238
1r	.16286	.24271	.18500	.37856	.33238	.17447	.00118
1s	.27397	.38622	.31118	.18454	.24396	.40456	-.13799
1t	.14090	.45584	.24840	.29215	.31018	.27206	-.15018
1u	-.09336	-.03589	-.18029	.06790	-.05380	-.10751	.12334
1v	.26180	.25378	.27412	.32637	.40684	.12065	-.00246
1w	.26068	.27419	.22444	.16830	.33983	.18988	-.10639
1x	.34228	.26935	.39179	.20833	.36135	.33326	-.03530
1y	.25886	.38910	.25319	.40205	.51338	.11239	-.00669
1z	.19540	.28849	.34596	.11495	.16708	.18103	-.16522
1aa	.36353	.25345	.35050	.14524	.23071	.29176	-.13262
2a	.09704	.19828	.11127	.01836	.07392	.02876	-.19398
2b	-.18604	-.03296	-.20043	-.22175	-.19186	-.13681	.03078
2c	.44127	.35879	.44827	.27102	.65038	.16931	-.21156
2f	.07787	-.11245	-.05055	-.13800	-.15285	-.08054	.03076
2h	.01937	-.03951	-.00282	-.04832	-.05641	-.08775	.28011
2l	.10124	-.01911	.06852	.04544	-.01981	.13670	-.07255
2m	-.01290	.01168	.17290	.06848	.06954	.06207	-.13953
2n	.31402	.37501	.36553	.27899	.38163	.11603	-.01068
2p	-.02235	-.25725	-.18310	-.14540	-.26985	-.09278	.14089
2q	.22116	.22238	.21665	.15419	.27303	.12202	-.05839
2r	.07606	.04325	-.04180	-.06947	.02357	-.07060	-.09129
2s	.30698	.32191	.35142	.27532	.33176	.07506	-.08051
2t	.26638	.12416	.19617	-.11982	.12465	.00332	-.13502

	1p	1q	1r	1s	1t	1u	1v
1p	1.00000						
1q	.13123	1.00000					
1r	.23202	.14675	1.00000				
1s	.39734	.17999	.36001	1.00000			
1t	.35270	.01010	.26696	.41034	1.00000		
1u	-.01402	.02309	.03989	-.09979	.02269	1.00000	
1v	.28888	.27482	.53272	.26051	.21062	-.07538	1.00000
1w	.13223	.15988	.16287	.42708	.52662	.07986	.24830
1x	.56703	.14283	.33345	.51203	.33362	.06267	.28379
1y	.24226	.21717	.29791	.19113	.29527	-.06302	.55369
1z	.19278	-.07491	.09306	.26141	.21901	-.41774	.20838
1aa	.29675	.22828	.13744	.43189	.24193	-.30041	.16414
2a	.16203	-.01330	.14817	.19274	.35429	.10283	.11163
2b	-.11285	-.08262	-.30194	-.25346	-.10854	.07787	-.14340
2c	.16375	-.03065	.33796	.23230	.23785	-.10761	.46901
2f	-.02187	.02672	-.21384	-.08853	-.03937	.09047	.04027
2h	.00449	.18439	-.08257	-.07822	-.08626	.16662	.10067
2l	-.02181	-.00118	.09935	-.03482	.00026	.10710	.02613
2m	.15665	-.31878	.06041	.04963	.21256	-.00384	.03081
2n	.14408	.01127	.30875	.26285	.25983	-.13544	.29937
2p	-.03775	.24904	.04870	.10556	-.10358	.05901	.03655
2q	.21624	-.00202	.13555	.17738	.42943	.10204	.21054
2r	-.22685	-.30805	-.24435	-.20405	-.03892	.14985	-.08287
2s	.09949	.06811	.39697	.23112	.23688	-.13303	.36210
2t	-.02171	.05479	.03962	.25699	.13216	-.04841	.11955

Correlation Matrix (continued)

	1w	1x	1y	1z	1aa	2a	2b
1w	1.00000						
1x	.26445	1.00000					
1y	.39021	.29995	1.00000				
1z	.24402	.13387	.23330	1.00000			
1aa	.17856	.25671	.18723	.32717	1.00000		
2a	.10689	.24471	.11841	.08062	.17697	1.00000	
2b	-.08752	-.14506	-.12919	-.09857	-.22214	-.05200	1.00000
2c	.22215	.26533	.47410	.19101	.29143	.08821	-.23260
2f	.03183	-.09056	.01462	.11758	-.11189	.03787	.04941
2h	.02743	-.01345	.12151	-.06511	-.02655	-.06762	.26542
2l	-.01652	.06843	-.02117	-.01622	-.00838	.20147	-.08671
2m	.03369	.09575	-.02621	.10219	.06051	.16783	.05887
2n	.16180	.20758	.32143	.24574	.29116	.10222	-.17629
2p	-.08358	.10261	-.09278	-.13267	-.05973	.06405	-.00924
2q	.34621	.32814	.12307	.14786	.14546	.26296	-.01893
2r	-.02540	-.11617	-.16863	.08870	-.11511	.00081	.15152
2s	.23423	.13687	.39045	.25098	.24250	.04218	-.08042
2t	.21445	.22387	.11986	.15937	.22936	.22351	-.09259
	2c	2f	2h	2l	2m	2n	2p
2c	1.00000						
2f	-.12142	1.00000					
2h	-.00147	.09312	1.00000				
2l	.00123	.28531	-.09066	1.00000			
2m	.02632	-.11118	-.17293	.14224	1.00000		
2n	.40340	-.20785	-.06200	-.10968	-.00415	1.00000	
2p	-.15102	.16044	.23712	.06792	-.07476	-.16516	1.00000
2q	.09667	.03704	.00086	.08840	.23422	.15324	-.19163
2r	.03046	.15662	.00636	.00624	.01664	-.00951	-.30798
2s	.42088	-.02734	.10198	-.04673	-.00189	.51133	-.14213
2t	.09453	.07277	.06523	.13814	.01639	.15876	.02684
	2q	2r	2s	2t			
2q	1.00000						
2r	.14506	1.00000					
2s	.17364	.06379	1.00000				
2t	.10840	.09042	.22530	1.00000			

Appendix 7.2

Anti-Image Correlation Matrix²

	1a	1b	1c	1d	1e	1f	1g
1a	.49234						
1b	.00802	.91874					
1c	-.02124	-.20916	.87122				
1d	-.05476	-.04506	-.20045	.83203			
1e	-.15897	.04297	.02197	-.03738	.59633		
1f	.04511	-.05887	.04558	.04760	-.09536	.62740	
1g	.13125	.01424	-.03486	-.12015	-.14504	-.06477	.81316
1h	.16837	-.06576	-.08710	.09503	.12689	-.05199	.00075
1i	-.13458	-.09457	-.28111	.05020	-.07772	-.05614	-.11731
1j	-.08445	-.13836	-.06229	-.09037	.12850	.02957	-.13557
1k	-.07438	.03924	.00754	-.15039	-.01505	-.19733	-.08062
1m	-.08740	.01838	-.05908	.01863	-.01254	-.11276	-.10498
1n	.11426	-.00407	-.18478	.02339	-.11645	.00856	.09474
1o	-.03525	-.04269	.01071	-.13910	-.12080	.03653	.26066
1p	.12434	.05726	.09836	.02547	-.15962	.05036	.05579
1q	-.03646	-.02812	-.04436	.08793	-.02620	-.14419	-.11441
1r	-.11097	-.12422	.07896	.14575	-.04960	.02141	-.00173
1s	.02726	-.09706	.06118	-.17102	.09292	-.11016	-.03436
1t	.17517	-.01542	.09848	.04917	.04435	.14456	-.30849
1u	.08153	.13375	-.03971	-.04085	.06960	-.16578	.10814
1v	-.07084	.02292	-.00017	-.02762	.03109	-.02750	.04034
1w	.06730	-.10658	.08000	-.16141	-.16093	.09347	.10594
1x	.00308	-.12988	-.07791	.06087	.04395	-.01149	-.08917
1y	-.09891	.00463	-.01489	.02420	-.01943	-.05673	.05214
1z	.09958	.09837	-.10096	-.08857	-.07671	.07746	.22290
1aa	-.07983	-.20074	.08723	-.10619	.07063	-.05570	.02339
2a	-.07331	-.05416	-.07826	-.09193	.01013	-.07032	-.04032
2b	-.00057	-.01221	.14741	-.04901	-.02352	-.03434	.15348
2c	-.04767	.01989	.03946	-.05799	.11589	.09384	.03123
2f	-.02743	-.13661	.10411	.06452	-.32862	-.11885	.07842
2h	.00139	.00161	-.05753	.08879	.00923	.02490	-.23110
2l	-.38377	.01394	.00510	-.10116	.13978	.11732	.02096
2m	-.09550	-.02347	.02208	-.00955	-.00519	-.02526	.13252
2n	-.12845	-.04479	.07175	.00918	.03445	.17994	-.07255
2p	-.17710	.08906	-.07693	-.02324	-.14232	-.07769	.13541
2q	-.12644	-.01835	-.00900	-.13181	-.04950	-.03729	-.21930
2r	.03415	-.10055	-.03992	-.07051	-.16402	.08080	.14468
2s	.23118	.08365	-.19251	.09744	.05932	-.10009	-.06216
2t	.04867	.02893	-.12082	.09274	-.12180	.03125	.09261

² Note: A 1 in front of the question letter means the question came from block A on the survey while a 2 indicates the question came from block B. For example question 2d is question d in block B.

Anti-Image Correlation Matrix (continued)

	1h	1i	1j	1k	1m	1n	1o
1h	.80942						
1i	-.00124	.85662					
1j	-.43048	.04486	.82652				
1k	-.04478	-.01831	.09880	.76954			
1m	-.12927	.10314	.09432	.14431	.85451		
1n	.09853	-.07130	-.16455	-.41735	-.08854	.76010	
1o	-.02949	.06055	-.08336	.03009	-.00734	.00166	.58838
1p	.08674	-.05280	-.18271	-.10384	-.16986	-.03173	.01244
1q	.02588	.02646	-.07870	.14621	.19324	.12676	-.11658
1r	-.04226	-.00091	.10298	-.13445	-.09715	.03656	-.07927
1s	-.00376	-.19847	.08975	.14300	.05095	-.21181	-.05075
1t	.13770	-.22446	.00182	-.08333	.00003	-.04110	-.10158
1u	.05245	-.10804	-.00728	-.14356	.01144	.12768	-.03663
1v	.01704	.04338	-.02877	-.07345	-.00203	-.01158	.01567
1w	-.12340	.11248	.00579	.04050	-.13394	-.04261	.11409
1x	-.04778	.09573	-.08350	.05162	-.03570	-.09239	-.05266
1y	-.03399	-.17054	.10179	-.26084	-.24463	.14137	-.06475
1z	.10576	-.12795	-.21439	-.02433	.04061	.08466	.12446
1aa	-.19838	.04671	.14224	-.00513	.01201	-.15595	.05233
2a	.02417	.01665	.01497	.13348	.11075	.08558	.14362
2b	-.02820	-.20704	.07447	.15651	.00197	-.07315	.10334
2c	-.08490	-.12212	-.16468	.01449	-.40811	.03120	.18220
2f	-.16872	.08344	-.00698	.11694	.09863	.01901	.01561
2h	.05548	.04446	-.06268	.01144	.05575	-.01145	-.28540
2l	-.10627	.01195	.02348	-.01683	.01417	-.21298	.07749
2m	.08798	.10449	-.21515	-.00760	.02875	.09697	.06704
2n	-.08233	-.11224	-.05493	-.11123	-.10112	.06843	-.14306
2p	-.20543	.18501	.18561	.03999	.15779	.01046	.04269
2q	-.13454	.03774	.09738	.01849	-.09854	.03443	-.04580
2r	-.14798	-.02947	.14011	-.02960	-.04462	.02996	.05857
2s	.09829	.01927	-.13719	-.09882	.06571	.12060	.00759
2t	-.05127	.00609	-.04259	.12861	-.05118	.08905	.10408

	1p	1q	1r	1s	1t	1u	1v
1p	.74887						
1q	-.06331	.59449					
1r	.10789	.02408	.72236				
1s	-.11231	-.01909	-.15160	.85866			
1t	-.14067	.01998	-.10784	-.00933	.81507		
1u	-.08361	-.06575	-.18910	.03174	.02848	.49908	
1v	-.17957	-.25559	-.42064	-.03253	.08793	.15736	.79002
1w	.20764	-.14473	.08683	-.26794	-.36548	-.22280	-.01483
1x	-.43441	.00051	-.14310	-.20860	.06964	-.08452	.12695
1y	.06787	-.12806	.19124	.15756	-.04900	.05429	-.27785
1z	-.06207	.09068	-.12779	-.04433	.00624	.39305	.00023
1aa	-.15328	-.29077	.08716	-.11873	-.03828	.15176	.12781
2a	-.05398	.09801	-.06917	.01601	-.23628	-.12199	-.00571
2b	.02876	-.00569	.17821	.12850	-.03736	.02467	-.08058
2c	.11754	.10324	.01330	.01708	-.05566	-.02941	-.23386
2f	-.07587	.10974	.26756	-.04281	-.10917	-.14192	-.15155
2h	-.08231	.03412	.07808	.03522	.12282	-.19147	-.05654
2l	.01898	-.11584	-.13122	.12186	-.00496	-.07145	.10079
2m	-.09131	.33376	.02186	-.03466	-.17272	-.05880	-.08172
2n	.05076	.04527	.06621	-.05603	-.03376	-.07341	-.06357
2p	.13901	-.09926	.02307	-.14467	-.16940	.00928	-.07795
2q	.04455	-.01406	.06519	.11467	-.15391	-.06095	-.16171
2r	.20938	.12031	.23679	.08236	-.07215	-.22947	-.17401
2s	-.00961	-.00511	-.35711	-.04103	.05544	.16112	.08677
2t	.19007	.04943	.11056	-.13823	-.04130	-.00519	-.11042

Anti-Image Correlation Matrix (continued)

	1w	1x	1y	1z	1aa	2a	2b
1w	.75934						
1x	.03028	.80819					
1y	-.21549	-.21465	.79066				
1z	-.13732	.00855	-.09974	.74169			
1aa	.10073	.10050	.04103	-.16460	.81455		
2a	.13208	-.01620	-.11506	-.00140	-.09803	.76532	
2b	-.00586	-.11441	.04550	.03473	.10251	-.03436	.68306
2c	.04781	-.04913	-.08157	.07475	-.12611	.00376	.12515
2f	.06889	.11058	-.07948	-.18566	.08540	.01594	.06491
2h	-.03815	.12082	-.11555	-.06061	-.09062	.04708	-.30181
2l	.01329	-.03215	.05174	.02665	.05988	-.10792	.04029
2m	.03785	.05015	-.03637	-.00264	-.09990	.00543	-.11612
2n	.09005	-.00439	.01632	-.09132	-.06232	-.04701	.01724
2p	.07753	-.24830	.14835	-.00420	.07588	-.08263	.06437
2q	-.12313	-.21518	.20048	-.07298	-.01037	-.08490	-.00318
2r	.10824	-.13309	.25516	-.13325	.03691	-.01580	-.00893
2s	-.07002	.15146	-.15976	.04345	-.06977	.08098	-.15626
2t	-.04829	-.17784	-.00168	.02363	-.13464	-.12212	.09933
	2c	2f	2h	2l	2m	2n	2p
2c	.85492						
2f	.00346	.49625					
2h	-.08362	.02564	.46675				
2l	.02006	-.30972	.03210	.49935			
2m	.05774	.19116	.11512	-.10956	.53725		
2n	.00813	.12089	.12039	.12381	.09158	.86554	
2p	-.05786	-.07427	-.27921	.05676	-.05577	-.01080	.56584
2q	.15410	-.03472	-.04602	.00375	-.17726	.01521	.18642
2r	-.05674	-.03917	-.06099	.03712	.03301	.03724	.29099
2s	-.13355	-.16017	-.08101	-.05869	-.03180	-.33573	-.03162
2t	.14451	.03557	-.11659	-.15200	.00335	-.04742	.04918
	2q	2r	2s	2t			
2q	.78819						
2r	-.03978	.51766					
2s	-.10111	-.17157	.76862				
2t	.05872	-.02059	-.13014	.70204			

Appendix 7.3

Inter-Cluster Differences for Individual Attitudinal Questions Included in Factor Analysis³

	Strategic Groups						Duncan's Multiple Range Tests for Intergroup Differences ¹										
	1	2	3	4	5	Av	F	F									
							ratio	prob									
1a	1.893	1.978	1.467	2.308	2.160	1.915	1.887	0.116	2-3*	3-4**	3-5**						
	<i>1.197</i>	<i>1.196</i>	<i>0.937</i>	<i>1.032</i>	<i>1.214</i>	<i>1.150</i>											
1b	2.964	1.800	2.633	3.231	2.400	2.447	9.915	0.000	1-2***	1-5**	2-3***	2-5**	3-4**	3-5*			
	<i>0.962</i>	<i>0.991</i>	<i>0.890</i>	<i>0.832</i>	<i>0.957</i>	<i>1.059</i>											
1c	3.179	1.822	2.667	3.154	2.040	2.433	13.787	0.000	1-2***	1-3**	1-5***	2-3***	2-4***	3-4***	3-5**		
	<i>0.612</i>	<i>1.051</i>	<i>0.802</i>	<i>0.689</i>	<i>1.060</i>	<i>1.051</i>											
1d	3.107	2.022	3.100	3.154	3.040	2.752	10.258	0.000	1-2***	2-3***	2-4***	2-5***					
	<i>0.832</i>	<i>1.138</i>	<i>0.803</i>	<i>0.689</i>	<i>0.841</i>	<i>1.040</i>											
1e	2.571	3.356	3.600	3.385	3.040	3.199	5.656	0.000	1-2***	1-3***	1-4**	1-5*	3-5**				
	<i>0.960</i>	<i>0.857</i>	<i>0.622</i>	<i>0.961</i>	<i>1.099</i>	<i>0.950</i>											
1f	2.500	2.756	2.300	2.539	2.080	2.468	1.927	0.110	2-3*	2-5**							
	<i>0.882</i>	<i>1.026</i>	<i>1.149</i>	<i>0.967</i>	<i>1.152</i>	<i>1.059</i>											
1g	3.464	2.711	3.367	3.462	2.600	3.050	8.561	0.000	1-2***	1-5***	2-3***	2-4***	3-5***	4-5***			
	<i>0.576</i>	<i>0.895</i>	<i>0.669</i>	<i>0.660</i>	<i>0.866</i>	<i>0.848</i>											
1h	3.143	2.289	2.067	3.385	2.560	2.560	6.241	0.000	1-2***	1-3***	1-5*	2-4***	3-4***	4-5**			
	<i>0.848</i>	<i>1.290</i>	<i>0.868</i>	<i>0.961</i>	<i>1.158</i>	<i>1.155</i>											
1i	2.964	2.378	2.967	3.385	2.000	2.645	8.131	0.000	1-2***	1-5***	2-3***	2-4***	2-5*	3-5***	4-5***		
	<i>0.637</i>	<i>1.051</i>	<i>0.765</i>	<i>0.506</i>	<i>1.155</i>	<i>0.994</i>											
1j	2.571	1.333	1.567	2.923	2.120	1.915	11.316	0.000	1-2***	1-3***	2-4***	2-5***	3-4***	3-5***	4-5**		
	<i>0.742</i>	<i>1.000</i>	<i>0.935</i>	<i>1.115</i>	<i>1.236</i>	<i>1.134</i>											
1k	2.357	1.756	1.833	3.385	1.680	2.028	8.058	0.000	1-2**	1-3*	1-4***	1-5**	2-4***	3-4***	4-5***		
	<i>0.911</i>	<i>1.069</i>	<i>0.986</i>	<i>0.768</i>	<i>1.249</i>	<i>1.134</i>											
1l	1.464	0.711	0.700	2.846	0.520	1.021	15.348	0.000	1-2***	1-3***	1-4***	1-5***	2-3***	2-4***	2-5***		
	<i>1.232</i>	<i>1.014</i>	<i>0.837</i>	<i>1.214</i>	<i>0.770</i>	<i>1.198</i>											
1m	2.000	1.244	0.800	2.769	0.640	1.333	11.948	0.000	1-2***	1-3***	1-4**	1-5***	2-3*	2-4***	2-5**	3-4***	4-5***
	<i>1.305</i>	<i>1.246</i>	<i>0.997</i>	<i>0.725</i>	<i>0.952</i>	<i>1.285</i>											
1n	2.786	2.222	2.733	3.077	2.600	2.589	2.348	0.058	1-2**	2-3*	2-4**						
	<i>0.995</i>	<i>1.185</i>	<i>1.143</i>	<i>0.760</i>	<i>1.000</i>	<i>1.096</i>											
1o	0.571	0.867	0.600	1.385	1.880	0.979	9.134	0.000	1-4**	1-5***	2-4*	2-5***	3-4**	4-5*			
	<i>0.690</i>	<i>0.894</i>	<i>0.855</i>	<i>1.121</i>	<i>1.201</i>	<i>1.038</i>											
1p	2.107	1.933	1.867	2.846	2.320	2.106	3.630	0.008	1-4**	2-4***	2-5*	3-4***	3-5*	4-5*			
	<i>0.994</i>	<i>0.915</i>	<i>0.776</i>	<i>0.555</i>	<i>0.945</i>	<i>0.916</i>											
1q	1.250	1.533	1.600	1.846	1.800	1.567	0.977	0.422									
	<i>1.005</i>	<i>1.272</i>	<i>1.221</i>	<i>0.899</i>	<i>1.155</i>	<i>1.161</i>											
1r	0.821	0.422	0.400	2.615	0.680	0.745	10.626	0.000	1-4***	2-4***	3-4***	4-5***					
	<i>1.467</i>	<i>0.892</i>	<i>0.855</i>	<i>1.261</i>	<i>1.282</i>	<i>1.273</i>											
1s	2.357	2.044	2.700	3.077	2.880	2.489	4.550	0.002	1-4*	1-5*	2-3**	2-4***	2-5***				
	<i>1.026</i>	<i>1.186</i>	<i>0.877</i>	<i>0.862</i>	<i>0.927</i>	<i>1.073</i>											
1t	3.071	2.511	3.133	3.462	2.440	2.830	5.176	0.001	1-2**	1-5**	2-3***	2-4***	3-5**	4-5***			
	<i>0.813</i>	<i>1.141</i>	<i>0.629</i>	<i>0.660</i>	<i>1.044</i>	<i>0.985</i>											
1u	3.214	2.844	1.767	2.231	2.760	2.617	7.255	0.000	1-3***	1-4**	2-3***	3-5***					
	<i>0.787</i>	<i>1.127</i>	<i>1.135</i>	<i>1.166</i>	<i>1.363</i>	<i>1.217</i>											
1v	0.321	0.489	0.100	3.000	0.080	0.532	31.681	0.000	1-4***	2-4***	2-3*	2-5*	3-4***	4-5***			
	<i>0.905</i>	<i>0.991</i>	<i>0.548</i>	<i>1.291</i>	<i>0.400</i>	<i>1.162</i>											

Mean scores are presented, standard deviations in italics

¹ For Duncan's Multiple Range Tests the numbers represent the strategic groups between which significant differences exist

* p < 0.1 ** p < 0.05 *** p < 0.01

³ Note: A 1 in front of the question letter means the question came from block A on the survey while a 2 indicates the question came from block B. For example question 2d is question d in block B.

Strategic Groups

Duncan's Multiple Range Tests for Intergroup Differences

	1	2	3	4	5	Av	F	F								
							ratio	prob								
1w	2.429	2.533	2.600	2.846	2.440	2.539	0.422	0.792								
	<i>1.168</i>	<i>1.217</i>	<i>0.969</i>	<i>0.801</i>	<i>0.870</i>	<i>1.059</i>										
1x	2.143	1.667	1.567	2.692	2.360	1.957	5.819	0.000	1-2**	1-3**	2-4***	2-5***	3-4***	3-5***		
	<i>0.891</i>	<i>1.066</i>	<i>0.971</i>	<i>0.630</i>	<i>0.810</i>	<i>0.999</i>										
1y	1.500	1.867	1.100	3.308	0.680	1.553	11.449	0.000	1-4***	1-5**	2-3**	2-4***	2-5***	3-4***	3-5***	
	<i>1.139</i>	<i>1.455</i>	<i>1.269</i>	<i>0.630</i>	<i>1.069</i>	<i>1.406</i>										
1z	1.214	1.378	2.067	2.539	1.440	1.610	6.611	0.000	1-3***	1-4***	2-3***	2-4***	2-5***	3-5***	4-5**	
	<i>0.876</i>	<i>1.114</i>	<i>0.583</i>	<i>0.967</i>	<i>1.158</i>	<i>1.047</i>										
1aa	2.357	1.556	3.067	3.154	2.240	2.305	9.669	0.000	1-2***	1-3**	1-4*	2-3***	2-4***	2-5**	3-5**	4-5**
	<i>1.311</i>	<i>1.139</i>	<i>1.015</i>	<i>0.801</i>	<i>1.332</i>	<i>1.298</i>										
2a.	3.607	3.211	3.633	3.539	3.040	3.379	3.182	0.016	1-2**	1-5**	2-3**	3-5**	4-5**			
	<i>0.567</i>	<i>0.908</i>	<i>0.615</i>	<i>0.519</i>	<i>1.020</i>	<i>0.810</i>										
2b.	1.643	2.400	1.800	1.308	1.600	1.879	3.379	0.011	1-2**	2-3**	2-4**	2-5**				
	<i>1.193</i>	<i>1.251</i>	<i>1.186</i>	<i>1.378</i>	<i>1.155</i>	<i>1.262</i>										
2c.	1.821	1.211	1.000	2.692	0.680	1.330	10.522	0.000	1-2**	1-3***	1-4**	1-5***	2-4***	2-5*	3-4***	4-5**
	<i>1.020</i>	<i>1.170</i>	<i>0.983</i>	<i>0.947</i>	<i>0.900</i>	<i>1.171</i>										
2d.	2.393	2.067	1.933	1.692	2.240	2.099	1.081	0.368								
	<i>1.066</i>	<i>1.251</i>	<i>1.015</i>	<i>1.251</i>	<i>1.268</i>	<i>1.173</i>										
2e.	1.893	1.667	1.133	1.539	1.760	1.603	1.392	0.240	1-3*							
	<i>1.166</i>	<i>1.430</i>	<i>1.196</i>	<i>1.330</i>	<i>1.451</i>	<i>1.336</i>										
2f.	2.357	3.178	2.767	2.769	2.560	2.780	3.818	0.006	1-2***	2-3*	2-5**					
	<i>0.989</i>	<i>0.887</i>	<i>0.858</i>	<i>1.013</i>	<i>1.003</i>	<i>0.972</i>										
2g.	3.286	2.933	2.767	3.308	3.040	3.021	1.376	0.246	1-3*							
	<i>0.713</i>	<i>1.116</i>	<i>1.006</i>	<i>0.630</i>	<i>1.099</i>	<i>0.989</i>										
2h.	1.143	1.756	1.067	1.692	1.440	1.426	1.730	0.147	1-2*	2-3**						
	<i>1.239</i>	<i>1.401</i>	<i>1.112</i>	<i>1.437</i>	<i>1.387</i>	<i>1.327</i>										
2i.	1.393	1.044	0.767	2.692	0.720	1.149	10.703	0.000	1-3**	1-4***	1-5**	3-4***	4-5***			
	<i>1.286</i>	<i>0.928</i>	<i>0.774</i>	<i>1.109</i>	<i>0.891</i>	<i>1.121</i>										
2j.	1.321	2.022	1.667	1.462	1.400	1.645	2.326	0.060	1-2**	1-5**						
	<i>1.020</i>	<i>1.138</i>	<i>0.922</i>	<i>1.127</i>	<i>1.291</i>	<i>1.122</i>										
2k.	1.500	1.622	1.433	1.923	1.520	1.567	0.421	0.793								
	<i>1.202</i>	<i>1.173</i>	<i>1.104</i>	<i>1.441</i>	<i>1.327</i>	<i>1.209</i>										
2l.	2.571	2.000	1.667	2.231	2.120	2.085	2.233	0.069	1-2*	1-3***						
	<i>1.200</i>	<i>1.225</i>	<i>1.184</i>	<i>0.832</i>	<i>1.236</i>	<i>1.204</i>										
2m.	2.071	1.733	1.867	2.615	2.280	2.007	1.706	0.152	2-4**							
	<i>1.386</i>	<i>1.304</i>	<i>1.106</i>	<i>0.961</i>	<i>1.308</i>	<i>1.268</i>										
2n.	1.643	0.733	1.400	3.154	1.000	1.326	12.667	0.000	1-2***	1-4***	1-5*	2-3**	2-4***	3-4***	4-5***	
	<i>1.394</i>	<i>0.915</i>	<i>1.070</i>	<i>1.214</i>	<i>1.190</i>	<i>1.307</i>										
2o.	1.821	2.111	1.867	2.385	1.800	1.972	0.810	0.521								
	<i>1.249</i>	<i>1.071</i>	<i>1.167</i>	<i>1.261</i>	<i>1.443</i>	<i>1.213</i>										
2p.	1.036	2.022	1.433	1.615	2.280	1.709	6.377	0.000	1-2***	1-5***	2-3**	3-5***	4-5*			
	<i>0.838</i>	<i>1.118</i>	<i>1.040</i>	<i>0.961</i>	<i>1.137</i>	<i>1.118</i>										
2q.	3.500	3.022	3.200	3.539	3.080	3.213	2.730	0.032	1-2*	1-5**	2-4**	4-5*				
	<i>0.577</i>	<i>0.812</i>	<i>0.664</i>	<i>0.660</i>	<i>0.812</i>	<i>0.745</i>										
2r.	3.036	2.600	2.700	2.539	2.000	2.596	3.479	0.010	1-2*	1-5***	2-5**	3-5**				
	<i>0.838</i>	<i>1.031</i>	<i>0.837</i>	<i>0.877</i>	<i>1.414</i>	<i>1.062</i>										
2s.	1.286	0.978	1.167	2.846	0.400	1.149	11.153	0.000	1-4***	1-5***	2-4***	2-5**	3-5**	4-5***		
	<i>1.243</i>	<i>1.138</i>	<i>1.117</i>	<i>0.987</i>	<i>0.817</i>	<i>1.242</i>										
2t.	1.857	1.578	1.767	2.308	1.400	1.709	1.237	0.298	4-5*							
	<i>1.407</i>	<i>1.118</i>	<i>1.431</i>	<i>1.316</i>	<i>1.384</i>	<i>1.318</i>										
2u.	2.964	3.200	3.000	3.077	3.080	3.079	0.361	0.836								
	<i>0.962</i>	<i>0.757</i>	<i>0.964</i>	<i>1.038</i>	<i>0.997</i>	<i>0.906</i>										
2v.	2.714	2.589	2.467	3.231	2.400	2.614	1.641	0.168	2-4*	3-4**	4-5**					
	<i>1.084</i>	<i>1.073</i>	<i>0.937</i>	<i>0.832</i>	<i>1.118</i>	<i>1.046</i>										

Appendix 7.4

Proportion of Strategic Group Members Growing Individual Crops
(numbers in bold, percentage in italics)

	Total	Strategic Group				
		1	2	3	4	5
Wheat	119	25	40	26	12	17
	<i>85</i>	<i>89</i>	<i>88</i>	<i>86</i>	<i>92</i>	<i>68</i>
Barley	86	18	30	15	9	14
	<i>61</i>	<i>64</i>	<i>66</i>	<i>50</i>	<i>69</i>	<i>56</i>
Clover	111	21	38	26	11	17
	<i>80</i>	<i>75</i>	<i>84</i>	<i>86</i>	<i>84</i>	<i>68</i>
Peas	112	22	33	25	11	21
	<i>79</i>	<i>78</i>	<i>73</i>	<i>83</i>	<i>84</i>	<i>84</i>
Lentils	40	10	10	11	5	4
	<i>28</i>	<i>35</i>	<i>22</i>	<i>36</i>	<i>38</i>	<i>16</i>
Potatoes	13	2	6	2	1	2
	<i>9</i>	<i>7</i>	<i>13</i>	<i>6</i>	<i>7</i>	<i>8</i>
Oats	31	3	13	4	2	9
	<i>22</i>	<i>10</i>	<i>28</i>	<i>13</i>	<i>15</i>	<i>36</i>
Malting Barley	30	6	8	7	1	8
	<i>21</i>	<i>21</i>	<i>17</i>	<i>23</i>	<i>7</i>	<i>32</i>
Ryegrass	50	11	13	16	5	5
	<i>35</i>	<i>39</i>	<i>28</i>	<i>53</i>	<i>38</i>	<i>20</i>
Fescue	37	4	14	7	3	9
	<i>26</i>	<i>14</i>	<i>31</i>	<i>23</i>	<i>23</i>	<i>36</i>
Seed barley	10	1	4	3	1	1
	<i>7</i>	<i>3</i>	<i>8</i>	<i>10</i>	<i>7</i>	<i>4</i>
Garden-Freezer Peas	19	5	7	2	4	1
	<i>13</i>	<i>17</i>	<i>15</i>	<i>6</i>	<i>30</i>	<i>4</i>
Garden-Freezer beans	11	0	2	6	2	1
	<i>7</i>	<i>0</i>	<i>4</i>	<i>20</i>	<i>15</i>	<i>4</i>
Chicory	5	2	0	2	1	0
	<i>3</i>	<i>7</i>	<i>0</i>	<i>6</i>	<i>7</i>	<i>0</i>
Hay-silage	15	6	4	3	0	2
	<i>10</i>	<i>21</i>	<i>8</i>	<i>10</i>	<i>0</i>	<i>8</i>
Linseed	7	2	1	1	2	1
	<i>5</i>	<i>7</i>	<i>2</i>	<i>3</i>	<i>15</i>	<i>4</i>
Carrots	2	0	0	0	1	1
	<i>1</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>7</i>	<i>4</i>
Chinese cabbage	6	0	1	1	1	3
	<i>4</i>	<i>0</i>	<i>2</i>	<i>3</i>	<i>7</i>	<i>12</i>
Radish	8	1	1	0	6	0
	<i>5</i>	<i>3</i>	<i>2</i>	<i>0</i>	<i>46</i>	<i>0</i>
Evening Primrose	16	7	2	1	6	0
	<i>11</i>	<i>25</i>	<i>4</i>	<i>3</i>	<i>46</i>	<i>0</i>
Sweet corn	3	1	1	1	0	0
	<i>2</i>	<i>3</i>	<i>2</i>	<i>3</i>	<i>0</i>	<i>0</i>
Kale	7	3	1	1	2	0
	<i>5</i>	<i>10</i>	<i>2</i>	<i>3</i>	<i>15</i>	<i>0</i>
Squash	6	3	0	2	1	0
	<i>4</i>	<i>10</i>	<i>0</i>	<i>6</i>	<i>7</i>	<i>0</i>
Feed barley	18	4	5	3	0	6
	<i>12</i>	<i>14</i>	<i>11</i>	<i>10</i>	<i>0</i>	<i>24</i>
Sunflowers	2	1	0	0	1	0
	<i>1</i>	<i>3</i>	<i>0</i>	<i>0</i>	<i>7</i>	<i>0</i>
Triticale	5	2	1	1	0	1
	<i>3</i>	<i>7</i>	<i>2</i>	<i>3</i>	<i>0</i>	<i>4</i>
Lupins	4	1	0	2	0	1
	<i>2</i>	<i>3</i>	<i>0</i>	<i>6</i>	<i>0</i>	<i>4</i>
Lotus	3	0	0	1	2	0
	<i>2</i>	<i>0</i>	<i>0</i>	<i>3</i>	<i>15</i>	<i>0</i>
Turf grass seed	10	2	2	2	2	2
	<i>7</i>	<i>7</i>	<i>4</i>	<i>6</i>	<i>15</i>	<i>8</i>
Unspecified Niche	8	1	3	1	2	1
	<i>6</i>	<i>4</i>	<i>7</i>	<i>3</i>	<i>15</i>	<i>4</i>
Ryecorn	10	4	5	0	1	0
	<i>7</i>	<i>14</i>	<i>11</i>	<i>0</i>	<i>8</i>	<i>0</i>
Oilseed rape	10	4	0	4	2	0
	<i>7</i>	<i>14</i>	<i>0</i>	<i>13</i>	<i>15</i>	<i>0</i>
Borage	15	9	0	1	4	1
	<i>11</i>	<i>32</i>	<i>0</i>	<i>3</i>	<i>31</i>	<i>4</i>

Appendix 7.5

Sales Methods

(Percentage of Strategic Group Members Growing Popular Crops that Sell, Store, and Use Crops in Various Ways⁴)

Wheat		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	24	0	84	4	4	12	0	0	84
	2	23	0	88	13	0	15	0	0	78
	3	19	0	85	15	4	8	0	0	85
	4	33	0	75	25	8	25	0	0	75
	5	29	0	83	12	0	6	0	0	77
Average		24	0	84	13	3	13	0	0	80

Barley		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	33	17	44	0	0	11	17	17	83
	2	20	7	73	7	0	0	3	10	77
	3	0	13	74	7	7	0	0	7	93
	4	22	33	56	11	22	0	0	0	78
	5	21	7	57	15	0	7	14	29	50
Average		20	13	54	0	4	4	7	13	77

Clover		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	43	5	52	19	5	0	0	0	19
	2	71	0	26	26	0	0	0	3	34
	3	54	0	39	27	0	0	0	4	42
	4	55	0	46	27	9	0	0	0	36
	5	71	0	29	27	0	6	0	6	24
Average		60	0	36	24	2	1	0	3	32

Peas		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	18	0	86	9	0	0	0	0	18
	2	24	3	64	18	0	12	0	0	18
	3	32	4	60	16	0	16	0	4	44
	4	27	18	64	0	9	9	0	9	55
	5	33	0	57	24	0	5	0	0	10
Average		27	4	66	15	1	9	0	2	26

⁴ See table 14 in the questionnaire

Sales Methods (continued)

Lentils

		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	10	20	80	10	0	0	0	0	20
	2	30	10	70	10	0	0	0	0	40
	3	18	36	46	9	0	0	0	9	18
	4	40	40	40	0	20	20	0	0	20
	5	0	25	25	75	0	0	0	0	0
Average		20	25	58	15	3	5	0	3	23

Oats

		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	67	0	33	0	0	0	0	67	40
	2	23	0	46	0	0	8	15	61	46
	3	0	0	50	0	0	25	25	50	38
	4	50	0	0	0	0	100	50	100	30
	5	67	0	0	44	0	100	33	33	24
Average		39	0	29	13	0	22	19	55	

Malting barley

		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	0	17	83	17	0	0	0	0	83
	2	13	13	63	25	0	0	0	0	75
	3	14	14	57	0	0	0	0	0	86
	4	0	0	0	0	0	100	0	0	100
	5	0	13	88	0	0	0	0	0	88
Average		7	13	70	10	0	3	0	0	83

Ryegrass

		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	46	0	64	18	0	9	0	0	18
	2	62	0	46	23	0	0	8	8	46
	3	38	0	75	18	0	0	0	0	38
	4	20	0	40	80	40	20	0	0	80
	5	60	0	40	20	0	20	0	0	0
Average		46	0	58	26	4	6	2	2	36

Sales Methods (continued)

Fescue

		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	0	0	75	25	0	0	0	0	25
	2	21	14	57	28	7	0	0	0	0
	3	29	14	29	14	28	0	0	0	49
	4	0	67	67	0	0	0	0	0	67
	5	33	11	33	22	0	11	0	0	22
Average		22	16	49	22	8	3	0	0	22

Evening Primrose

		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	14	0	88	0	0	0	0	0	15
	2	0	50	50	0	0	0	0	0	0
	3	100	0	100	0	0	0	0	0	0
	4	17	0	100	0	0	0	0	0	0
Average		19	6	86	0	0	0	0	0	50

Turf grass seed

		Free market Sale	Pooled	Fixed Contract	Forward Contract	Other Contract	Seed (Myself)	Feed (Myself)	Sold privately	Stored
Group	1	0	0	100	0	0	0	0	0	0
	2	0	50	50	0	0	0	0	0	0
	3	0	0	100	0	0	0	0	0	0
	4	0	0	100	0	0	0	0	0	0
	5	0	0	50	50	0	0	0	0	0
Average		0	10	80	10	0	0	0	0	50