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AN INVESTIGATION INTO THE ADVISORY SERVICE NEEDS OF HILL COUNTRY FARMERS IN THE TAIHAPE AND HUNTERVILLE REGIONS OF NEW ZEALAND.

Nicholas John Daniels

1993

A thesis presented in partial fulfilment of the requirements for the degree of Masters of Agricultural Science in Farm Management

at

Massey University.

Abstract

This thesis reports an investigation into the advisory service needs of hill country sheep and beef farmers.

Given the market reforms recently applied to the advisory services market, understanding of the needs of consumers (i.e. farmers) should be the primary concern of those involved in providing advisory services. Literature reviewed described how farmers needs could be seen as resulting from efforts to attain, maintain or enhance desired management styles, within a given situation. Two research studies were conducted to document farmer's advisory needs, and to investigate where factors characteristic of particular management styles, were associated with distinctive advisory needs.

The first study involved analyzing data collected through an intensive study of thirty hill country sheep and beef farmers. Four groups of farmers with distinctive advisory needs were identified. Several factors were found which were capable of explaining differences in farmer's recognition of advisory needs.

The second study comprised a postal survey of the total farmer population in the same farming region. Survey responses provided detailed information on the specific nature of farmers advisory needs. However, the less detailed questionnaire was unable to identify factors responsible for differences in the advisory service needs of respondent farmers.

The findings of both studies contain valuable information for those involved in providing farm advisory services. Details are given on the range of services required by those farmers who recognised needs for advisory services. Differences in farmer's needs for advisory services were predominantly between farmers who recognised needs for

specialist advisory services (typically of a technical nature), and farmers who recognised a need for advice in areas which they were regularly involved in making management decisions. A finding of major significance was that farmer's with similar goals do not necessarily have similar advisory needs. It was concluded that only individually orientated advisory services would be capable of ascertaining the unique goals and objectives of farmers, and delivering a service compatible with those goals.

The research also contains several findings relevant to future research into farmer needs and behaviour. The study recognised that a large range of factors were active in influencing farmers needs and demands for advisory services. It was therefore concluded that future research should avoid concentrating on isolated factors associated with farmer needs, but must attempt to consider all factors which influence farmers attempts to attain, maintain or enhance desired management styles. Such studies are likely to benefit from the use of an intensive qualitative research approach.

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To my flatmates, for the meals left uneaten,

To my friends, both at home and abroad, for failing to keep in touch,

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To you this thesis is dedicated.

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CHAPTER ONE

Introduction

1.1 NEW ZEALAND AGRICULTURE, ECONOMIC CHANGE AND FARM ADVISORY SERVICES

In New Zealand the average hill country farmer is a professional businessman, controlling assets in excess of $670,000 (NZMWBES, 1992). Pressures for change stemming from the adoption of market-led economic policies, confront these farmers with greater force and importance than a decade ago. Exposure to market forces may well result in producers facing greater risk and more crucial decision making situations, as individual producers, rather than the industry, now have to deal with changing circumstances.

In this situation, an increased use of professional advisory services could be expected to assist farmers in making and evaluating farm management decisions. The role of the farm advisor has been described as that of a change agent, someone who facilitates change at the farm level. Kampenallas (1981:1) believed that;

> *"the rapid social and technological changes* [of the late 1970's] *make the need for coping with change a task for every individual and particularly those who provide counsel and professional leadership to people".*

Changes experienced within the agricultural sector following the restructuring of the economy from the mid 1980's, make this statement more pertinent.

A major thrust of the market reforms was the removal of Government assistance from many industry and service areas. Central Government has turned to market systems to allocate resources more efficiently by providing the services demanded by consumers. This policy resulted in Governments withdrawing from the funding of advisory services for farmers.

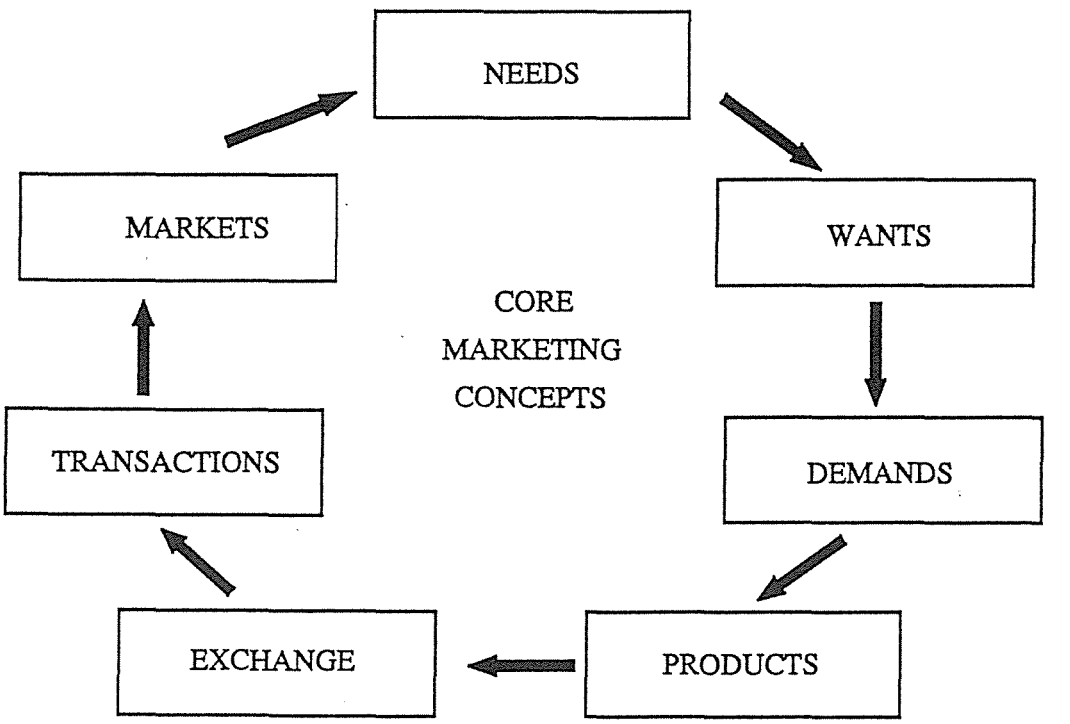
This thesis reports a study into advisory services for hill country farmers. The characteristics of these services are now influenced by market-led policies.

1.2 MARKET PROCESSES

Advisory services for hill country farmers are now provided by a market system. The characteristics of advisory services are determined by the components of this market system and the mechanisms by which it operates. An understanding of the components of market systems is therefore central to any study on advisory services in New Zealand.

The process by which markets operate is defined by Kotler and Armstrong (1989) as the series of stages through which consumer demands are satisfied by the consumption of products. The marketing process is described as comprising a series of core concepts, as shown in Figure 1.1.

FIGURE 1.1 Core market concepts.



SOURCE: Kotler & Armstrong, 1989:5

1.2.1 Needs, wants and demands.

Kotler and Armstrong (1989) describe the market process as beginning and ending with the consumer. The consumer related concepts which drive the market system are needs, wants and demands. Consumer needs form the basic fuel for human action, arising from a state of personal deprivation. Wants are the desire for an object that will satisfy a need. Culture and individual personality also create wants in addition to those based on human needs. Demand arises when wants are accompanied with purchasing power. A demand is recognised when a consumer decides which wants they choose to satisfy with limited resources.

In this study these three concepts are described collectively as a consumer demand function, i.e. those concepts which dictate the shape and form of consumer demand. The parallel for the consumer demand function in economic theory, is termed a satisfaction utility function. (Houston & Gassenheimer, 1987).

The market system relies on consumer demands to dictate resource allocation towards specific products.

1.2.2 Products.

Products are those commodities which can satisfy consumer demand. They form the other side of the economic supply-and-demand equation: the production function which provides goods and services in response to the demands of consumers. Services are distinctive products which can satisfy consumer demand (Lovelock, 1988; Kotler & Armstrong, 1989).

Services have the properties of;

Intangibility;

they cannot be experienced until the service is performed.

Perishability;

as services are produced at the moment they are performed, they cannot be stored. The value of the service exists only at the point of transaction.

Variability;

as services are produced at the moment they are performed, they are one-off actions. The repetition of a service invariably leads to differences in that service.

Inseparability;

as a service is an act performed by the service provider, it is inseparable from whoever provides the service.

These properties have special implications for a service market system. Firstly, intangible services are difficult to sell, since consumers will not demand a service if they cannot perceive potential benefits from using that service. Secondly, services are difficult to provide. The service provider has to ensure that a product which is inherently variable and cannot be stored, is capable of satisfying consumer demand. The fact that a service is inseparable from the service provider means that the service has to be performed where the consumer demands it, and will always be associated with the service provider.

1.2.3 Exchanges, transactions, markets.

Exchange is described by Kotler & Armstrong (1989) as the concept through which the marketing process operates. Exchange is said to occur because humans are basically goal seeking beings, but with an ability to prioritize goals. In addition, humans can anticipate consequences of actions and direct their behaviour towards preferred anticipated outcomes (Blalock & Wilken, 1979: cited by Houston & Gassenheimer, 1987).

Transactions involve the exchange of values between two parties. Essentially, the assigning of units of measurement to the values exchanged. Where transactions occur, markets for commodities can exist. Markets can exist for any product of value, and involves the set of possible and actual buyers and sellers for any product.

1.3 MARKET PHILOSOPHIES

Market philosophies dictate the ways in which producers participate in markets. They define the strategies involved in the process of "marketing";

> *"..the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to create exchanges that satisfy individual and organisation objectives"* (American Marketing Association, 1986: cited by Houston & Gassenheimer, 1987:4).

There are two principle philosophies through which this process can be directed.

Traditionally producers have concentrated on improving the products they provide. This is known as a "product" philosophy. Strategies followed within this philosophy include concentrating on improving the quality, performance and features of products. This philosophy has a major identified weakness. Termed "marketing myopia" it is described by Levitt (1960: cited by Kotler and Armstrong, 1989) as the mistaken emphasis on producing products, rather than satisfying consumers needs or wants. It is the failure to recognise that;

> "*...consumers do not buy products. Rather, they buy the benefits those products provide*" (Wills *et al*, 1990:19).

Marketing myopia can lead to products being superseded by new products which better satisfy consumer needs. A service organisation which adopted a product philosophy would concentrate primarily on improving the services they provide. For example, an

accounting firm may attempt to process tax returns more rapidly. However, the accountancy firm could still lose custom if people began using personal computing packages to complete their tax returns.

An alternative philosophy is described by Kotler and Armstrong (1989) as the "marketing philosophy". This philosophy takes satisfying consumer needs as it's principle focus. The marketing philosophy begins with determining the characteristics of the market, from which customer needs and demands are assessed. Products are then designed from the description of consumer needs. This philosophy contrasts with the product philosophy, in that changes to products occur as a result of market research, not as a result of product development.

1.4 AREAS FOR STUDY

With the exposure of agricultural industries to market forces, advisory services could be expected to help farmers cope with change. As part of economic reform however, Governments withdrew from the funding of farm advisory services. Market forces which dictate the nature of farm production, now also dictate the nature of advisory services available to farmers.

Little research into advisory services has been completed since Government funding for advisory services was withdrawn. Previous research into farm advisory services concentrated on the nature of the product service. In particular, the role of advisory services in the diffusion of agricultural innovations. These studies have not discussed the role of advisory services in the context of a market system. In addition, no research has discussed or investigated farmer needs for advisory services. In the current situation, consumer needs should be driving the advisory services market.

1.5 OBJECTIVES AND OUTLINE OF RESEARCH

The primary goal of the research reported in this thesis was to develop an understanding of, and document, farmers needs for advisory services. This was seen as important, and hitherto unreported, information for the providers of advisory services. Given this information, agencies providing advisory services should be able to improve the services they offer to existing clients, and develop services relevant to potential clients.

Developing an understanding of farmers needs for advisory services involved two distinctive tasks.

Firstly, literature was reviewed to provide a background on the features of the advisory services market. Specifically, the major services provided, the organisations providing them, and their relationship with the farming community. It was expected that any recent changes which had occurred in these areas would impart significant characteristics on the market for advisory services. This review is presented in Chapter Two; *The characteristics of advisory services for New Zealand's hill country farmers.*

Secondly, the research gathered information so as to better understand the role of farmers as consumers and potential consumers in the advisory services market.

This task began with a review of literature on those factors with a recognised influence on the formation of consumers needs, and how these needs may be translated into demands. Research into the characteristics of farmers was also reviewed to develop a theoretical model of how factors which influence consumer behaviour may be manifested in the market for farm advisory services. This review and the development of a theoretical model of farmer demands for advisory services are presented in Chapter Three; *Characteristics of consumer demand.*

This review provided the basis for two research studies.

Chapter Four reports on the methodologies and findings of an exploratory study entitled *Study One*. Study One involved an investigation of the concepts which comprised the theoretical model developed in Chapter Three, and consisted of an intensive study of thirty hill country sheep and beef farmers.

The methodologies and findings of the second research study, *Study Two*, are reported in Chapter Five. Study Two consisted of an extensive survey of hill country farmers. The study was designed to allow validation of some of the findings of Study One from a wider sample of farmers. Study Two also investigated further issues raised by Study One on farmer needs for advisory services.

Chapter Six; *Conclusions*, presents a summary and discussion of the findings of both research studies and their relevance to the literature reviewed. The implications of these findings to the providers of farm advisory services are also presented.

CHAPTER TWO

The characteristics of advisory services for New Zealand's hill country farmers

2.1 INTRODUCTION

The purpose of this chapter is to present a review of the literature on farm advisory services for hill country farmers in New Zealand. The core marketing concepts introduced in the previous chapter are central to this review. The development of advisory services in New Zealand is firstly discussed, to provide a background to the relative importance of the marketing concepts in advisory services. The two distinctive approaches to advisory work which have dominated New Zealand's advisory service history are then highlighted. These two approaches can also be viewed as the application of two distinctive marketing philosophies. Research and anecdotal evidence is then introduced to present a view of the farmer-advisor relationship. Consumer influences are identified as major factors in the current advisory services market.

2.2 THE DEVELOPMENT OF FARM ADVISORY SERVICES IN NEW ZEALAND

2.2.1 The traditional doctrine of farm advisory work.

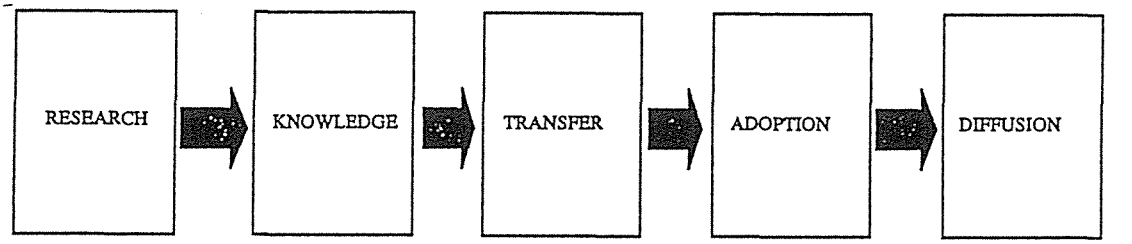
Farm advisory services in both New Zealand and overseas countries, have traditionally been considered part of the field of agricultural extension. Agricultural extension services were first developed by the Land Grant Colleges of the United States late in the 19th century (Van den Ban & Hawkins, 1988). As with many other countries, New Zealand's publicly funded advisory services were modelled on the extension services of the Land Grant Colleges (Squire, 1985). Hence, farm advisors in New Zealand are described as being synonymous to extension officers or "change agents" described in overseas literature (Squire & Hughes, 1973; Journeaux, 1985).

These extension services were primarily involved in educating farmers and farm communities on improved farming practices (Van den Ban & Hawkins, 1988). These

services concentrated on educating farmers on new ideas and technologies, which were provided by researchers as means of overcoming technical difficulties faced by farmers.

The dominance of technological information in advisory services has led to advisory services being described as the link between research and the on-farm application of research findings (Tate, 1987). The association has been modelled as the "extension equation", also known as the "research-adoption-diffusion" model, the "transfer of technology" (TOT) model or the "lineal" model of technology transfer (see Figure 2.1). It is the most frequently cited model for the role of extension in the diffusion of agricultural innovations (Russell *et al*, 1989).

FIGURE 2.1. The TOT model, or "extension equation".



SOURCE: Russell *et al*, 1989:5

The model places advisory services between researchers and farmers, with the role of transferring research information from subject matter specialists to farmers. A feature of the TOT model is the diffusion of ideas from specialist sources of knowledge, to a wider community. These services have characteristically focused their attention on maximizing the coverage of advisory messages. Such services have frequently been based on a "mass education" approach to advisory services, involving agricultural field days, discussion group and mass media activities.

2.2.2 Technological innovations and advisory services in New Zealand.

The period from the 1920's to the 1960's was one of rapid growth in New Zealand agriculture. Farm production was calculated by Philpott (1963) to have increased at a compounded rate of 2.3% p.a. from 1920 to 1960. Improved technologies, resulting in an increased efficiency of input use, were credited as being responsible for over 40% of this growth.

Farm advisory services were closely involved in this technological development. The first advisory service in New Zealand was established by the Department of Agriculture in 1922 and was orientated towards educating farmers on technical innovations (Saxby, 1962). Consequently, the activities of advisory staff were described as offering "part farm" advice on technical aspects of farming. The agricultural research conducted from within the Department probably augmented the dominance of this approach within publicly funded farm advisory services.

2.2.3 The influence of Government policies in maintaining a technological approach in advisory services.

The major thrust of Government policies relating to agriculture during the 1960's, 1970's and early 1980's centred on increasing agricultural output to increase export revenues (Le Heron, 1988). As part of these policies, Government offered financial

incentives to farmers for increasing production. The Ministry of Agriculture and Fisheries (MAF) was actively involved in promoting these schemes and developing technologies capable of boosting pastoral output (MAF, 1981).

A mass education approach towards the provision of advisory services formed a large component of the work undertaken by the MAF through into the early 1980's (Volans, 1985). This was facilitated by the Management By Objectives (MBO) programme operated by the MAF's Advisory Services Division (ASD). The MBO programme essentially injected Government directives into the ASD's activities, through a hierarchy of work plans. The work programmes of all advisory staff were dictated by regional plans, which in turn, were based on Ministerial guidelines.

Advisory techniques used by the ASD included a range of technology packages. For example, Controlled Grazing Systems (CGS) was widely promoted during the early 1980's, and involved a package of improved grazing management technologies including; subdivision with electric fences, pasture renovation and rotational grazing techniques (MAF, 1982).

2.2.4 Problems with traditional advisory services.

A review conducted by Russell *et al*, (1989) outlines several sources of unease with the dominance of technology based extension in advisory work. Their review faults a reliance on the traditional TOT model, on which many mass education advisory services were based.

Russell *et al* (1989) describe such models as implying a dichotomy between sources of knowledge and target farming populations. Consequently knowledge and expertise are sourced solely from centralised research institutions, with farmers overlooked by researchers as legitimate sources of knowledge. Although many extension texts point out that the TOT model should operate as a two-way process (i.e. that extension officers

should also be actively involved in passing information from farmers to research workers), the topic receives very little attention in the literature[1].

Of the sources of unease raised by Russell *et al* (1989), regarding the application of traditional extension models, two are of particular relevance to the New Zealand situation;

1) Where research policies are determined by Governments, research agendas may reflect interests other than those of individual producers.

2) A reliance on centralised institutions as sources of information and expertise for extension services, results in poor communication between farmers and researchers.

From the 1960's to the 1980's, it was clear that the ASD concentrated on the uptake of existing and new technologies. The expressed purpose of this policy was to assist farmers increase production to take advantage of favourable Government policies. The 1981 MAF annual report to Parliament stated that;

> "*Pressure on advisory staff has required a decision to concentrate assistance in areas with greatest export potential and service those farmers and growers who are actively developing and increasing export production*" (MAF, 1981:3).

Thus, "public" or Government objectives formed the primary focus for the Ministry's extension staff, instead of the objectives of farmers. In particular, the MBO plans of Farm Advisory Officers (FAOs) were not verified against the objectives of farmers. As reported by Kampenallas (1981);

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[1] For an example, Van den Ban and Hawkins (1988) discuss the importance of a two-way communication between farmers and researchers. Yet, while their book "Agricultural Extension", discusses at length means of communicating with farmers, no attention is given to means by which the views of farmers can be ascertained and communicated to researchers.

"..as programme planning [was] currently applied by the farm advisory service, farmers [had] little involvement in the process of setting objectives, the design and execution of learning experiences and the evaluation of extension activities" (*ibid*:19).

2.2.5 The re-positioning of New Zealand farm advisory services.

The re-positioning of advisory services in New Zealand seems to have been initiated partially by a decline in the rate of technical advancement, as predicted by McMeekan in the early 1960's. McMeekan (1963) described concerns he had regarding the future of technological advances in agriculture;

"Twenty years ago it was relatively easy to develop research programmes that had a reasonable chance of paying off...Today in contrast the picture is obscure...no longer is it obvious that research should be concentrated in particular directions or on particular problems" (*ibid*:37).

McMeekan signalled potential future difficulties in the ability of researchers to identify lucrative research opportunities. This was at a time when the extension efforts of the MAF were focused on technological innovations (Saxby, 1962). McMeekan pointed to the development of alternative extension services as evidence of the failure of the MAF advisory services to provide the services requested by farmers. It was his view that;

"The Department of Agriculture is well outnumbered and outmanoeuvred in the advisory field" (*ibid*:35).

Sources of dissatisfaction with advisory services appear to have been the genesis of the second major tradition in advisory services, the development of services based on the needs of individual farmers. These services were distinctive in that they could explore issues other than those which lent themselves to a mass education approach.

The first advisory services designed specifically to give advise to individual farmers was provided by the Farm Improvement Club (FIC) movement, founded in the early 1950's. FICs involved a group of 40-50 farmers who collectively employed an advisor to provide an advisory service to individual club members (Rose, 1968). Tate (1969) describes the principle idea behind the FIC movement was that farmers believed that they;

> "*..could make greater progress by having an intensive personal advisory service, in which the advice was given by a qualified agriculturalist with a full appreciation of financial, physical and psychological limitations of the farmer with whom he was dealing*" (*ibid*:174).

The number of FICs peaked in 1967. Their role was taken over by private farm advisors who offered individual advisory services to farmers on a fee-for-service basis. Private advisors appeared to offer essentially the same service as FIC advisors. However, as they were not employed by a farmer co-operative, they were able to perform a greater proportion of "one-off" services, such as feasibility studies and property valuations (Ashworth, 1968; Ibbotson, 1979).

The principle differences between the services provided by the ASD and private advisors appears to have been the different ties of accountability, and the level of individual contact in services offered. Private advisors were responsible directly to clients, while Government advisors were responsible to their divisional superiors and ultimately the MAF. The contrast between the Government funded mass education services and those offered by private advisors is described by Whitty (1983), who believed that private advisors were;

> "*..trying to help the producers first, the nation second.*"...while.."*The MAF have opted for computerised information services, mass media and field days and seminars all over the place.*" (*ibid*:3)

Private advisors established the New Zealand Society of Farm Management (NZSFM) in 1969 to assist in the development of the advisory profession. The society developed a code of ethics and a registration procedure for advisors, referred to within the society as farm consultants.

2.2.6 Evolution of advisory services into the 1990's.

With the market deregulation that occurred from 1984, Government advisory services went through a series of restructuring phases. The Ministry attempted to refocus MAF activities towards specific business areas. MAF advisory services were combined with MAF research activities into the MAFTech business group (MAF, 1987). As part of advisory services MAFTech continued to market combined research and advisory packages[2].

Publicly funded advisory services were involved in further restructuring in 1992, with MAFTech research activities relocated into Crown Research Institutes (CRIs). MAFTech advisory services were established as a standalone advisory service organisation, MAFTech Management Consultancy Services (MCS). The Government intended to have MCS established as a State Owned Enterprise (SOE) by 1992. However, corporatisation plans ran into difficulties, with an $11 million injection of public funds was required in 1991 to reduce excessive overhead costs (Barber, 1991). The SOE proposal fell through in mid 1992 with the failure of employment negotiations with staff. Instead, a franchise operation was established, with MCS consultants purchasing shares in consultancy practices and paying an annual franchise fee. The new

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[2] The Hill and High Country Consultancy Service (HHCCS) was described in the 1987 MAF Parliamentary report as an example of MAFTech's combined researcher-advisor approach to advisory services. The HHCCS was described as offering advice to individual properties by a combined team of farm advisors and scientists. Although the service was described as offering advice tailored to individual properties, the nature of the service as a "technical package" was demonstrated by the fact that the service concentrated;

> *"...firstly on directing clients towards more effective use of fertiliser. It then offers assistance and advice on improving stock performance, grazing systems and financial management". (MAF,1987)*

chain of consultancy practices was established under the generic name of Agriculture New Zealand (AgrNZ) (N.Z.Farmer, 12/8/92). This move completed the transition of advisory services from the traditional mass education service, to individually based consultancy style advisory services.

While the role of advisory services in "technology transfer" has been well documented, there is comparatively little written on the role of the individual advisor. Russell *et al* (1989) describe such services which concentrate on "human resource development", as the second major tradition in agricultural extension. Both the "technological information" and "human resource development" approaches are only two of several recognised approaches to business consultancy (Magerison, 1989). The use of these approaches in farm advisory work can be linked to the characteristic structure of farm businesses. As farm businesses are typically small, other advisory approaches which concentrate on means of improving the efficiency of businesses staff are frequently inappropriate.

Individually based farm advisory services described in the literature, can be classified into two groups. There are services in which the advisor acts as a specialist, performing a task that farmers recognise as being outside their expertise (for example, in assessing impact the of a new tax law). The second type of service involves those in which the advisor acts as auxiliary to the normal decision making process. In other words, assisting in a task that is performed in the normal routine of the farming operations (such as advising on livestock purchasing and selling decisions).

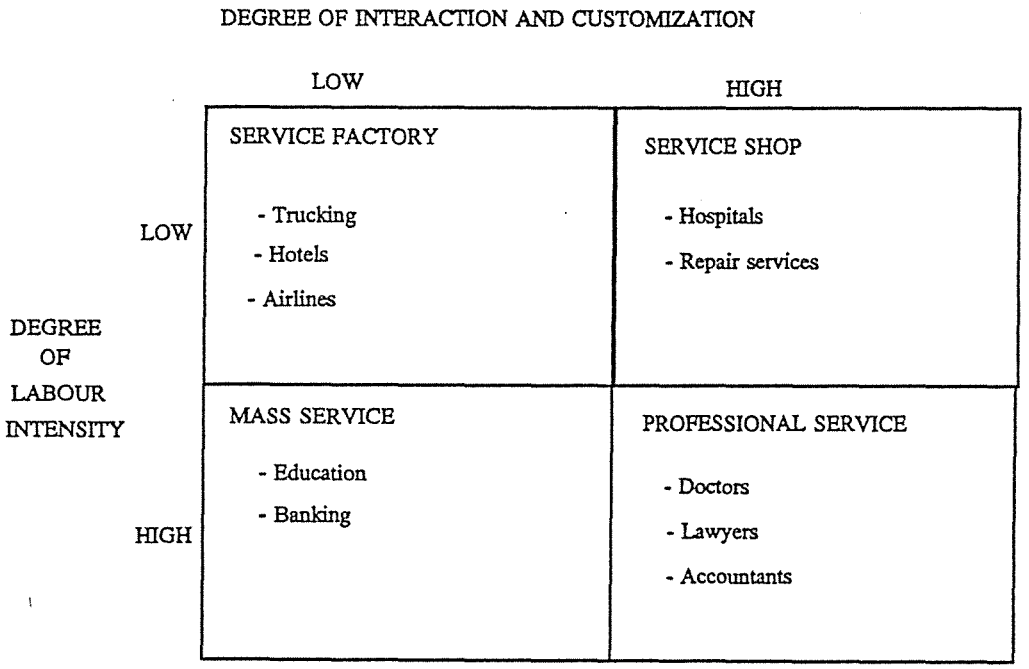
The establishment of AgrNZ marked the full evolution of advisory services offered to hill country farmers, from the traditional mass education services funded by Government, to individually orientated and funded advisory services. These changes have major implications in the marketing of advisory services.

2.3 THE ADVISORY SERVICE PRODUCT

The changes described which have occurred in New Zealand advisory services reflect changes which have occurred in advisory services overseas. However, New Zealand is distinctive in that the complete removal of state funded advisory services, to leave only "user-pays" services, has occurred at a more rapid rate (Russell *et al*, 1989).

Schmenner (1986) describes how services with the same characteristics as advisory services offered to New Zealand farmers, present distinctive challenges to service providers. Schmenner illustrates these challenges and the customary forces for change in his Services Process Matrix (SPM), depicted in Figure 2.2. The SPM classifies services according to their differing levels of labour input, customization and personal interaction with the service provider.

FIGURE 2.2 Schmenner's Services Process Matrix



SOURCE: Schmenner (1986)

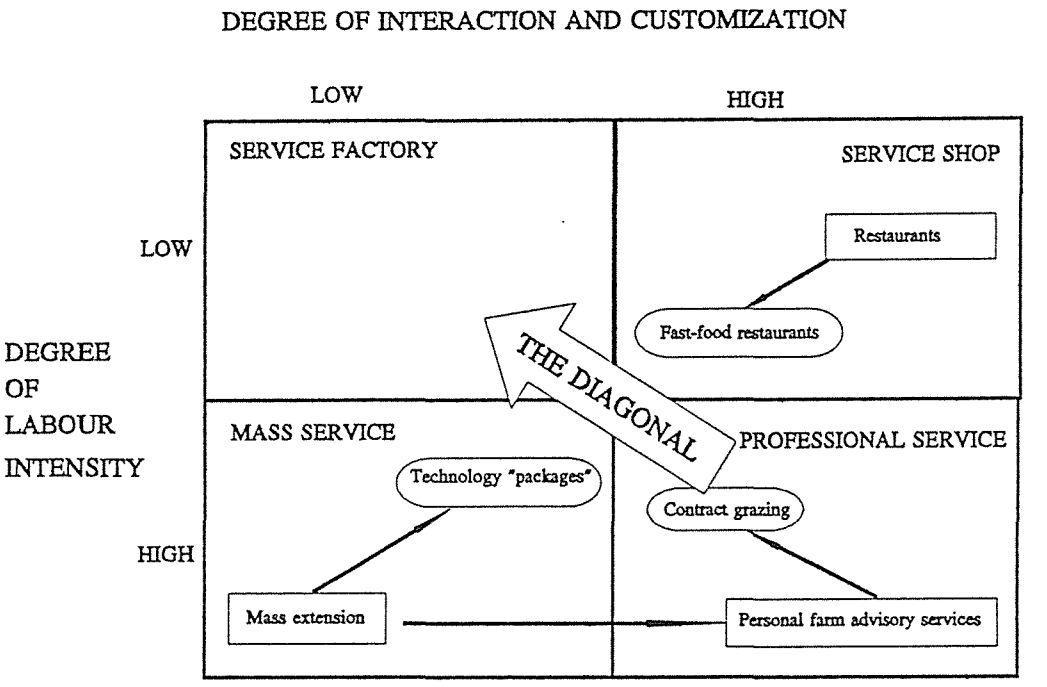
"Mass services" include education and traditional mass extension advisory activities. While there is a high labour input involved in these services, there is a low level of customization and customer interaction and little involvement with the service providers. Essentially everyone receives the same service. With a low level of customer interaction, difficulties exist in ensuring the service satisfies consumer needs. The challenges for service providers centre on making a standardized service attractive to consumers.

The professional service with both a high degree of labour input, customization and interaction, is clearly most applicable to farm advisory services orientated towards individual farmers. As customer involvement is high, it is easier for professional services to ascertain consumer needs and to ensure services satisfy consumer demands. Schmenner (1986) states that the principle challenges which typically face professional services, involve the structure of service organisations and maximizing the efficiency of expensive labour resources.

The move from mass advisory services to professional advisory services is described by Schmenner as a characteristic of strategic moves by service organisations. He describes the overall movement as an attraction towards the SPM "diagonal", as shown in Figure 2.3.

Changes in advisory services appear to be readily explained by Schmenner's classification scheme. The development of "advisory packages" by the mass education advisory services (such as CGS), represent moves to overcome high labour constraints, essentially increasing the amount of extension output for the same labour input.

FIGURE 2.3 Strategic movements within the SPM



ADAPTED FROM: Schmenner (1986)

However, the dominant trend within farm advisory services was toward professional type services. This demonstrates that the primary constraint facing providers of advisory services was the lack of personal contact and customization of services. The expected result of the strategic movements evident, was that the services provided were more highly customized to meet farmers demands. This is an important feature of the changes which occurred in the advisory services market from the mid 1980's to the early 1990's. That is, the demands of farmer consumers became the prominent force dictating the nature of farm advisory services.

More recently private advisory services have developed package-type services. Examples include contract grazing or procurement schemes involving meat processing companies (for example, see Day, 1991). These activities demonstrate that the professional style of advisory service are primarily constrained by the capacity of their labour resources.

However, with the dominant movement towards advisory services based on the needs of individual consumers, it also follows that the relationship between consumers and service providers is likely to be an important influence in the advisory service performance.

2.4 THE ADVISORY SERVICE PERFORMANCE

Services are defined in Section 1.2 as a performance which occurs at a given point-in-time. As such, the farmer-advisor relationship is an important component of the advisory service.

Several studies have investigated farmer use of advisors. Many of these studies have attempted to ascertain farmer use of advisory services within specified regions (typically as part of larger studies). While it has not been demonstrated that advisory use between regions differs, comparing results of advisory use between studies of distinctive regions must be done with some caution.

2.4.1 Farmer use of advisory services.

In a nationwide survey of 3,000 New Zealand farmers, Pryde (1977) found that 71% of sheep and beef farmers made use of at least one advisory service. Table 2.1 below summarises the proportion of sheep and beef farmer respondents who used advisory services.

TABLE 2.1 Use of advisory services by sheep and beef farmers in 1976.

ADVISORY SERVICES USED BY SHEEP & BEEF FARMERS	PERCENTAGE USING
MAF advisory services	67%
Farm Improvement Club	6%
Private advisor	13%
Producer Board advisory services[3]	3%
Service provided by commercial companies (e.g. fertilizer companies etc.)	45%
Total percentage using at least one advisory service	71%

SOURCE: Pryde (1977)

These findings indicate a high use of farm advisory services. However, as the survey had a valid response rate of 64%, there exists a possibility of non-response bias. The extent of any bias can be estimated by assuming that of those who failed to complete questionnaires, *none* used an advisory service. If this were the case, the proportion of the total population who did use an advisory service, would fall to 45%. In addition, as the survey questioned farmers about their use of farm advisory services without specifying any time-period, responses may reflect contact with advisory services over a number of years. It is possible therefore, that more recent farmer use of advisory services was lower than that reported in Table 2.1.

This is one conclusion which can be drawn from a more detailed study of farm advisory services in the King Country conducted by Fairgray (1979). Fairgray found that of the farmers that he surveyed[4];

[3] The only advisory services for sheep and beef farmers provided by Producer Boards discussed in the literature were offered by the New Zealand Wool Board.

[4] The study conducted by Fairgray incorporated both a postal and personal interview survey of farmers. Thirty percent of farmers in the King Country were included either one of the surveys.

> *"...52% gained little or no information from a field day; 64% got little or no information from a FAO; 68% got little or no information from a MAF booklet; and 73% did not belong to a discussion group"* (*ibid*, 1979:142).

A more recent study conducted by Moore (1990) demonstrates that the level of contact with farm advisory services may have dropped over the following ten years. Only 26% of Canterbury farmers interviewed had on-going contact with a farm advisory service (an estimated 10-15% of these with the local MAFTech advisor). However, discussion group membership of surveyed farmers was approximately 30%.

These findings demonstrate that farmer use of advisory services in New Zealand has not been high. There are also indications that use of advisory services has fallen in the past decade. The removal of publicly funded advisory services is likely to have been a contributing factor in this decline.

2.4.2 Farmer-advisor relationships.

Findings of various researchers and comments made by industry commentators point to a variety of relationships between farmers and advisors. In general, research has indicated favourable attitudes towards advisory services were limited to the minority of farmers who used these services. Less favourable attitudes towards advisory services were found amongst the majority of non-users (Kampenallas, 1981).

On a study tour of New Zealand McConchie (1975) found that while MAF advisors appeared to have good skills and credibility, they also tended to be over-powering and poor communicators. Thus, it is not surprising to find Fairgray (1979) reporting large differences in opinion between farmers and advisors regarding preferred sources of information. Information received from fellow farmers was regarded by farmers as their most used and credible source of information. This was in stark contrast to the opinion

farm advisors, who viewed the advice they gave very highly, but saw the credibility of farmer advice as being very low.

The major changes in Government policies which occurred from the mid 1980's were likely to have influenced farmer attitudes towards advisory services. The overall effects of Government policies on the farming sector are well documented (Fairweather, 1987; Sandrey & Reynolds, 1990). However, less attention has been given to farmer attitudes towards advisory services following the withdrawal of what transpired to be short-term assistance measures.

The effects of Government policy on farmer-advisor relationships are alluded to by Tate (1987), who described the situation where advisors were faced with having to serve the needs of two masters (the farmer and the Government) as leading to a situation where farmers;

> "*...have had grounds to be suspicious of some of the extension advice given*" (Tate, 1987:232).

A report by Englebrecht (1991) provides some indication of farmer attitudes towards advisors in the late 1980's. The report was prepared for Government on one of the few assistance packages offered to farmers since the commencement of the economic reforms of the mid 1980's, which involved free advisory services to farmers affected by East Coast droughts.

Englebrecht believed that negative attitudes towards advisors employed through the scheme were directly related to the incentive programmes offered during the early 1980's. Englebrecht described advisors and Governments as being the scapegoats for problems faced by farmers participating in the schemes.

A deterioration in farmer attitudes towards advisors following the removal of agricultural assistance programmes is likely to have resulted in a decline in the use of advisory services by farmers. The introduction of a user-pays philosophy for MAF advisory

services also appeared to result in a decline in the use of these services. This can be seen as the result of two factors. Firstly, as this period was characterised by acute financial pressures on many sheep and beef farms (Johnston & Sandrey, 1990), many farmers would have been unable to pay for these services. Secondly, negative feelings generated by the economic reform process may also have reduced farmer use of advisory services.

Thus, despite advisory service agencies re-positioning their services towards the demands of the consumers, changes in agricultural policies and the declining fortunes of individual farmers appears to have resulted in a decreased use of farm advisory services.

2.5 CHAPTER SUMMARY

Advisory services for sheep and beef farmers in New Zealand have demonstrated the two major approaches in the provision of advice to farmers documented in overseas literature.

Traditional advisory services were characterised by a concentration on technical innovations and a reliance on mass extension techniques. The advisory services of the MAF were the most notable proponents of such services, driven by Government policies aimed at increasing farm production.

The development of individually orientated advisory services reflects the second major approach to advisory services. The move towards these services indicates the pressures felt by providers of traditional services to satisfy consumer demands.

MAF advisory services also concentrated on the provision of individual advisory services following the introduction of a user-pays philosophy. There was a strong indication that changes in Government policies resulted in a reduction in consumer demand for advisory services.

The changes which have occurred in the advisory services market show how the demands of consumers have become the major force which dictates the nature of advisory services. Given the importance of the role played by consumers, this study now investigates both the characteristics and determinants of consumer demand for farm advisory services.

CHAPTER THREE

Characteristics of consumer demand

3.1 INTRODUCTION

Chapter Two described how consumer demands were the principle determinants of the form and nature of farm advisory services. The purpose of Chapter Three therefore, is to discuss the factors which influence the demands of farm consumers.

Consumer demands were described in Section 1.2.1 as occurring when an individuals took actions to satisfy needs or wants. This chapter describes how needs arise as a result of consumers seeking to achieve desired "lifestyles". The range of factors which influence and characterise lifestyles are introduced and discussed. A sequence of events is defined that determines which needs are satisfied by specific actions. This sequence involves; consumer recognition of specific needs, the beliefs held by the consumer regarding means capable of satisfying those needs, and the effects of values and attitudes in determining which courses of action are taken to satisfy those needs.

Discussion of the components of consumer demand presented in this chapter begins with general models derived from marketing literature. These models are based on recognised determinants of consumer demand. To describe the factors which influence the behaviour of farm consumers, research into the characteristics of farmers was also reviewed. This allowed the derivation of theoretical models which describe the factors which influence the demands of farmers.

3.2 DEFINING THE CONSUMER

Hawkins *et al* (1989) define a consumer as;

> "*a decision making unit (individual, family, household, or firm) that takes in information (consciously and unconsciously) in light of the existing situation and takes actions to achieve satisfaction and enhance lifestyle*" (*ibid*:21).

As farm advisory services are orientated towards the operations of the farm, farm businesses constitute consumers. However, as most New Zealand farms are based on family operations[5], the characteristics of families, households and individuals could be expected to impact on the decisions made within the farm business. As the farmer can be defined as the principle decision maker on a farm, the farmer represents the consumer for the farm business.

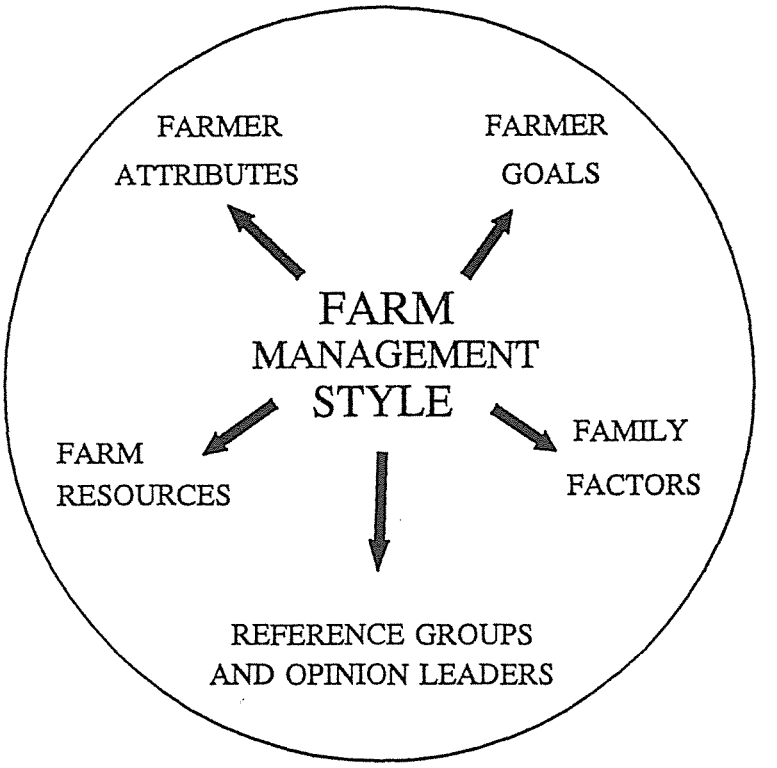
3.3 FARMER LIFESTYLES AND INFLUENCING FACTORS

Consumers are defined as individuals who take action to achieve satisfaction and enhance lifestyle. Hawkins *et al* (1989) define a lifestyle as being how a consumer chooses to live. A farm management style can therefore be defined as being how a farmer chooses to farm.

A model of an organisations "lifestyle" is considered a useful basis from which to study the demands of farm consumers. Figure 3.1 is a model derived from an organisational lifestyle model presented by Hawkins *et al* (1989). The model depicts those factors influencing a farmer's management style, which were considered to be the farm equivalents of factors described by Hawkins *et al* (1989). Thus, Figure 3.1 represents a theoretical model of the factors which may influence the consumption decisions of farmers.

[5] The NZMWBES (1992) report that 79% of sheep and beef farms are single owner businesses. It is likely that the majority of these properties will be supporting family units, and can thus be considered family farms.

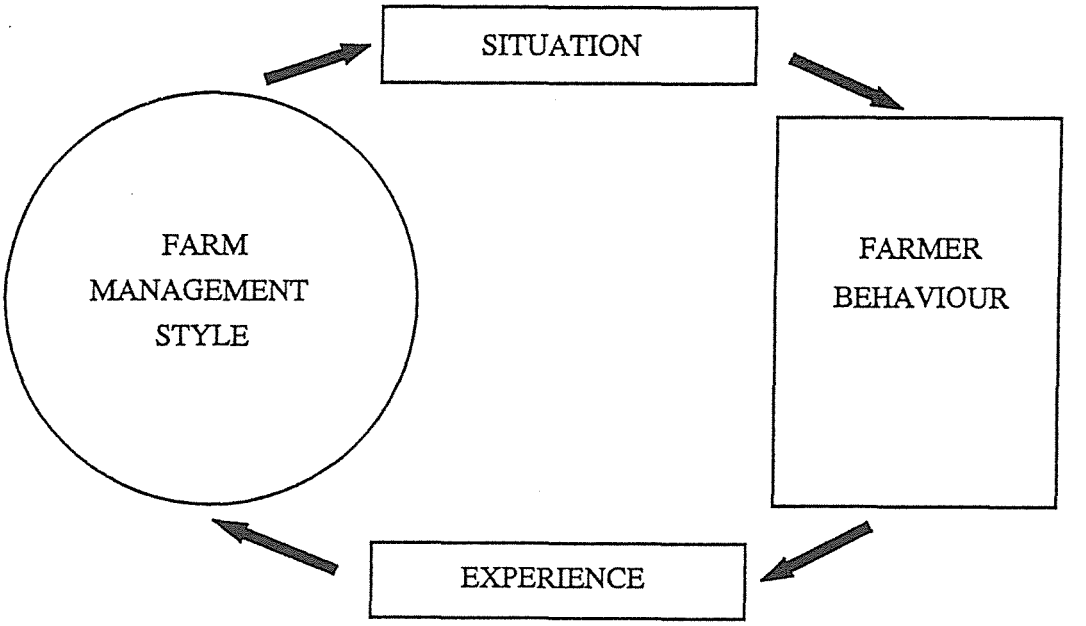
FIGURE 3.1 Determinants of farm management style.



ADAPTED FROM: Hawkins *et al* (1989).

The distinctive lifestyle of a consumer describes not only their needs and wants, but also the consumption decisions (or demands), taken to satisfy those needs. Thus, where a farm management style describes how a farmers chooses to farm, it encompasses not only the factors which influence management style, but also characteristic consumptive behaviours. Figure 3.2 depicts how farm management style and consumer behaviour are linked.

FIGURE 3.2 Farm management style and behaviour.



ADAPTED FROM: Hawkins *et al* (1989).

This review of consumer demand now studies those factors identified in Figure 3.1 as being likely to influence farm management style. The mechanisms by which farm management style leads to consumptive behaviour are then considered in Section 3.4.

3.3.1 Farmer goals.

Studies of farmer goals have shown that goals are probably the most important factor influencing management styles of farmers. Gasson (1973) defines goals as an end or state that an individual wishes to accomplish. Success in any activity can be measured by the

extent that which goals are accomplished (Fairweather & Keating, 1990). Goals therefore form an important determinant of management behaviour.

However, studying goals can be complex, as researchers have shown that both firms and individuals can hold a range of goals, in some instances conflicting. Thus researchers aggregate goals to form goal orientations. Goal orientations equate to utility functions, the set of criteria by which an individual or firm maximizes satisfaction (Gasson *et al*, 1988).

The importance of goals in influencing management styles is also shown by the fact that many of the following factors which influence management style are reflected in different goal orientations.

3.3.2 Farm resources and activities.

Farms consist of a variety of resources including land, labour and capital. The available resources and activities undertaken on the farm will invariably influence the nature of a farm's operations and hence management decisions. For example, the management activities and decisions made on a large scale sheep station will differ markedly from those of a small scale dairy farm.

An example of how farm resources are associated with different farm goals was shown by Gasson (1974). This study found that farmers with large farms valued instrumental (income) related goals more highly than farmers operating small farms, who were more orientated towards independence and intrinsic attributes of farming.

Thus, the nature of a farm's resources and activities form a major consideration when studying differences in farmer management styles and farmer behaviour.

3.3.3 Farmer attributes.

A major determinant of the overall management styles of farmers are their personal attributes. In particular, research has pointed to the abilities and experiences of farmers as having a major influence on farmer goals. This is reflected in Figure 3.2, which depicts experiences resulting from consumption behaviour as an influence on the management styles of farmers.

Both Gasson (1974) and Greer (1982) concluded that farmers goals were largely influenced by experiences of previous goal achievement, as farmer's successes or failures in attaining goals, influenced aspirations and future goals. The management ability of farmers in attaining goals is therefore a major determinant of the decisions and tasks undertaken on the farm. Thus, any study into influences on management styles should recognise that differences between farmers can be attributed to differences in farmer's abilities and experiences.

Various researchers have studied relationships between farmers management ability and their goals. However, Fairweather and Keating (1990) point out that management ability is frequently defined by researchers in *normative* terms, which are those aspects which are readily identified and studied by researchers. These typically involve financial and physical performance (such as farm surplus/ha, lambing percentage etc.). The goals of farmers however, are *subjective*, and may relate to aspects of the farming operation not easily assessed by researchers (such as the enhancement of the farm landscape or livestock appearance etc.). Farmers success in attaining these subjective goals may not be readily recognised and assessed by outsiders, even though they may be major influences in farmers goals and management styles.

Thus, assessments of farmers management success and experience may be possible when farmers abilities and efforts relate to financial and productivity goals which are easily assessed by researchers. However, it must also be recognised that successful managers may not always be identified where their success is based on goals not easily assessed by outsiders.

3.3.4 Family related factors.

Farm families have long been recognised as major influences of farm management decisions. The objectives of farms, as with other businesses, are described by a utility function. However, in the case of family farms, the utility functions of farm and family are inter-related. For example, Gasson *et al* (1988) describe how family farms can demonstrate an ability to survive economic downturns through sacrificing household consumption in favour of maintaining farm viability. The "self-exploitation" of cheap family labour was pointed to as a major factor in the survival of family farms. However, the reverse situation is more commonly described in the literature, when farm management decisions are dictated by the needs of the family. Both Kaplan (1979) and Gasson *et al* (1988) describe how characteristic stages in the development cycle of family farms have major influences on farm management decisions;

Early phases:

Gasson *et al* (1988) describe an early phase of the farming cycles where children (if present) are under school age. This results in high family demands, but less labour for farm work. The early phase described by Kaplan (1979) centred on the age at which a young farmer first assumed financial control of a farm business. This was believed to have been a major determinant of the extent to which that farmer was able to develop a farm property. Younger farmers were found to have young families, and were under pressure to provide for the needs of their dependants. This is finding is corroborated by Greer's (1982) study, which found that younger farmers are more orientated towards income and achievement goals than older farmers.

Middle phases;

Gasson *et al* (1988) describe a middle phase of the farming cycle as occurring when children are of working age. In this instance, high family demands are able to be met with an increase in the availability of labour (although children could be working off the farm). The second major age factor described by

Kaplan (1979) was termed the "holding pattern". His study found that many farmers relaxed development efforts on their farms in their early forties. The similarity with the middle phase described by Gasson *et al* (1988) is that the farm is sufficiently able to meet the needs of family, without excessive effort.

Late phases;

The late phase of the farming cycle was described by Gasson *et al* (1988) as occurring when the children had left home. This phase was characterised by lower demands on the farm's resources, and a declining ability for production. Retirement and secession characterise the final phase described by Kaplan (1979). Where a successor was able to take over the operation of a farm business, Kaplan found that farmers tended to retire earlier. Older farmers who had no immediate successors were found to be less orientated towards production and instrumental goals (Kaplan, 1979, Greer, 1982).

These phases of the farming cycle, which reflect the needs of the farm family, are likely to constitute a major influence on the nature of farming goals and the farmers overall management style. Investigation of different consumptive behaviours should therefore also consider the impact of family factors.

3.3.5 Reference groups and opinion leaders.

Reference groups are described by Kotler and Armstrong (1989) as groups which can influence an individual's behaviour. Hawkins *et al* (1989) describe opinion leaders as filtering, interpreting or transferring information to reference group contacts. Hence, both are of interest to this review of influences on the behaviour of farmer consumers.

Reference groups are recognised as typically influencing behaviour by applying conformative pressure. That is, members react to role expectations or group norms. Reference groups are said to have a greater influence for non-essential consumption

decisions, while the influence of opinion leaders is normally believed to be important for high involvement decisions (*ibid*).

Farm discussion groups are a well documented point of contact for the discussion of farming issues and are a common advisory service. While discussion group membership has been associated with increases in production (Mace & Peterson, 1979) and greater use of new technologies (Fairgray, 1979), no study has been able to demonstrate that members of discussion groups demonstrate similar management styles. The only specific behaviour that members of discussion groups have been shown to have in common, has been group attendance. Similarly, while opinion leaders have been identified amongst New Zealand farming populations (Gibbs, 1970; Fitzharris, 1974), these studies have not determined the extent or effects of their influence on the management styles or behaviour of participating farmers.

Thus, while reference groups and opinion leaders are likely to influence farmer behaviour, the majority of research on farmer behaviour has given little attention to these influences. This indicates that the influence of reference groups and opinion leaders are less readily identified than other factors, such as farmer goals, resources and personal attributes.

3.3.6 The management styles of New Zealand farmers.

Several factors were presented in Figure 3.1 as likely to influence the management styles of farmers, and hence, their consumptive behaviour. The most comprehensive attempt to assess overall management styles of New Zealand farmers is that conducted by Fairweather and Keating (1990). The management styles described in their study identify factors associated with management styles (such as farmer goals, resources etc.) and specific patterns of behaviour (which reflected farmers efforts to attain, maintain or enhance desired management styles).

Their study identified distinctive management styles according to the way in which farmers grouped a series of statements on aspects of farm management. Farmers who grouped statements in a similar way were identified by computer sorting. Interview transcripts were then used to interpret groupings of statements. This allowed researchers to derive a subjective interpretation of the groups derived from statistical sorting procedures.

Fairweather and Keating classified three distinctive management styles;

1: *The dedicated producers;*

whose goals were orientated towards the production of top-quality produce, developing their farms and striving "*to be the best farmers they could be*" (*ibid*: 32). The characteristic patterns of behaviour exhibited by these farmers were hard work, careful planning and concentrating their attention on on-farm factors.

2: *The flexible strategists;*

whose goals sought to achieve a balance between farm life and family interests, and market their product effectively. Their characteristic patterns of behaviour included concentrating on the effective marketing of farm produce, the use of various sources of information in farm decision making and keeping in touch with off-farm events.

3: *the lifestylers;*

who valued farming for the type of lifestyle. Their goals included striving to improve the environment and enjoying family life. Characteristic patterns of behaviour included employing family members, cutting back where necessary and attention to nurturing the environment.

These management styles provide a profile of farmers decision making characteristics. However, the study falls short of providing a comprehensive basis for studying farmer behaviour on several counts;

1: The methods used by Fairweather and Keating (1990) were only able to classify 54% of their sample into one of the above categories.

2: The sample used was highly selective, and included groups of farmers poorly represented within the farming population. Thus the study classifications may not be representative of the majority of New Zealand farmers.

3: Only a few general behaviourial traits were related to each of the management styles. For example, any of the above management styles could make use of a farm advisor in assisting with farm management processes.

However, the management styles described by Fairweather and Keating (1990) are useful as they reflect the two components of the consumptive behaviour model presented in Figure 3.2. Firstly, that management styles reflect influencing factors such as farmer goals. Secondly, that management styles were associated with characteristic patterns of behaviour.

However, the factors which influence management styles will not, on their own, be able to explain differences in specific farmer behaviour (such as demands for advisory services). As defined in Figure 3.1, farmer behaviour reflects the actions taken by farmers to satisfy needs. Thus, the question that is next investigated asks: how do farmers recognise behaviour capable of satisfying needs, created in their attempts to attain, maintain or enhance desired management styles?

While factors which influence lifestyles will determine needs, specific behaviours to satisfy those needs are dependant upon a sequence of events. Firstly, upon the recognition of specific needs, secondly on beliefs regarding which actions could result in the satisfaction of those needs, and thirdly, upon value and attitudes which dictate which actions are taken. These elements are the next issues considered in this review.

3.4 CONSUMER BEHAVIOUR

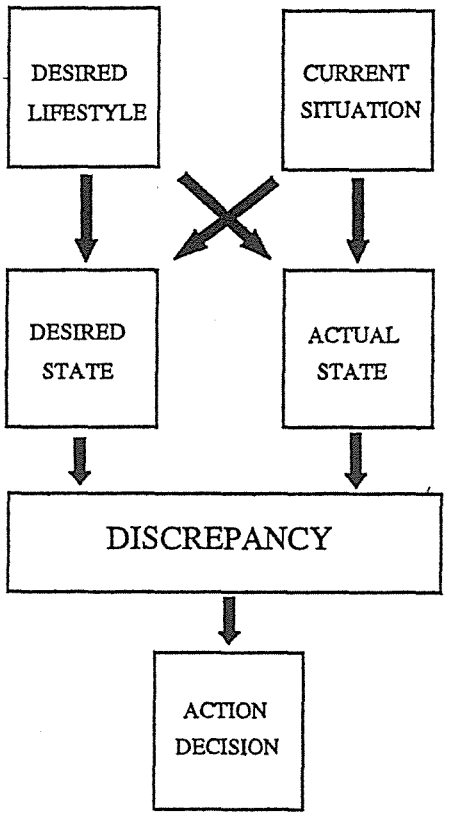
Consumer behaviour was described in Section 3.3 as action taken to attain, maintain or enhance desired management styles. Section 3.4.1 reviews literature on the factors which influence consumers recognition of their needs. This forms the first stage in a sequence of events that determines the nature of consumer behaviour. Section 3.4.2 discusses the importance of farmers perceptions and beliefs regarding their needs and possible action capable of satisfying needs. The effect of farmers attitudes and values towards possible actions are discussed in Section 3.4.3.

3.4.1 Consumer needs.

The recognition of needs can be regarded as forming the basis of all except instinctive human behaviour. The means by which consumers recognise needs are central to most widely accepted theories of consumer behaviour.

Of the various theories which have been developed to explain consumer behaviour, those based on humanist theories of behaviour are probably the most useful, as they are capable of explaining complex and reasoned behaviour (Wills *et al*, 1990). Humanist theories of behaviour are based on the philosophy that an individuals view of the world is based on observation and experimentation. People attempt to predict and control the effects of actions based on their personal observations and experiments (Journeaux, 1985). The given definition of a consumer states that consumers take actions to attain, maintain or enhance lifestyle. Thus consumers, in view of their desired management styles, plan and evaluate preferred courses of action. The process by which a consumer identifies the desire for specific behaviours is based on the recognition of a problem, or need (Hawkins *et al*, 1989), as shown in Figure 3.3.

FIGURE 3.3 The needs recognition process governing consumer behaviour.



ADAPTED FROM: Hawkins *et al*, 1989.

For farmers, the factors influencing farm management styles form the basis for desired farm management states, within the constraints of their current situation. In any given situation a consumer has a view of what their current (actual) state is, relative to how they would like it to be (desired state). The discrepancy between these two states dictates the needs of the consumer. It is from the recognition of a need that an individual evaluates actions

(which may include the consumption of various products), capable of helping the consumer move closer to where they would like to be.

Upon recognising a need, the consumer begins a search process to solve the problem and satisfy the need (Hawkins *et al*, 1989). The actions taken will be determined by several factors, which all centre on the individuals beliefs regarding the nature of the need. This is determined by the consumer's perception of their actual state, their desired state, and the discrepancy between them.

3.4.2 Perception and beliefs.

Each of the concepts depicted in Figure 3.3 are defined by the subjective perceptions and beliefs of the individual consumer.

> "*Perception is the process by which people select, organise and interpret information to form a meaningful picture of the world*" (Kotler & Armstrong, 1989:132).

Perceptions are unique to individuals and are based on an individual's belief system. An individuals belief system has been defined as comprising;

> "*..the total universe of a persons beliefs about the physical world, the social world and the self*" (Rokeach, 1960: cited by Journeaux, 1985).

Perception is selective as people are more likely to interpret messages that fit within their existing belief system, than alter it to form a new belief system. The beliefs and views of farmers which are based on personal perceptions are defined as being subjective. As discussed previously (Section 3.3.3), the subjective views of farmers can differ from the

beliefs and views of outsiders, who are defined as having a normative perspective (Olsson, 1988).

A question which can now be raised is; "when does a farmer perceive a need for advisory services?" Clearly, where farmers believe that the discrepancy between their actual and desired states can be eliminated or reduced by the use of a farm advisory service, a need for such services is recognised.

This definition of farmer needs for advisory services raises several issues relevant to the New Zealand farm advisory services market. The fact that the service provided by farm advisory agencies has changed over the past decade (from those based on traditional mass education strategies), may mean that farmers beliefs pertaining to advisory services are inaccurate.

Alternatively, farmers may not recognise particular discrepancies that farm advisors can assist them in over-coming. Advisors describe that they are often able to assist farmers in ways that farmers are not aware of (Read pers. comm., 1992). This represents an *inactive* problem. An inactive problem is defined as a problem which is not recognised by the consumer (Hawkins *et al*, 1989). This can be due to deficient or inaccurate beliefs held by the farmer as to the services provided by advisors and the ensuing benefits.

However, the recognition of a discrepancy between actual and desired states which can be reduced by the use of an advisor, does not necessarily result in any specific action. The extent that which a need initiates behaviour is dependant upon two factors (Hawkins *et al*, 1989);

1: The magnitude of the need.

2: The relative importance of the need.

As with the identification of discrepancies between actual and desired states, these two factors are based on the subjective perceptions of the individual.

The question which follows from the recognition of a need of sufficient magnitude or importance is; "what dictates preferred courses of action to satisfy the need?" For needs that require consumption, how will these needs become demands for specific products? The individual will hold beliefs as to possible courses of action which could be taken to satisfy the need. Farmer values and attitudes are based on beliefs and perceptions, and are outlined below as important determinants of which courses of action are taken by consumers, and hence the nature of consumer demand.

3.4.3 Values and attitudes.

Values are defined as elements within an individuals belief system (Oskamp, 1977). They have the characteristics of forming important life goals which individuals strive to attain or maintain. Values are described by Gasson (1973) as being organised into systems or value orientations.

> "*Such value orientations determine desired ends of behaviour and prescribe norms or socially acceptable means of attaining them.*" (*ibid*:525).

Thus, values dictate appropriate behaviour and appropriate behaviourial ends. Whether specific patterns of behaviour are taken will also be dependant upon an individual's attitudes. A widely cited definition of attitudes is the following definition presented by Fishbein and Ajzen (1975:6) who describe an attitude as;

> "*A learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object*" (cited by Oskamp, 1977:9).

Oskamp (1977) describes the attributes of attitudes which impart their importance in this study. He describes attitudes as a motivating force, as;

> "*..they impel behaviour and guide it's form and manner*" (*ibid*:8).

In addition, attitudes are described as being formed on the basis of experiences and are relatively enduring (*ibid*). Attitudes, therefore, have an obvious role in the determination of consumer behaviour. As management styles dictate needs, attitudes will influence how the consumer goes about satisfying those needs.

Attitudes have been the focus of many studies into consumer behaviour. As attitudes are defined as predispositions to respond in a particular manner, an assessment of an individual's attitudes should enable the prediction of behaviour. Thus, in theory, a study of farmer attitudes towards the farm advisory services should not only allow for an appreciation of whether farmers saw needs for advisory services, but also those services farmers were likely to use.

While this is a sound theoretical argument, Oskamp (1977) outlines several reasons why attempts to predict behaviour from attitudes have rarely been successful in practice. He describes differences between observed behaviour and assessments of attitudes as being due to attitude measurements being insensitive in detecting differences in attitude components.

Attitudes are described as being comprised of cognitive, affective and behaviourial components. The cognitive component of an attitude consists of ideas and beliefs about the attributes of an object. The affective component of an attitude comprises the emotions or feelings towards attributes of an object. The behaviourial component of an attitude involves the action tendencies towards attributes of an object (*ibid*).

Hawkins *et al* (1989) state that attitude components tend to be consistent with one another, in that they all tend to be favourable or unfavourable towards objects[6]. However, where attitude components are inconsistent, behaviourial patterns can be different from those expected. Hawkins *et al* (1989:439) describe seven factors which can act to reduce consistency between measured attitude components and observed behaviour. Briefly, these factors are;

1) As attitudes require needs or motives, *a perceived lack of need for object* can reduce consistency between attitude components. This is the effect of need recognition discussed above. An example of the inconsistent attitudes would be where an individual may not recognise a need for an advisor of sufficient magnitude or importance, and thus will not employ one, despite having favourable cognitive and affective attitudes towards advisory services.

2) An individual may have an *inability to carry out a preferred course of action*, i.e. an individual may not have the resources to employ an advisor despite having favourable attitudes.

3) An individual may have *alternatives other than those considered* i.e. an individual who has favourable attitudes towards advisor may prefer to seek advice from another farmer or a graduate family member.

4) *Weakly held affective and cognitive attitudes*, which can be altered in certain situations.

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[6] For example, a farmer who makes use of an advisory service may;

1: believe that the service provided is beneficial to the management of the farm, which representative of a favourable cognitive attitude.

2: enjoy the management support provided by the advisor, representative of a favourable affectual attitude.

3: intend contacting an advisor when problems arise, representative of a favourable behaviourial attitude.

5) *Others may influence the behaviourial decision* (such as reference group members or opinion leaders), resulting in a compromise of an individual's attitudes.

6) Attitude measurements may not reflect *situation-specific behaviour*, i.e. a farmer may hold negative attitudes towards farm advisors, but uses an advisor when considering large investment decisions.

7) Differences between attitude measurements and observed behaviour can occur when *estimates of cognitive and affective components are inaccurate or incomplete.*

Thus, the question becomes, how is it possible to distinguish between potentially inconsistent attitudes and identify those attitudes "*that impel behaviour and guide it's form and manner*"?

Labaw (1980) states that determining an individual's behaviour is likely to be the most reliable means of establishing priorities amongst attitudes, and can also reflect an individual's beliefs towards objects where conscious thought is involved. Hawkins *et al* (1989) state that high level purchase decisions, such as would be involved in deciding to make use of farm advisory services, are likely to involve cognitive thought processes. Hence, the actions of an individual will reflect decisions reached on the basis of the knowledge and beliefs of that individual[7].

The findings of Kampenallas (1981) reflect a relationship between attitudes and behaviour. In a study of farm attitudes towards farm advisory services, farmers who had the most favourable attitudes towards farm advisory services, also had the greatest contact with those services. Kampenallas' study also found associations between management style factors and

[7] Not all decisions are made on the basis of conscious thought. Labaw (1980) states that where people are have a low level of consciousness, they are heavily influenced by their environment. Hence it is not surprising that Hawkins *et al* (1989) describe how low involvement purchase decisions are frequently based on unconscious reactions.

attitudes. This study also showed that more favourable attitudes towards MAF advisory services were associated with larger farms, larger debts and the farmer's number of dependant children. However, the study was unable to distinguish the reasons for these associations due to the measurement techniques used. Furthermore, Kampenallas only studied farmer attitudes towards the farm advisory services of the MAF *as a source of information.* Although the provision of information was a major function of the ASD at the time of Kampenallas' study, it represents only one dimension of the role of farm advisory services.

In summary then, a farmer's decision to employ an advisor forms the final stage of a necessary sequence. Firstly, the farmer must recognise a discrepancy between actual and desired states. A need for advisory services is recognised when the farmer believes that advisory services can assist in eliminating or reducing this discrepancy. Finally, a demand for advisory services (manifested in the decision to employ an advisor), will only result where the farmer holds consistent and favourable attitudes towards the use of advisory services. Only farmer behaviour has been identified as a sound and easily observed measure of where these factors reflect favourable overall beliefs regarding the usefulness of advisory services in satisfying farmer needs. Observation of consumer behaviour therefore should form an important component of any study into consumer needs.

3.5 A FRAMEWORK FOR FURTHER STUDY

The primary goal of this research study was to learn more about farmers needs for advisory services. It is recognised that determining the nature of consumers needs for advisory services, should allow for the better provision of advisory services for farmers.

The majority of previous research into advisory services has not looked at the needs farmers wanted satisfied by the use of such services. Rather, research has focused on factors which influence farmers technology adoption behaviour. These studies have invariably made the

assumption that the technologies are capable of satisfying the underlying needs of farmers. However, literature reviewed in Chapter Two suggested that the mechanisms in place for setting research agendas, have provided no means for guaranteeing that this would be the case for the majority of farmers. Previous studies therefore provide little indication as to what farmers advisory service needs are, let alone the factors which determine such needs. The provision of new technologies is now recognised as being only a component of the services provided by private and public advisory firms. This study therefore looks beyond the technology based needs of farmers and towards all services farmers need to assist them in moving closer to desired states.

However, as outlined in preceding sections, farmers needs arise from a range of interacting factors, and are likely to be complex. The difficulty in ascertaining farmer needs is further complicated by farmers subjective perceptions of those needs, and their potentially inconsistent attitudes towards the use of advisory services.

To study how farmers behave as consumers of advisory services, therefore, research methods that provide an in-depth and detailed knowledge of the processes and influences on farmer needs and behaviour were necessary. An intensive investigation of farmers formed a principle component of research conducted into farmer use of advisory services. As such a study would inevitably involve a small number of farmers, it was recognised that an extensive study could also be included to validate the relationships found amongst a small number of farmers. In addition, the extensive study could be used to investigate the advisory needs of a greater number of farmers.

Thus, a two-stage research programme was constructed. The first stage, Study One, is reported in Chapter Four. Study One involved an intensive study of a small sample of farmers. Farmer use of advisory services provided the basis for drawing conclusions as to farmers perceptions of their advisory service needs. Factors identified as determining farmers needs were then studied to ascertain whether relationships could be found between farmers needs as reflected by their behaviour, and the determinants of management style

described in the literature. Study Two, reported in Chapter Five, consisted of an extensive survey, set up to validate findings of Study One and to gain further information on the nature of farmers advisory service needs.

CHAPTER FOUR

Study One

4.1 INTRODUCTION

Study One was an exploratory study, which investigated the advisory service needs of a sample of 30 farmers. The study involved collaboration with an existing research study, the Farmer First Research (FFR) programme. This chapter firstly discusses the methodology utilised by the FFR programme, and the analysis conducted as part of Study One. Results from Study One are discussed, and issues investigated further in Study Two are presented.

4.2 OBJECTIVES OF STUDY ONE

The primary goal of the research reported in this thesis was to investigate farmers needs for advisory services. Study One was an exploratory study of farmer needs, investigating relationships suggested by the review of literature presented in Chapter Three. The two broad objectives of the study were;

1: To establish differences in farmer needs for advisory services.

2: To investigate factors which may influence differences in the advisory needs of farmers.

As described in Section 3.3, a consumer's needs arise from efforts to attain, maintain, or enhance desired management styles. The types of factors thought likely to influence farm management styles were described as complex. It was therefore recognised that an intensive study of farmers would be required to gain an appreciation of those factors which influenced farmer needs and consumptive behaviour.

A study programme which fitted the requirements of Study One was being conducted through Massey University's Agricultural and Horticultural Systems Management Department, at the time the study into advisory services commenced. The FFR programme commenced in October 1991, to investigate the research needs of hill

country sheep and beef farmers through an intensive study of thirty farmers. The objectives of the FFR programme which required collection of data suitable for Study One were (McRae *et al*, 1993);

1: To describe in detail the goals and circumstances of a sample of farmers.

2: To identify with farmers the constraints they face in helping them to attain their goals, and their needs to assist them in overcoming their constraints.

3: To work with farmers in the design and implementation of strategies for change.

Detailed information on farmers needs and circumstances formed components of the farm behaviourial models presented in Chapter Three. The data collected from the FFR sample of farms was therefore useful in the investigation of farmer needs for advisory services.

The procedures of data collection, the characteristics of the data, and the procedures involved in Study One are discussed in the following sections.

4.3 METHODOLOGY

4.3.1 Research methods utilised by the FFR programme.

The methodologies used by the FFR programme consisted primarily of qualitative research techniques. Qualitative research involves less structured and intensive methods, where in-depth information is gathered from a small proportion of the target population (Aaker & Day, 1991).

4.3.1.1 Advantages of qualitative research.

Several advantages of qualitative research are given in the literature. Qualitative research overcomes a limitation of traditional research based on established theories, in that it can identify issues not suggested by theory. Qualitative research methods are described as being suitable for studies which are exploratory, clinical or for orientation (*ibid*). Each of these characteristics were relevant to the FFR programme.

1: The FFR study was exploratory in nature[8], with researchers hoping to use the study to define problems facing farmers and develop hypotheses for further study.

2: The FFR study was also clinical, in that a different series of elements may prove to be more important than those identified as relevant prior to the study.

3: The FFR also involved orientation, as researchers became acquainted with the farming environment.

The use of the qualitative approach allowed research to begin at a broad base, with no constraints imposed at the commencement of the study, as to what particular farmer needs or circumstance the study should investigate.

The FFR programme recognised that if the assessment of a farmer's goals, circumstances and needs were to be made by solely by research officers, the result would be the normative assessments of outsiders. Such views may not be appreciative of the subjective assessments of farmers. Rather, the FFR programme was interested in farmer's subjective assessments of their goals, circumstances and needs. Such assessments were also required to satisfy the objectives of Study One.

[8] Both the objectives and methodology used in the FFR programme represent new developments in agricultural research in New Zealand (McRae *et al*, 1993).

4.3.1.2 Disadvantages of qualitative research.

The weakness of qualitative research lies in a lack of rigour. Qualitative research methods often lack statistical verification, and generalizations based on inductive reasoning may often be suspect (Howard & MacMillan, 1991). Aaker and Day (1991) describe the limitations of qualitative research as being the susceptibility of the methods to misuse by researchers, rather than shortcomings of the methods involved. They cite the following principal dangers in the use of qualitative methods;

1: Due to the intensity of qualitative methods, research is typically conducted only with small samples drawn from the target population. Thus, findings may not necessarily be representative of the wider population.

2: Results typically contain a large amount of ambiguity, which is subject to the selective interpretation of the researcher.

Consequently, the mode of research for the FFR programme was designed to minimize the influence of these effects.

4.3.2 Mode of research.

The implementation of the selected methods was devised in such a manner so as to minimize the effects of possible failings in the qualitative method identified above. An on-going programme was devised, with a research officer making a series of visits to each farmer over a period of time. Although an expensive process, the procedure had the following advantages;

1: The dynamic changes in farms required on-going study to ensure an accurate perspective of the situation on any farms studied.

2: It was recognised that the nature of the information required from farmers could not be obtained unless the farmers had confidence in both the research officer and the research programme. Thus, an on-going programme was more likely to enable the establishment of a useful relationship between the research officer and the farmers involved.

3: The longitudinal nature of the programme could allow the diagnostic and implementation stages of the programme to be completed with the same farmers, if that was deemed appropriate.

The research method had several advantages in overcoming identified weakness in qualitative research methods. In farm management research using qualitative methods, case studies or non-random samples have often been used (Fairweather & Keating, 1990; Howard & MacMillan, 1991). As this study involved a random sample of farmers, there was a greater basis for the inference of results to the wider population from which the sample was drawn.

As interpretation of the findings of the study was conducted by both the research officer and participating farmers, the effects of selective interpretation by researchers was minimised. In addition, the programme was structured in such a way so as to allow contact and input from experts in a wide range of disciplines (McRae *et al*, 1993).

Only data collected during the diagnostic stage of the FFR programme was used for Study One. This phase of the FFR programme comprised the first two interviews conducted by the research officer.

4.3.2.1 The first interview.

The farms surveyed were initially interviewed during the autumn of 1992. The general objective of the first interview was to concentrate on what was done on the farm. Thus aspects of the farm's resources, operation, farmer situation and behaviour were discussed. The first interviews were also designed to allow the research officer to

become acquainted to the farmer and with the farming system. Semi-structured interviews collected descriptive information on the farming system and the activities involved in running the farming operation.

Financial accounts from four seasons were collected for analysis (1981/82, 1984/85, 1987/88 and 1990/91). The accounts were used to derive the physical and financial performance of the farms in each of the respective seasons. The data was summarised to allow comparison between farms. Farmers were also asked for their aims for the next 3-5 years as the starting point to understanding why they did what they did.

The first interviews lasted between 2 to 3½ hours.

4.3.2.2 The second interview.

Each farmers received summarised data on the physical and financial performance of their farm prior to the second interview. This data formed the background to discussion on how and why farmers ran their farms in the manner did. Thus, a view of farmer situation and aspects of management style was derived, consistent with the perceptions of the farmer. These interviews lasted for 2 to 2½ hours.

During the interview farmers were asked to reflect on the past ten years (or for however many years they had been farming on that property), and whether or not the analysis presented was an accurate assessment of how their situation had changed. Farmers were asked to reconsider their aims as described in the previous interview, and asked why those aims were held. To derive goals underlying farm activities and stated objectives, a "laddering" questioning technique was used[9] (Aaker & Day, 1991).

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[9] This technique involved repeated questioning on a specific topic. For example, for a farmer who had the stated objective of further farm sub-division;

Interviewer: "Why is that important?"
Farmer: "To improve pasture control during the summer".
Interviewer: "Why is that important?"
Farmer: "To improve winter pasture growth rates".
Interviewer: "Why is that important?"
Farmer: "To feed ewes better".

4.3.3 The target farming system.

The FFR programme was established with funding from the Agricultural and Marketing Research and Development Trust (AGMARDT) with a requirement that the study be of relevance to New Zealand beef farmers.

To study systems representative of the majority of New Zealand beef producers, areas carrying large numbers of beef cattle were selected for study. The general area selected was that described by the New Zealand Meat and Wool Board's Economic Service (NZMWBES) as Class IV hill country[10]. The Taihape and Hunterville wards of the Rangitikei district council were the localities selected for the study (herein referred to as the Taihape study)[11].

The Taihape region was selected for the following reasons (Brazendale pers. comm., 1992);

1: An identified uniformity of soil type and topography, as indicated by land resource inventory maps.

2: Approximately 85% of farms in the area were classified by the NZMWBES as Class IV hill country.

Interviewer: "Why is that important?"
Farmer: "To improve the quality (performance and appearance) of the ewe flock".
Interviewer: "Why is that important?"
Farmer: "To achieve my ambition of being recognised as a "good" Romney ram breeder".

[10] This farm classification accounts for approximately 24% of all New Zealand farms, and 47% of all farms in the North Island. These farms also carry 26% of all beef stock units in New Zealand, and 50% of the North Island's beef stock units (NZMWBES, 1991).

[11] Within Class IV North Island hill country classification, two distinctive climatic zones regions can be distinguished. The summer moist areas of the west coast, and the summer dry areas of the east coast. A district from each region, in close proximity to Massey were involved in the FFR programme. These were; the Taihape and Hunterville wards of the Rangitikei district council, and the Aromoana ward of the Central Hawkes Bay district council. For this study, only data from the Taihape and Hunterville study (referred to as the Taihape study) was used, as at the time the study into advisory services commenced, only the Taihape study was sufficiently advanced to provide useful data.

3: It was a part of the Rangitikei district council with a large beef cattle population.

4: The area was well recognised by farmers and industry people.

As with other farming studies (Kampenallas, 1981; Greer, 1982), the FFR programme was concerned purely with commercially orientated farming entities and not "part-time" farming operations. The majority of farm production is based on full time farming operations and research evidence suggests that the characteristics of part-time farmers could be significantly different from full-time farming entities (Fairweather & Keating, 1990). For the FFR programme, farms deemed to be "non-commercial" were eliminated from the study. A non-commercial farm was described as one which would not be able to support an average farmer and farm family. Non-commercial farms were eliminated from the study on the basis of the scale of farming operations. This was achieved by constructing a population frame of farms greater than 200ha in size. It was felt that a farm of 200ha would be running approximately 2000 su, which was considered a minimum size of an economic unit for an owner-operator farmer. A population frame of 298 farms (all > 200ha in size) was constructed from data supplied by the Federated Farmers Rangitikei field officer.

A feature of change thought likely to have been important to farming circumstances, was changes in farm size (Fairweather, 1987, 1992). Consequently, it was considered important to have a range of farm sizes represented in the survey sample. To achieve this, the population frame was split into two strata. A MAFTech consultant identified which farms in the frame were above average in size, which was approximated to 500ha. The number of farms in each strata was 157 (small farms) and 141 (large farms). A random sample of 15 farms was drawn from each strata, given a total sample of 30 farms, approximately 10% of the population frame. This resulted in a sample in which all farms in the frame had an approximately equal probability of selection[12].

[12] The probability of a large farm (>500ha) being selected was 1:141, or 0.007. The probability of a smaller farm (200-500ha) being selected was 1:157, or 0.006.

The Federated Farmers field officer provided the name of the appropriate contact person for each selected farm. A letter was then sent to each farmer briefly outlining the objectives of the programme, and indicating the research officer's intention to contact the farmer by phone. Telephone contact was made to explain the programme more fully and arrange to meet the farmer with no obligation. At these initial interviews, farmers were informed of the need for on-going farmer contact and access to financial and production records. Of the thirty farmers interviewed, three declined participation, as they felt they did not have time. A further three farmers were selected and agreed to replace them, from their respective strata.

4.3.4 Overview of advisory services in the region.

Prior to 1968, the Taihape-Hunterville region was largely un-serviced by advisory services. No FIC was ever established in the region, although a small amount of private advisory work was conducted by FIC advisors based in Wanganui (Hockey pers. comm., 1993). The MAF established an advisory office in Taihape in 1968. Prior to the establishment of this office, contact with the ASD had been via occasional visits from advisory staff based in Wanganui.

The Taihape office was staffed by a single advisor who predominantly serviced the area covered by the Taihape and Hunterville district council wards. A second advisor was appointed to the Taihape office in 1980, to cover predominantly the Central Plateau area, west of Taihape. The region south of Mangaweka continued to be serviced by ASD staff based in Wanganui. Two staff were based in Taihape until 1986, when one left to join a private firm based in Palmerston North. The office was closed 10 months later in May 1987, when the remaining advisor left and joined a private advisory firm based in Waipukurau. MAF continued to service the area from offices in Marton, which were established in 1984. Two advisors were based in Marton from 1985 through into 1990, when staff levels fell to one (Wilson pers. comm., 1993).

At the time of the FFR study, the bulk of advisory services used by farmers in the region came from ex-ASD staff, who had maintained client bases in the region. The most widely used services were provided by a Palmerston North based firm, John Read Agricultural Consultancy Ltd (JRAC). One of the directors of JRAC had been based in Taihape for five years from 1981 to 1986. In addition to personal advisory services, JRAC ran two discussion groups in the area and were coordinators for a large scale contract grazing scheme which had contractors in the area. The scheme, which involved JRAC organising farmer grazers for 18 month bull beef contracts, was funded by a meat company, Riverlands Foods Ltd. As part of the contract farmers received three visits from advisory staff (Day, 1991).

Two other former ASD employees serviced clients in the area. One from Wanganui, and the other from Waipukurau. Two discussion groups were run from the offices of a Hunterville accountant. Some farmers in the area were members of a discussion group whose members consisted of large scale farming operations from throughout the country (Brazendale pers. comm., 1992).

4.3.5 Variables and statistical analysis.

The first objective of Study One was to determine different advisory needs of farmers involved in the FFR programme. As outlined in Section 3.3, farmer needs result from efforts to attain, maintain or enhance desired farm management styles. Due to the complexity of factors influencing farm management style, it was thought that differences in farmer use of advisory services would provide the best indication of farmers perceptions of their different advisory needs. Transcripts from farmer interviews were studied to establish farmers use of advisory services. The transcripts were complied by the FFR research officer following an unstructured section during the second interview.

From these transcripts two groups of farmers were identified, a group who maintained on-going contact with an advisory service, and the remainder who did not. The inference, drawn on the basis of the literature reviewed in Chapter Three, was that

farmers who used advisory services did so to satisfy a perceived need for such services. However, transcripts indicated that the reverse was not true for farmers who did not use advisory services. These farmers were able to be classified into one of three distinctive advisory needs categories. Thus, four distinctive advisory needs groups were identified amongst the farmers involved in the FFR programme. The description of the perceived advisory service needs of these four groups satisfied the first objective of Study One.

However, the advisory needs of these groups are described only in general terms, due to limited information collected from surveyed farmers. As discussions into farmer use of advisory services formed only a small part of the FFR study, little detailed information on farmer use of advisory services was obtained. In particular, while details were gathered on the nature of the advisory services used (i.e. regular advisory visits vs discussion group membership etc.), little information was gathered on the specific advisory services used (i.e. budget preparation, evaluation of livestock performance etc.). In some instances, the issues discussed and information recorded by the research officer varied between farmers. These were recognised limitations of the data. However, given the exploratory nature of this study, the data available still provided a valuable basis for a description of farmers advisory service needs and elucidation of factors associated with those needs.

The second objective of the study was to investigate factors identified in Chapter Three as likely to influence the advisory needs of farmers. Study One therefore sought to establish where different advisory service needs were associated with differences in those factors likely to influence farm management style.

The four advisory distinctive advisory needs groups formed the basis of this investigation, which involved determining how the advisory needs groups differed with respect to management style variables. For example, was farmer use of advisory services associated with distinctive production policies or techniques? Where distinctive advisory service needs were found to be associated with factors likely to influence farmers management styles, these can suggest causes of the different advisory needs of

surveyed farmers. A series of statistical procedures were employed to determine which factors were associated with different uses of advisory services.

However, the characteristics of the FFR data set imposed several constraints on the procedures which could be used. The two principle difficulties where the quantity and nature of the data. Firstly, the FFR data set was fairly small, containing only 30 observations for each variable of interest. In the case of some variables, not even 30 observations were available[13]. Thus establishing statistically significant differences between groups of farmers was difficult, where differences at the 0.05 level of probability were taken to represent significant differences between groups. In addition, much of the data collected during the course of the study was collected at nominal and ordinal levels. This precluded the use of many standard parametric procedures. However, the SPSS/PC+ statistics package used for data analysis, allowed many corresponding (although less powerful) non-parametric procedures to be used instead.

It is important to note that the study involved establishing factors that were *associated* with different advisory needs, not factors which *caused* differences in advisory needs. Cause-and-effect relationships are typically only described as a result of experimentation. Experiments involve controlling a range of factors known to influence objects under study, so a specific treatment can be considered responsible for differences in observations made on the object. Such conditions were not found in either of the research studies undertaken, where observations were made on an uncontrolled population. As such, it was possible that observed differences in advisory service needs, may be caused by factors other than those measured. Therefore, the study was restricted to observing factors of interest (farmers advisory needs) and determining which factors were associated with different advisory needs.

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[13] The most notable causes missing data occurred when farmers were unable or unwilling to supply details on the financial aspects of their farming operations. In some instances, even numbers of stock carried were not made available. An argument existed for excluding these farmers from the FFR programme in favour of farmers able and willing to provide a more complete set of information. However, it was recognised that those farmers represented a valid proportion of the farming population and to exclude them (from either study) would result in observations being made on an inherently biased proportion of the farming community.

A variety of statistical procedures were used in this part of the study, to establish whether advisory needs groups were different with regard to farm and farmer characteristics. The two non-parametric procedures used for this purpose were the Kruskal-Wallis (K-W) test and the Mann-Whitney (M-W) test. The respective parametric equivalents of these procedures are the one-way analysis of variance (ANOVA) and the two sample T-test. Hence it follows that the K-W test was used to establish whether differences existed between the four advisory needs groups with respect to variables of interest. The M-W test was used in a similar manner to identify differences between any two of the four advisory needs groups.

While the K-W and M-W tests were able to identify a series of factors associated with different advisory needs, it was desirable to identify those factors which best distinguished between the advisory needs groups. Discriminant analysis was a procedure which provided a means of achieving this aim.

The principle statistical tests used in the analysis of the FFR data are described below in greater detail, as not only do they form an important part of the analysis of studies reported in this thesis, but many of the procedures have not been utilised in previous research of this nature.

4.3.5.1 Tests used to identify differences between groups.

Two non-parametric procedures were used to detect whether significant differences existed between advisory needs groups and the situational and management style variables. These tests were the Mann-Whitney test and the Kruskal-Wallis test.

The Mann-Whitney test;

The Mann-Whitney (M-W) test was used to test the null hypothesis that two independent samples come from the same distribution. The test is similar to a T-test except that the assumptions of normality and equal variances are not needed. The test requires only that observations be a random sample and that values can be ordered from smallest to largest. Consequently, the test can be

used for data recorded at the ordinal and interval levels. Instead of comparing group means, the Mann-Whitney test sums all observations and compares groups on the basis of the average ranking of each observation (Norusis/SPSS INC, 1988: ppB-177).

The test can be used to examine whether different farmer behaviours (use of advisory services) were associated with differences in other variables. The assumptions required are that farmers represented a random selection of different users of advisory services, and that their use of advisory services was independent of their inclusion in the sample (Conover, 1971). Both assumptions are deemed to be valid for the FFR sample.

The Kruskal-Wallis test;

The Kruskal-Wallis (K-W) test is the non-parametric equivalent of the one-way analysis of variance. It is similar to the Mann-Whitney test in that it compares the respective rankings to determine whether differences exist between the mean ranks of two or more groups with respect to a independent variable. The assumptions for the K-W test are the same as those for the M-W test.

4.3.5.2 Tests of association between groups.

Correlation coefficients were calculated to provide a measure of the amount of association between variables. For tests of linear association between two variables measured at the ordinal level or greater, Pearson's correlation coefficient was used.

Pearson's Correlation Coefficient;

Pearson's correlation coefficient is used as a measure of linear association between two variables. When squared, the correlation coefficient gives the proportion of the variation in one variable that is explained by variation in another (Norusis/SPSS INC, 1988: ppB-145). The computed significance of correlation coefficients are reliant upon assumptions of normality. The

Kolmogorov-Smirnov test (see below) was used to check the validity of this assumption for correlated variables.

As the correlation coefficient measures only the strength of a linear association between variables, distinctive non-linear associations are not recognized. Assessment of the usefulness of the correlation coefficients can be obtained by visual appraisal of plotted relationships between the variables. Scatter-plots of all variables for which correlation coefficients are calculated, are therefore included in appendices.

The Kolmogorov-Smirnov test;

The Kolmogorov-Smirnov (K-S) test was used to check if the distribution of a variable deviated significantly from a standard normal distribution (Norusis/SPSS INC, 1988: ppB-182). This test was used to check the assumptions required for calculation of the significance of computed correlation coefficients, and for suitability for inclusion in discriminant analysis (see below).

4.3.5.3 Tests which distinguish between group membership.

Discriminant analysis was used in both Study One and Study Two to determine which variables were best capable of distinguishing between identified advisory needs groups.

Discriminant analysis;

Discriminant analysis is a multi-variate procedure used to distinguish between groups identified by a dependant variable, according to a series of independent variables (Norusis/SPSS INC, 1990: ppB-1). In discriminant analysis a linear combination of independent variables are summarised into discriminant functions, with coefficients estimated that result in the greatest separation between groups[14]. The form of the discriminant function is;

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[14] The discriminant functions maximize the ratio;

$$\frac{\text{between groups sums of squares}}{\text{within groups sums of squares}}$$

$$D = \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n$$

Where;

D = the individuals score on the dependant variable.

x_n = are the independent variables.

β_n = are the discriminant coefficients.

For this study a step-wise procedure was used which included variables into the functions where they were able to contribute significantly to the discrimination between advisory needs groups.

Up to *k-1* discriminant functions can be computed to distinguish between *k* different groups, where the first function calculated is that which best discriminates between groups, and subsequent functions are computed that variables best distinguish between the groups on the remaining variation not accounted for by the first function. Thus, for both studies, three discriminant functions are calculated which discriminate between the four advisory needs groups.

As functions are computed simultaneously, it can be difficult to interpret which variable in a series of functions, best discriminates between groups. As with other studies (Kampenallas, 1981; Greer, 1982) results presented in this thesis include tables of standardized canonical coefficients for each of the independent variables as indicators of the relative discriminating ability of variables. Results of discriminant analysis also include tables which present the actual membership of dependant variables against those predicted by the discriminant functions. Included in appendices are canonical correlation coefficients which are measures of the association between group membership and membership of the discriminant functions.

Several assumptions are required for the inclusion of variables in discriminant analysis. The primary assumption is that predictor (independent) scores are independently and randomly sampled from a population of scores. Continuous variables should also follow normal distributions, and any combination of predictor variables should follow a

multivariate normal distribution. The normality of continuous variables can be tested by use of the K-S test, while SPSS/PC+ provides Box's M statistic to show whether the distribution of variables differs markedly from normal. In addition, while discriminant analysis can include data that is either dichotomous or continuous, ordinal data should not be used.

Thus the list of requirements for data to be included in discriminant functions calculated in Study One and Study Two were that;

1: Data should be independently and randomly selected.
2: Data should be normally distributed.

4.4 RESULTS

The results of Study One are presented in three sections. Section 4.4.1 firstly presents a brief overview of the sample of thirty farms used in the study. Section 4.4.2 then presents a description of the different advisory needs groups derived from the FFR interview transcripts. A study of the factors associated with each of the advisory needs groups is then presented in Sections 4.4.3 and 4.4.4.

4.4.1 Overview of the farmer sample.

Table 4.1 shows that farms included in the FFR sample were slightly larger in size than the average Class IV hill country property reported by the NZMWBES (1991). This is an expected result as farms wintering less than 2000su were excluded from the sample[15].

[15] The NZMWBES exclude farms wintering less than 750su from their annual farm survey. These criteria applied to the FFR study would have excluded hill country farms less than 75ha.

TABLE 4.1 Effective farm size.

All farms average	609ha	Range[16] 180-4000ha
Average less largest farm	479ha	Range 180-1300ha
NZMWBES (1991)	374ha	

The average age of farmers in the Taihape study was 46 years, slightly older than 42 years of age reported by Moore (1990) in his study of 110 farmers in Canterbury. Table 4.2 also shows that there were differences in the distributions of farmer age reported in the respective studies.

TABLE 4.2 Age of Taihape and Canterbury farmers (FFR & Moore, 1990).

FARMER AGE	PERCENTAGE OF TAIHAPE FARMERS	PERCENTAGE OF CANTERBURY FARMERS
25-34 years	7%	29%
35-44 years	33%	24%
45-54 years	33%	27%
> 54 years	27%	17%

All except one of the farmers surveyed were responsible for all aspects of the running of the farm business (see Table 4.3).

TABLE 4.3 Management roles of Taihape farmers.

MANAGEMENT	NUMBER OF FARMERS
Owner/operators	29
Manager	1

[16] One farm in the FFR sample which was selected with a total farm area of 211ha was later found to have an effective area of only 180ha.

There was little evidence to suggest the study sample was grossly atypical of hill country sheep and beef farms and thus, no reason to suspect that use of advisory services or associated behaviours would be atypical from that on other farms in the region.

4.4.2 Farmer use of advisory services.[17]

Four distinctive advisory needs groups were identified from the interview transcripts derived from the FFR study. Of the thirty farmers who participated in the FFR study, twenty seven of these were classified into one of four advisory needs groups. A description of these advisory needs groups is presented in this section.

4.4.2.1 GROUP I: Farmers who saw no use for farm advisory services.

The first identified group of farmers identified in the sample (herein referred to as Group I) consisted of 10 farmers, or one third of all farmers interviewed. None of these farmers employed an advisor, nor did they have any intention of doing so. Thus, these farmers perceived no needs for advisory services.

Reasons given as to why farmers perceived no need for advisory services were diverse. An indication of numbers of farmers who gave common responses is presented in Table 4.4. Several farmers gave more than one reason.

However, it should be noted that while the responses of these farmers indicated they had no perceived needs for advisory services, some farmers indicated a perceived need for services, but not for advisors. Two farmers stated their access to alternative sources of information was a reason for not using advisory services. Another two farmers stated that the expense of advisory services was a reason for not using advisory services. This

[17] Throughout this and subsequent chapters, references are made towards farmers involved in the FFR programme in terms of "he" or "his". This is purely the result of all farmers in the FFR survey being males, and should not be seen as an indication of gender bias.

suggests that farmers may have perceived benefits from the use of advisory services, but not sufficient to warrant the cost involved.

TABLE 4.4 Characteristics of Group I: farmers who saw no need for advisory services.

REASONS GIVEN BY GROUP I FARMERS FOR NOT USING ADVISORY SERVICES		NUMBER OF FARMERS	% OF TOTAL SAMPLE
-	farmers not interested in making changes to their farming system.	2	7%
-	farmers who believed advisors to have poor credibility	3	11%
-	farmers who believed advisors had insufficient practical experience	2	7%
-	farmers satisfied with alternatives to advisory services	2	7%
-	farmers citing expense a reason for not employing an advisor	2	7%
Group I:	farmers not interested in employing an advisor	10	30%

4.4.2.2 GROUP II: Farmers who would use specialist advisory services for specific tasks.

Group II consisted of six farmers, or 20% of the total sample. While none of the farmers in this group maintained on-going contact with an advisory service, all indicated specific advisory services they would make use of. The advisory services mentioned by Group II farmers were either technically orientated (such as recommendations on fertilisers, or new pasture species), or feasibility studies (for farm purchases or farm development etc.).

Both of these types of service are distinctive in that they are demanded by farm consumers in specific situations, and the nature of the service involve decisions which the farmer is not required to make on a regular basis. Hence, the advisory services mentioned by these farmers all consisted of areas of specialist expertise.

TABLE 4.5 Characteristics of Group II: farmers who perceived a need for specific advisory services.

ADVISORY SERVICE NEEDS OF GROUP II FARMERS	NUMBER OF FARMERS	% OF TOTAL SAMPLE
- technical services mentioned	3	10%
- feasibility studies mentioned	2	7%
Group II: farmers who would use specialist advisory services	6	20%

4.4.2.3 GROUP III: Farmers who expressed an intention to establish contact with an advisory service.

Group III consisted of five farmers (17%) who expressed an intention to establish contact with an advisory firm. Of these farmers, two farmers (7%), perceived a need for assistance in planning development projects and stated a clear intention to employ an advisor in the near future. One farmer was interested in employing an advisor but other items (principally fertiliser) had spending priority. Another farmer was looking to re-establish links with an advisory service after dissatisfaction with previous services. The remaining farmer was keen to participate in a discussion group but was constrained by his role as a farm manager. In this instance, the farmer's father retained responsibility for financial control of the business.

An important feature to note was that two farmers expressed an intention to make use of advisory services mentioned by Group II farmers as specialist services. This suggests that these farmers may be similar to Group II farmers in those respects which define the

nature of their advisory service needs, but due to their current situation, they were contemplating satisfying needs for specialist advisory services. This indicates potential differences between Groups II and III which were responsible for their different advisory service needs.

TABLE 4.6 Characteristics of Group III: farmers interested in using an advisory service.

CHARACTERISTICS OF FARMERS INTENDING TO USE ADVISORY SERVICES	NUMBER OF FARMERS	% OF TOTAL SAMPLE
- farmers interested in services for farm development.	2	7%
- farmers who saw expense as a constraint to employing an advisor.	1	3%
- farmers looking to re-establish contact with an advisory service.	1	3%
- farmer whose decision making was constrained by his father.	1	3%
Group III: farmers intending to employ a farm advisor.	5	17%

4.4.2.4 GROUP IV: Farmers who maintained on-going contact with farm advisors.

Group IV consisted of six farmers (20%), each of whom maintained on-going contact with a farm advisory service at the time of the second FFR interview. The frequency of contact ranged from annual to quarterly visits. Advisors were described as offering services in two principle areas of farm management practice; the planning of farm strategies, and reviewing and evaluating the outcomes of farm practices (Kay, 1981). Advice on policies and strategies were common services used by farmers who were in contact with advisors on an on-going basis. Three farmers (10% of total sample, 43%

of those using advisory services) were also members of discussion groups facilitated by their farm advisor.

On the basis of models presented in the previous chapter, these farmers are viewed as demonstrating a perceived need for advisory services. As all of these farmers intended continuing with their advisory service, it is concluded that these farmers believed the services they received, satisfied their perceived needs.

TABLE 4.7 Characteristics of Group IV: farmers making regular use of farm advisory services.

CHARACTERISTICS OF FARMERS MAKING REGULAR USE OF ADVISORY SERVICES	NUMBER OF FARMERS	% OF TOTAL SAMPLE
- farmers intending to continue with service.	6	20%
- farmers also members of a discussion group.	3	10%
Group IV: Farmers who employed an advisor on a regular basis.	6	20%

4.4.2.5 Farms unclassified on basis of advisory needs.

Three farmers (10%) were difficult to classify into one of the above categories. One farmer was required to keep contact with an advisor to satisfy his financiers. Of those who maintained contact with advisory services, he was the only farmer who intended discontinuing contact, as soon as his relationship with his creditors improved. The other two farmers saw no need for farm advisory services but were members of discussion groups facilitated by farm advisors. Their attendance at discussion groups appeared to be for contact with other farmers, rather than for contact with advisory service *per se.*

4.4.2.6 Summary of the advisory service needs of surveyed farmers.

The four groups of farmers described above reflect four distinctive advisory needs.

Group I;

Farmers who perceived no needs for advisory services.

Group II;

Farmers who saw a need for specialist services only. These services were situation specific and involved advice in decision making situations which farmers would not be expecting to deal with on a regular basis.

Group III;

Farmers who expressed an intention to employ a farm advisor. These farmers either recognised a specific situational need (indicating a possible difference farmer circumstance between Groups II and III), or, expressed an intention for more general "operational" advice.

Thus farmers in this group may represent an overlapping of the characteristics of farmers in Groups II and IV. It is proposed that some farmers may be more characteristic of farmers in Group II, but due to their situation, intended employing an advisor. The remaining farmers appeared intent on utilising the services used by Group IV farmers, but for various reasons, had not initiated contact with an advisory service.

Group IV;

The on-going contact maintained with advisory services indicates that the advisory service needs of these farmers are concerned with those areas of the farms operation in which the farmer was engaged in on a regular basis.

Although not stated by farmers, it was assumed that as information on on-going issues were supplied by an advisor, advice on specialist issues (such as those mentioned by Group II farmers) were also supplied by farm advisors.

The identification of these four groups of farmers satisfies the first objective of Study One, to identify farmers needs for advisory services. With identified differences between advisory service needs, this study now focuses on the factors which may influence these different advisory needs.

Section 3.3 described how needs arise as a result of consumers efforts to attain, maintain or enhance desired management styles. The recognition of such needs is situation dependant and occurs when the individual consumer perceives a discrepancy between their actual and desired states. This relationship between management styles and situations is represented in Figure 3.2.

The identification of the different advisory needs groups indicated that situational factors may be important in influencing the advisory service needs of surveyed farmers. For this study then, the question was raised, what factors constitute situational influences on farmers consumptive behaviour?

Hawkins *et al* (1989), present Belk's (1975) definition of situational influences on consumer behaviour. This definition describes situational influences as;

> *"All those factors particular to a time and place of observation which do not follow from a knowledge of personal (intra-individual) and stimulus (choice alternative) attributes and which have a demonstrable and systematic effect on current behaviour"* (Belk, 1975:158)

An example of such a situational influences on consumer behaviour would be the reported increases in the sale of wood-fired heaters following the 1992 winter, which was characterised by record low temperatures and an electricity crisis. In this instance,

consumers behaved in a manner not directly related to factors considered to influence lifestyles, but in a manner related to situational events.

While it is recognised that situation factors of this nature are equally likely to influence decisions made by farmers relating to their advisory service needs, a broader range of factors (related to personal attributes) were also considered within this study as situational influences. Some of the factors identified in Figure 3.1 as likely to influence the management styles of farmers, can also be seen as influencing the situation facing farmers. Primarily, those factors associated with family and the changing phases of the farming cycle.

This was considered appropriate for this study as employing an advisor represented a purchase decision which was likely to involve a long time frame, and hence situational considerations such as family and farmer age are likely to reflect this. For example, the purchase of a family car would represent a similar decision. In this case, the needs of the family can be considered as an important situational influence (i.e. would a station-wagon be required to meet needs created by growing children?). Analysis of the FFR data showed that for the advisory service needs of a farm, situational influences such as those represented by different phases in the farming cycle, were a major influences on different advisory needs of farmers.

Thus, the following discussion of factors identified in Chapter Three as likely to influence farmers advisory needs and behaviour, considers both situational and management style factors.

4.4.3 Farmer situation.

Various situational variables were collected by the FFR programme. The first of these considered was the influence of farming cycles. The factors related to farming cycles, such as farmer age, were then considered.

4.4.3.1 Farming cycle.

Farmers were asked to consider a conceptual farming-cycle consisting of three phases; an establishment phase, a consolidation phase and an exit (or retirement) phase. Farmers were then asked for their assessment of which phase they perceived their farming operation to be in.

Farmer respondents in each stage of the farming-cycle and their respective advisory needs groupings are shown in Table 4.8.

TABLE 4.8 Advisory needs and stages in the farming cycle.

ADVISORY GROUPINGS	ESTABLISHMENT	CONSOLIDATION	EXIT
	n = 5	n = 10	n = 12
GROUP I	1	1	8
GROUP II	-	5	1
GROUP III	4	-	1
GROUP IV	-	4	2

There are clear differences in advisory needs of farms in different stages of the farming cycle. Of farmers in establishment phases, the majority were interested in establishing contact with an advisory service. Of those farmers with no perceived advisory needs, 80% were in exit phases. The only Group III farmer in the exit phase, was a son who was managing a farm for his father.

A K-W test found that stages in the farming cycle were significantly different for each of the advisory needs groups (P=0.0315). However, as is suggested in Table 4.8, this difference was due primarily to the extreme position of the majority of Group I and III farmers. This was confirmed by a series of M-W tests[18].

[18] Details of M-W tests appear in Appendix A.

4.4.3.2 Farmer age, number of dependants and experience as financial manager of a farming business.

Additional situational variables collected by the FFR study included; farmer age, the number of years spent in financial control of a farming business and the number of dependant children supported by the farm business. As expected all these factors were closely related to stages in the farming cycle[19].

Consequently, Group III farmers (who were predominantly in establishment phases), were found to be significantly younger than farmers in Groups I, II and IV (P=0.01, P=0.03, P=0.02), and had spent fewer years in financial control of farming businesses (P=0.00 for all groups).

Conversely, Group I farmers, (who were predominantly in exit phases), had significantly fewer children than farmers in Groups III and IV (P=0.03, P=0.02). These findings are consistent with the assumption that those heading towards retirement are similarly later in their respective life cycles.

4.4.3.3 Discriminant analysis of situational influences on advisory needs.

Each of the situational variables discussed above was capable of distinguishing between different advisory needs groups. However, some variables (such as farmer age) were

[19] Correlation coefficients between farming cycle (FM_CYC), farmer age (AGE), years spent in financial control of a farming business (YIFC) and number of dependant children (DEPS).

	FM_CYC	AGE	YIFC	DEPS
FM_CYC	1.0000	0.6136	0.6490	-0.6853
AGE	0.6136	1.0000	0.8937	-0.5826
YIFC	0.6490	0.8937	1.0000	-0.5508
DEPS	-0.6853	-0.6853	-0.5508	1.0000

only able to distinguish one group from the other three. Discriminant analysis was used to identify those variables best capable of distinguishing between advisory needs groups.

As discussed in Section 4.4.3.2, discriminant analysis requires that variables used are either; continuous and normally distributed, or dichotomous. A K-S test showed that the variable which recorded the number of dependant children was significantly non-normal, and thus, unsuitable for inclusion in the discriminant analysis. As farming cycle data was ordinal in nature, three dummy variables were used to indicate which phases of the farming cycle farmers were in[20].

Thus, the variables put forward for discriminant analysis were; farmer age, the number of years spent in financial control of a farm business and the three variables which recorded farmer's stage in the farming cycle. Two of the farming cycle variables (ESTAB & EXIT) and the farmer age variable were included in the stepwise calculation of discriminant functions[21]. Table 4.9 shows the discriminant function coefficients which show the contribution of variables in discriminating between the different advisory needs groups.

TABLE 4.9 Discriminant analysis of situational variables: standardized canonical coefficients.

	FUNCTION 1	FUNCTION 2	FUNCTION 3
AGE	-1.05394	0.40954	0.88191
ESTAB	1.39185	0.24278	0.29830
EXIT	1.34328	0.78791	-0.79937
% of VARIANCE$^{\alpha}$	87%	12%	0.01%

α: % OF VARIANCE is the contribution of each discriminant function to the total variance explained by the discriminant analysis.

[20] Farming cycle was represented in discriminant analysis by the use of the following dummy variables;

ESTAB - distinguished farmers in establishment phases from farmers in other phases.
CONSOL - distinguished farmers in consolidation phases from farmers in other phases.
EXIT - distinguished farmers in exit phases from farmers in other phases.

[21] Further details of discriminant analysis is included in Appendix A.

The first discriminant function calculated explains 87% of the total variance explained by the discriminant analysis. As the canonical coefficients of all variables in the first discriminant function are all of similar magnitude, each of the variables included in the analysis contribute equally to the discriminant analysis.

Table 4.10 shows that the discriminant functions were capable of successfully classifying 70% of farmers into their respective advisory needs groups.

TABLE 4.10 Discriminant analysis of situational variables: classification results.

ACTUAL GROUP	NUMBER OF CASES	PREDICTED GROUP MEMBERSHIP			
		GRP I	GRP II	GRP III	GRP IV
GROUP I	10	9 (90%)	1 (10%)		
GROUP II	6	1 (17%)	5 (83%)		
GROUP III	5			5 (100%)	
GROUP IV	6	2 (33%)	4 (67%)		
UNGROUPED CASES	3	1	1	1	
PERCENTAGE OF "GROUPED" CASES CORRECTLY CLASSIFIED: 70.4%					

Table 4.10 also shows that the discriminant functions were most successful in discriminating Group I and III farmers. The difficulty the functions had in discriminating between Groups II and IV, can be attributed to the fact that farmers in these advisory needs groups had similar characteristics with regard to the situational variables submitted for analysis.

Although only three situational variables were included in the discriminant functions, they were able to apportion 70% of cases into their correct groupings. This suggests

that farmers perceived needs for advisory services are strongly influenced by situational factors.

This descriptive analysis provides the basis for propositions on the reasons for the different advisory service needs of surveyed farmers. The lack of advisory needs demonstrated by Group I farmers could be attributable to;

1: A greater amount of farming experience, which could lead to a reduced need for operational advice.

2: A reduced desire to move towards new farming "states". Hence, less of a need for a "change agent", or farm advisor.

It is thus proposed that the reverse may be true of establishment phase farmers, with less farming experience and a greater discrepancy between perceptions of actual and desired states, resulting in a perceived need for advisory services.

However, situational variables were not able to explain differences in the advisory service needs of farmers in Groups II and IV. These farmers were predominantly in consolidation phases of their respective farming cycles, were of similar age, had similar levels of experience in the financial control of farming businesses and a similar number of dependant children.

In Section 4.4.2.6 it was suggested that Group III farmers may represent a collection of farmers on the fringes of Groups II and IV, and that situation characteristics could be a reason for differences in their advisory needs. However, farmers in Group III were found to be not only relatively homogenous with regard to their situational characteristics, but also were significantly different from farmers in Groups II and IV.

Thus, on the basis of the situational relationships presented, it is concluded that; farmers situation may influence farmers *recognition of a need* for advisory services. However, while pressures associated with establishment and exit phases may influence the

recognition of an advisory need, it does not explain why some farmers maintain on-going advice and others are only interested in specific "one-off" services.

4.4.4 Determinants of farm management style.

In Section 3.3 several factors were identified as likely to influence the management styles of New Zealand farmers. The relationships between those factors which are likely to influence management styles and the advisory needs of farmers, are now investigated. As many of the variables introduced in Section 3.3 were described as influencing management styles through their influence on farmers goals, the goals of surveyed farmers are discussed first.

4.4.4.1 Farmer goals.

As goals of farmers are recognised as a major influence on farm management style and farmer behaviour as they prescribe desired farming states. The reasons farmers chose farming as an occupation were considered first as a possible source of differences in farming goals.

All of the farmers involved in the FFR programme chose farming as an occupation (or chose to remain farming), for quality of life reasons. The attributes of farming farmers believed enhanced their quality of life were;

- independence: *being their own boss, and in control of their own destiny.*
- flexibility: *ability to arrange family life around farming activities.*
- job satisfaction: *farming was perceived to be a "meaningful" and challenging career.*

Given that all farmers were farming for similar reasons, different goals were investigated to indicate what, as farmers, they were trying to achieve.

As all farms in the FFR study were family farms, the livelihood of farmers was dependant upon the performance of the farming operation. Hence, it was not surprising that the primary goal of all farms was to generate sufficient profit to meet the basic living expenses of the farm family. However, when provision for family survival had been met, farmers exhibited three distinctive goal orientations;

1: *Profit orientated*

Seven farmers (23%) saw the principal end point of the farming operation as being to generate profits. Profits were for various sources, provision for retirement, children's education, debt reduction etc.

2: *Personal satisfaction*

For fifteen farmers (50%) personal satisfaction was the principle end point for farming. Satisfaction was derived from aspects of farming such as; producing top quality livestock, progressing by developing the farm, and pride from doing a good job.

3: *Family succession*

Eight farmers (27%) saw the primary end point of their farming operations as being able to hand over the farm to children (sons). The goals of these farmers included; expanding the size of the farming operation to support two households, providing for retirement, having no financial worries.

The range of distinctive goals exhibited by farmers would suggest distinctive behaviours. However, this was not found to be the case. Due to farmer's different beliefs and perceptions, farmers viewed a variety of different means as suitable for attaining the

same ends[22]. Hence, the FFR programme found that farmers with similar goals exhibited a variety of behaviours. It was therefore not surprising to find no relationship between farmer's goals and their use of advisory services (see Table 4.11).

TABLE 4.11 Farmer goals and advisory needs.

	PROFIT ORIENTATED	PERSONAL SATISFACTION	FAMILY SUCCESSION
GROUP I	1	4	5
GROUP II	2	3	1
GROUP III	1	4	-
GROUP IV	2	3	1
OTHERS	1	1	1

The only feature of Table 4.11 is the slightly higher proportion of Group I farmers with goals orientated towards family succession. This group also contained a higher proportion of farmers in exit phases of the farming cycle. However, it should be noted that while farmers with succession orientated goals predominantly assessed themselves as being in the retirement or exit phase of the farming cycle, this was not a definitive association. Five farmers who saw themselves as being in a consolidation stage were planning the succession of the farm to family members.

Given that farmer goals have been shown not to be useful indicators of likely sources of farmers perceived needs, the other factors identified as likely to influence management style, (and hence farmers needs) were studied. There is no *a priori* order in which the remainder of these factors should be studied. Discussion below begins

[22] An example of the subjectivity of farmer perspective on goals and success is given by one farmer who held goals relating to personal satisfaction. This farmer had as a specific goal, the development of a high wool producing sheep flock, and was proud of his success in this achieving this goal. However, the wool production of his flock was consistently below the average wool production on other farms in the study, for each of the four years studied.

with physical factors; farm resources, policies and performance, followed by a discussion of farmer behaviour and experiences with advisory services.

4.4.4.2 Farm resources.

The level of resources available to a farm business are an important characteristic of the nature of that business. It has been shown that the amount of resources available to a farm business were associated with specific goal orientations (Gasson, 1974). The level of farm resources may therefore be reflected in the different management styles and behaviourial patterns of surveyed farmers.

Measures of farm resources were recorded during the FFR programme included farm size, labour input, and the number, breed and classes of livestock farmed. Previous studies have used Government property valuations as indicators of the quantity of farm resources (Greer, 1982). As Government valuations are abstract assessment of the resources available to farm business, and not used by farmers, they were not considered useful for the purposes of either the FFR programme, or the research studies reported in this thesis.

As farm size and the number of livestock farmed were highly correlated (coeff= 0.977 r^2=0.955: for farm size excluding outlier farm), size was used as the principle measure of resources available to surveyed farms. It was found that Group III farms were significantly smaller than Group IV farms (P=0.031)[23].

The smaller size of Group III farmers was most likely to be due to the fact that these farmers tended to be those establishing farm businesses. A possible reason for those farmers who used advisory services being larger in size may be due to the fact that these farmers benefit from improved economies of scale, which favour the use of advisory services. Economies of scale arise where larger farms, capable of earning larger

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[23] Group III farms: average size = 311ha
Group IV farms: average size = 750ha
The outlier farm was one of the three farms not classified into one of the advisory needs groups.

financial surpluses pay the same amount for advisory services as smaller farms which earn comparatively less.

No significant differences between farms were detected in terms of their labour resources, or labour units per stock units farmed.

4.4.4.3 Farm policies.

All surveyed farmers had breeding ewe flocks. Twenty of these farmers finished the majority of surplus lambs, four finished a proportion of surplus lambs while the remaining six farmers sold the majority of surplus lambs store. The relationship between farmer's lamb policies and their respective advisory needs groups are shown in Table 4.12.

TABLE 4.12 Lamb policies of studied farms.

LAMB POLICIES	ADVISORY NEEDS GROUPS			
	GROUP I	GROUP II	GROUP III	GROUP IV
MAJORITY FINISHED	8	6	1	2
PROPORTION FINISHED	-	-	2	3
MAJORITY STORE	2	-	2	1

While Table 4.12 shows that Group I and II farmers finished a greater proportion of their lambs finished than Groups III and IV, this provides no insight into possible causes of differences in advisory service needs.

While sheep production policies were fairly uniform across surveyed farmers, cattle policies operated by surveyed farmers were diverse. Fourteen farmers operated two year steer finishing policies, twelve farmers had breeding cow herds, of whom six finished progeny while the remainder sold surplus progeny store. However, as with the sheep

production systems, cattle polices exhibited no significant relationships with regard to the use of advisory services.

The only differences in livestock production policies related to differences in advisory needs, was in the relative proportion of sheep stock units farmed. Group III farmers had a significantly higher proportion of sheep stock units farmed than other groups. As with other factors, this finding was closely related to stages in the farming cycle. Establishment stage farmers farmed a significantly higher proportion of sheep stock units than both consolidation and retirement stage farmers (P=0.004, 0.013). The low capital cost of sheep is the likely reason for these farms having a higher sheep to cattle ration.

4.4.4.4 Farm performance.

Several indicators of farm performance were collected by the FFR programme. To ensure the results of past performance could be compared between farms, standardised records were derived from annual financial statements. This restricted analysis to normative measures and took no account of performance levels outside of those reported in annual financial statements.

The limited usefulness of such an assessment is illustrated by comparing normative financial analysis to farmers goals. Only seven of the thirty farmers were orientated towards profit, which is the primary performance criteria derived from financial statements. However, it is recognised that the goals of many of the remaining farmers are influenced by the business performance of their farms.

It was also of interest to assess whether there had been changes in the relative performance of surveyed farms, as experiences gained from farming are recognised as an important aspect of farm management style. Farm performance variables proved to be highly correlated between years (see Appendix A). Thus high performers in one of the four annual review season, tended to be high performers in others. No farmers notably increased or decreased their relative standings over the ten year period.

Productivity.

Indicators of farm productivity derived were; wool production per sheep stock unit, lambing percentage (lambs weaned per 100 ewes mated), sheep income and cattle income per stock unit.

Group III farmers had the lowest average lambing percentage, wool weights, sheep income per sheep stock unit and cattle income per cattle stock unit. Group II farmers had the highest average lambing percentages, wool weights, sheep income per sheep stock unit and cattle income per cattle stock unit[24]. Group I and IV farmers had similar levels of productivity for each of these performance criteria. However, due to large variability in each of the recorded variables, only differences between Groups II and III were significant beyond the designated level of probability.

It is proposed that the predominantly establishment phase farmers may be poorer performers as a result of limited farming experience. A recognition of this fact may instill the need for outside advice. Conversely, the more successful Group II farmers are less likely to perceive a need for outside advice, except in areas where specialist skills are required.

Profitability.

Annual financial statements provided information for the following financial performance measures; farm income per hectare, farm working expenditure per hectare, total expenditure per hectare, interest and debt per hectare. Economic farm surplus per hectare (EFS) was calculated as the farm income (adjusted for changes in livestock) less farm expenditure, less interest and rent and a management fee[25].

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[24] Physical productivity and financial productivity per stock unit were strongly correlated. Farms were ranked on the basis of lambing percentage and wool weights, and their average ranks correlated against sheep income. The correlation coefficient was 0.60, r^2=0.36 P=0.001.

[25] This measure of EFS was used to allow comparison with the EFS of farms reported by the NZMWBES.

As with previous performance variables, there was a large amount of variability in the financial performance of surveyed farms. The only statistically significant relationships were again between Groups II and III. Group II farms not only had the highest income per hectare, but also the highest EFS. However, as shown in Table 4.13, there were no significant differences between farms in terms of either farm working expenditure, or total farm expenditure.

TABLE 4.13 Summary of the financial performance of advisory needs groups.

	ADVISORY NEEDS GROUPS			
	GROUP I	GROUP II	GROUP III	GROUP IV
Total income/ha	$331.93	411.51^{\alpha}$	251.66^{\alpha}$	$335.20
Farm working expenditure/su	$13.25	$12.51	$7.90	$12.55
Total farm expenditure/ha	$248.89	$273.42	$207.83	$263.75
Economic farm surplus/ha	50.09^{\beta}$	137.79^{\beta\gamma}$	31.84^{\gamma}$	$105.08

Means with same characters designate significant differences.
α: P = 0.032 β: P = 0.002 γ: P = 0.032

The high level of debt held by sheep and beef farmers has attracted a lot of attention in recent literature (Sandrey & Reynolds, 1990; Frengley & Johnston, 1992). Debt levels were therefore investigated as a factor likely to reflect farm performance and hence farm management style. Surprisingly, there were no relationships between levels of farm debt and productivity or profitability. Nor were any relationships observed between debt levels and farmers stage in the farming cycle or advisory service needs. Farms from all advisory needs groups included heavily indebted and debt free farm businesses. However, a debt constraint index was calculated on the assumption that heavily indebted and poor performance farmers would be under greater financial pressure due to debt

burdens[26]. On the basis of this index, Group III farms were found to be under a significantly greater debt constraint than the more productive and profitable Group II farmers.

Although not confirmed by the above analysis, it is likely that the financial pressures of Group III farmers were due in part, to their establishment situation. This suggestion reinforces the earlier proposition that the advisory service needs of Group III farmers may stem from the circumstances resulting from their stage in the development cycle. However, as was pointed out in Section 4.4.2.3, there were some differences in the advisory service needs of Group III farmers. While some Group III farmers were interested in specialist services (related to farm development), others appeared to be more interested in more operational type advice. Unfortunately the FFR transcripts did not provide further detail on the exact service needs of farmers, that would allow further elucidation of the validity of the proposition, and the issue remains one for further study.

4.4.4.5 Farmer use of technology.

Several studies have associated use of advisory services with the use of new and recommended technologies (Fairgray, 1979; Kampenallas, 1981; Greer, 1982). Surveyed farmers were questioned as to their use of 22 different pieces of technology. Most of the technologies had been developed and promoted widely over the previous ten years, although some (the use of objective evaluations for sire selection) had been available for longer. These technologies were selected as it was believed that most farmers would have heard of the technologies, and that most were applicable to farmers in the region. The FFR research officer was able to confirm that all farmers had heard of the majority of the technologies on which enquiries were made.

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[26] The debt constraint index was calculated as total income per stock unit less interest commitments per stock unit. As such, the index was simply a measure of income, net of interest commitments. Although more sophisticated indicators of financial stress have been proposed (Frengley & Johnston, 1992), the nature of the FFR data set did not allow for such measures to be calculated. This was due to the fact that farmers participating in the FFR programme were only requested to provide details of the financial situation of the farm business, and not their personal situation.

Farmers use of advisory services was compared with their respective technology adoption score[27]. The mean technology adoption score of Group IV farmers was significantly higher than those of Groups I and II (P=0.00, P=0.01) and almost significantly higher than that of Group III (P=0.08). This confirms the findings of previous studies, that farmers with greater contact with advisory services, use more recommended technologies.

The principle question therefore becomes, what is the cause of this phenomenon? Is greater use of technologies by farmers a symptom of advisory use (i.e. that farmer use of advisory services results in exposure to new technologies, which subsequently leads to the use of those technologies), or, that farmer use of technology is the cause of advisory contact (i.e. that farmers initiate contact to receive information and advice on new innovations). It is likely that the answer varies between these extremes for different farmers. Given the limited information regarding farmers use of advisory services and the reasons behind technology adoption, all that can be concluded on the information available is that Group IV farmers are more likely to see the use of new technologies as assisting in the attaining, maintaining or enhancing of desired farm management styles.

4.4.4.6 Previous contact with advisory services.

As described in Section 3.3.3, a farmer's experiences of advisory services is likely to influence beliefs regarding the benefits derived from the use of that service, and hence, perceptions of future needs for that service, and future consumptive behaviour (Hawkins *et al*, 1989).

Few details regarding previous contact with advisory services was collected by the FFR programme. However, four major categories of previous advisory use were displayed by farmers participating in the FFR programme;

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[27] List of technologies and construction of adoption scores are presented in Appendix A.

1: 12 farmers (44%) mentioned contact with the services provided by the ASD through involvement in Government incentive programmes such as the Livestock Improvement Scheme (LIS) and Land Development Encouragement Loan (LDEL) schemes.

2: 5 farmers (18%) had used advisory services for one-off specific issues, or had contact purely through membership of a discussion group.

3: 5 farmers (18%) had made use of personal advisory services, either in addition to, or without involvement in discussion groups.

4: 6 farmers (22%) had no previous contact with any advisory services.

The previous use made of advisory services by each of the advisory needs groups are presented in Table 4.14.

TABLE 4.14 Previous use of advisory services.

	FARMERS PREVIOUS USE OF ADVISORY SERVICES			
	INVOLVEMENT IN MAF SCHEMES ONLY	PERSONAL ADVISORY SERVICES	DISCUSSION GRP, OR ONE-OFF ADVICE ONLY	NO ADVISORY CONTACT
GROUP I	5 from 10	-	2 from 10	3 from 10
GROUP II	4 from 6	1 from 6	1 from 6	-
GROUP III	-	2 from 5	1 from 5	2 from 5
GROUP IV	3 from 6	2 from 6	-	1 from 6
TOTAL	12	5	5	6

There are several interesting points to note from Table 4.14, relating to the previous advisory experiences of those groups who where not using advisory services at the time of the FFR study. These are;

1: None of the Group I farmers had made use of personal advisory services. This is consistent with their behaviour at the time of the FFR study. It also means that the beliefs of these farmers regarding potential benefits of personal advisory services were not derived from first-hand experience, but from contacts with other farmers or experiences based on involvement in MAF programmes.

2: All Group II farmers had had some contact with farm advisory services. Thus, it is expected that they would have beliefs founded on the experiences of the services they had contact with.

3: No Group III farmers had been involved with MAF schemes. This is not surprising as many of these farmers would not have been farming during the period they were available. Hence, their perceptions of services offered by farm advisors is less likely to be tempered by recollections of traditional extension-type advisory services.

The information collected in the FFR programme provided no details on the nature of farmers experiences with advisory services, nor with the satisfaction gained from contact with advisory services. However, it does show the source of farmers previous advisory experiences. The findings are consistent with propositions thus far. Individual advisory services are described as those most likely to provide a service capable of satisfying the needs of consumers. Only one farmer who had previous contact with personal advisory services was not either currently using advisory services or had intentions of doing so. Conversely, farmers with no perceived needs for such services, had no experience of such services.

4.4.4.7 Features of management style influences on farmers advisory needs.

The second objective of Study Two was to distinguish factors that were associated with different advisory needs. Hence, factors thought to influence the management styles of farmers participating in the FFR programme were studied to see what relationships (if any) were present. Surprisingly, farmer's goals (likely to be the major determinants of

farmer behaviour), were unrelated to farmer's advisory needs. This demonstrated that while goals defined farmers desired ends, farmers employed a range of means to attain those ends. Hence, not only were there no relationships between farmers goals and their advisory needs, but there were few relationships between farmers goals and farm policies.

However, there were differences between the performance of the different advisory needs groups. It has been shown that farmers in Group II tended to be higher performers in terms of both productivity and profitability, while Group III farmers were the lowest performers. This finding is consistent with the different advisory needs of farmers in Groups II and III. Successful farmers recognised a need only for specialist advisory services, while poorer performing farms demonstrated a need and intentions to make use of a wider range of advisory services. However, the average productivity and profitability of Group IV farmers gave no indication as to why these farmers not only recognised a need for advisory services but also acted on this need. The only management style factors which exhibited reasons for the behaviour of Group IV farmers involved the larger size of Group IV farmers properties, and their greater use of recommended technologies. It is suggested that greater advisory use made by larger farms may reflect improved economies of scale, in comparison to smaller farms. Farmers use of technologies is likely to reflect both the contact with advisors as well as means farmers see as suitable in attaining desired ends.

4.4.4.8 Discriminant analysis of management style influences on advisory needs

Discriminant functions of factors influencing the management styles of farmers were constructed. The objective, as was the case in Section 4.4.3.3, was to identify those variables best capable of distinguishing between the advisory needs groups.

Several variables which distinguished between the advisory needs groups were found to be unsuitable for inclusion in discriminant analysis. The farm size variable was

excluded as the skewed distribution of farm sizes violated requirements for normality. The debt constraint index was excluded when Box's M test indicated that it contributed to non-normal multi-variate distributions. As most of the indicators of financial performance were highly correlated, only total income per stock unit and EFS were submitted for discriminant analysis.

The variables submitted for discriminant analysis were; the % of sheep farmed, wool production per stock unit, farmer's technology adoption score, total income per stock unit and economic farm surplus per hectare.

However, as shown in Table 4.15, the stepwise procedure overlooked profitability measures in the calculation of discriminant functions and included only three of the remaining variables submitted[28].

TABLE 4.15 Discriminant analysis of management style variables: standardized canonical coefficients.

	FUNCTION 1	FUNCTION 2	FUNCTION 3
% SHEEP	-1.01611	-0.04030	0.57643
WOOL/SU	0.02719	0.95059	0.33128
TECH_AD	0.99885	-0.23143	0.54757
% of VARIANCE$^{\alpha}$	78%	20%	2%

α: % OF VARIANCE is the contribution of each discriminant function to the variance explained by the discriminant analysis.

The standardized canonical coefficients indicate that the proportion of sheep farmed and technology adoption scores were the most powerful contributors to the discriminant functions.

[28] Further details of discriminant analysis is included in Appendix A.

TABLE 4.16 Discriminant analysis of management style variables: classification results.

ACTUAL GROUP	NUMBER OF CASES	PREDICTED GROUP MEMBERSHIP			
		GRP I	GRP II	GRP III	GRP IV
GROUP I	9	4 (44%)	2 (22%)	2 (22%)	1 (11%)
GROUP II	5		5 (100%)		
GROUP III	5	1 (20%)		4 (80%)	
GROUP IV	6		1 (17%)		5 (83%)
UNGROUPED CASES	3			2	1
PERCENTAGE OF "GROUPED" CASES CORRECTLY CLASSIFIED: 72.00%					

Table 4.16 shows that the functions were able to classify a similar proportion of farmers into their correct groupings as the discriminant functions presented in Section 4.4.3.3, which used situational variables. However, there were differences in the relative proportions of groups successfully classified. While the situational variables were unable to discriminate between farmers in Groups II and IV, the management style variables had greater difficulty distinguishing Group I farmers from the remaining groups.

The conclusion drawn at the end of Section 4.4.3.3 was that situational influences distinguished between the advisory service needs of farmers in establishment and exit phases of farming. The discriminant analysis suggests that differences between consolidation stage farmers may be dependant on their management styles. In particular, as technology adoption is a prominent variable, the nature of the respective information seeking needs of consolidation stage farmers appears to be strongly related to farmers advisory service needs.

4.5 CONCLUSIONS FROM STUDY ONE

4.5.1 Factors associated with use of advisory services.

The FFR programme was established as an exploratory study to determine the research of sheep and beef farmers. The programme provided a broad description of the behaviour, physical and personal characteristics of a randomly selected sample of farmers.

Models presented in Chapter Three described how farmer use of advisory services would result from a farmer perceiving the usefulness of an advisory service in moving from their perceived state, to a desired state. Farmers were classified into four groups which reflected distinctive perceptions of advisory service needs. Of the thirty farmers surveyed, these needs were;

Group I;

Ten farmers saw no potential benefits from the use of advisory services. These farmers were older, had fewer dependant children, and tended to be in retirement or exit phases. None of these farmers reported having made use of personal advisory services.

The proposition that was put forward was that, for some farmers, the lack of perceived need for advisory services could be attributed to the fact that farmers had few aspirations to further develop farm properties, or that farmers felt they had sufficient farming experience not to warrant the use of an advisor.

Group II;

Six farmers could perceive benefits from the use of advisory services in specific situations, where the advisor would act to provide specialist expertise.

Group II farmers were predominantly in consolidation phases, were of average age and had spent an average number of years in control of farming businesses. These farmers were the highest ranking with respect to productivity and profitability measures, and were most clearly distinguished by these management style variables.

It is was concluded that these farmers would be the least likely to perceive benefits from the on-going use of an advisor in working to improve farm performance.

Group III;

Five farmers perceived potential benefits from the use of advisory services, but either the magnitude or the importance of this need was not large enough to result in farmers acting on this need.

Group III farmers tended to be farming properties in establishment phases. Their stage in the farming cycle was the likely reason for these farms running a higher proportion of sheep to cattle. These farmers were younger with less farming experience than other farmers, and ranked lower than other groups in terms of productivity and profitability.

The conclusions drawn from these characteristics is that these farmers had the greatest discrepancy between desired states and their actual states. For two farmers, limited resources were given as reasons for not using advisors in their actions to move closer to their desired states.

On the basis of interview transcripts of these farmers it was originally suggested that this group may represent a merging of farmers on the fringes of Groups II and IV. Some of these farmers would normally be interested in specific services, and where only included by virtue of the fact that they were in situations which demanded those services. However, this suggestion was rejected, as the

situational and management style characteristics of farmers were fairly uniform, suggesting that Group III farmers were a homogenous group.

Group IV;

Six farmers perceived benefits from advisory services in the on-going operation of their farming businesses. These farmers ranked highest in terms of their use of recommended technologies, and apart from high rankings for farm size, were unable to be distinguished by the other variables measured.

These farmers were most similar to Group II farmers, with discriminant functions having difficulty in distinguishing between these groups on most variables. This suggests that the differences between these farms in factors which determine different advisory service needs, were either to complex or subtle to be detected by the research methods employed. It was suggested that the information seeking behaviour of these farmers is likely to be involved in causing differences in farmers perceived needs for advisory services.

Unclassified farms;

Three farmers did not fit within any of the above classification criteria.

Of these farmers, one maintained contact with an advisory service purely due to pressure from financiers. This farmer was lowly ranked in terms of productivity and profitability. The two remaining farmers were both members of farm discussion groups facilitated by farm advisors. However, both they stated that they were not interested in (saw no perceived need for) the use of a personal advisory service on their farms.

The interview transcripts indicated that the advisory needs of these farmers were quite distinctive. However, without other farmers displaying similar advisory needs, it was recognised that an investigation of factors likely to influence these advisory needs would be based on a limited number of observations, and hence, conclusions would be poorly validated.

4.5.2 Advisory service needs groups distinguished by situational and management style variables.

The final discriminant analysis combined those variables included in preceding discriminant functions. This discriminant analysis identified both situational and management style variables which were capable of discriminating between the advisory needs groups. The of the variables submitted for analysis were included in the discriminant functions, shown in Table 4.17[29].

TABLE 4.17 Discriminant analysis of situational and management style variables associated with advisory needs groups: standardized canonical coefficients.

	FUNCTION 1	FUNCTION 2	FUNCTION 3
% SHEEP	0.37087	-0.57966	-0.43489
WOOL	0.07513	0.32636	-0.81878
TECH_AD	-0.30459	0.73227	0.63991
ESTAB	1.06520	0.37702	0.25772
EXIT	0.92766	-0.40567	0.56958
AGE	-0.83889	-0.25692	-0.04023
% of VARIANCE$^{\alpha}$	76%	15%	9%

α: % OF VARIANCE is the contribution of each discriminant function to the variance explained by the discriminant analysis.

The situational variables are the major determining factors in Function 1, which explains 76% of variation in discriminant functions. Table 4.18 shows that these discriminant functions, incorporating both situational and management variables, are capable of classifying 88% of farmers into their correct groupings.

[29] Further details of discriminant analysis is included in Appendix A.

TABLE 4.18 Discriminant analysis of situational and management style variables associated with the use of advisory services: classification results.

ACTUAL GROUP	NUMBER OF CASES	PREDICTED GROUP MEMBERSHIP			
		GRP I	GRP II	GRP III	GRP IV
GROUP I	9	9 (100%)			
GROUP II	5	1 (20%)	4 (80%)		
GROUP III	5	1 (20%)		4 (80%)	
GROUP IV	6	1 (17%)			5 (83%)
UNGROUPED CASES	3	2		1	
PERCENTAGE OF "GROUPED" CASES CORRECTLY CLASSIFIED: 88.00%					

The discriminant functions successfully classified all Group I farmers, who had no contact with advisory services. However, as with other discriminant functions, farmers in Groups II and IV were difficult to distinguish between.

The identification of the above groups is a unique and useful piece of information. Not only was it possible to identify a series of distinctive advisory service needs of farmers, but relationships were identified between distinctive situational and management style variables.

Of the four distinctive patterns of advisory needs which were displayed by farmers in the Taihape sample, each was also associated with distinctive situational and management variables. These allowed some tentative conclusions to be drawn as to why some farmers may have behaved in the way they did.

4.5.2 Issues for further study.

Study One drew conclusions as to why the situational and management style factors were associated with the distinctive advisory needs groups. The conclusions drawn centred on the reasons why farmers may have recognised a need for advisory services.

However, as the FFR data was limited in the information derived regarding farmers use of advisory services, there was no information on what types of advisory services farmers perceived as useful in satisfying their advisory needs. Information of which specific services farmers perceived needs for, should allow the providers of advisory services to develop and target services for the farming community.

However, the study indicated that a crucial question pertaining to farmers advisory needs was not answered by the information collected during the study. That question asks; *what do farmers use advisory services for?* This question is clearly related to the question which asks; *what are farmers farming for?* As was shown by the description of farmers goals, farmers were farming for a range of different reasons, with few relationships to overall management styles of farming situation. Advisory services could be used as one of a variety of different means, employed to reach a variety of different ends.

Therefore, issues for further study include;

1: Validation of the relationships found from the FFR study. For example, was use of advisory services related to technology use across a wider portion of the farming population?

One of the limitations of qualitative research described in section 4.3.1.2 was the poor statistical rigour of findings based on small samples. Any further study should therefore seek to verify, where possible) conclusions drawn from the FFR sample.

2: The need to describe in greater detail the specific advisory service needs of farmers.

3: To establish why some farmers who perceive benefits from the use of advisory services don't complement this recognition with behaviour. Attitudes towards advisory services are identified as a likely influence in determining whether perceived needs are likely to be complemented with behaviour.

CHAPTER FIVE

Study Two

5.1 INTRODUCTION

Study One involved an intensive study of a small number of hill country farmers and investigated factors which affected farmers advisory needs. The value of the data analyzed in Study One, was that it covered a broad range of factors recognised as being associated with consumer needs and behaviour. This provided a perspective of the advisory needs held by a randomly selected sample of farmers.

An extensive study was used to complement the first, by providing further information from a larger section of the farming population. The objectives of the second study were to validate, where possible, the findings of Study One, and extract further information on the specific advisory needs held by hill country farmers.

The issues reported in this chapter relating to Study Two include; objectives of the study, the selection of a mail survey as an appropriate study technique, construction of the survey questionnaire and the administration of the survey used to study farmers advisory needs. The findings of the study and a discussion of their relevance to the first study are also presented.

5.2 OBJECTIVES OF STUDY TWO

Theories of consumer behaviour presented in Chapter Three describe how consumer demand is influenced by situational and management style factors. Study One found that several of these factors, identified through the FFR's intensive study of farmers, were associated with farmer's perceived needs for farm advisory services. The first objective of Study Two was to see if similar findings could be duplicated from a less detailed, extensive study of farmers.

Study One found that farmers in similar situations with characteristic management style factors were similar in their recognition of needs for advisory services. Yet, farmers in similar advisory needs groups demonstrated a diverse range of goals. It was concluded

that the identified series of factors appeared to influence the recognition of a need for advisory services, but it was acknowledged that farmers were likely to hold needs for a variety of services.

Study one did not collect information on the exact nature of farmers advisory needs. A further study provided the opportunity to identify which advisory services farmers perceived needs for. With an appreciation of the specific advisory needs of farmers, the analysis of factors influencing consumer behaviour can be taken a step further. It could be tested whether those factors identified as influencing the recognition of advisory needs also influenced farmers choice of services to satisfy that need.

However, as outlined in Section 3.4.3, farmers who perceive a need for advisory services, may not reflect this recognition with complementary behaviour. The various influences which may prevent an identified need from being complemented with action are compiled in an individual's attitudes towards that object or situation. The third objective of this study was therefore to investigate attitude components to explain differences in behaviour. Of particular interest was the opportunity to investigate whether differences in farmer attitudes towards advisory services could be associated with specific aspects of advisory service performance. Where negative attitudes held by farmers could be traced to areas of service quality or delivery etc., this would identify areas to which attention should be paid by the providers of advisory services.

The objectives of Study Two can be summarised as follows;

1: To investigate whether the factors associated with the perceived needs of farmers identified in Study One, were evident amongst a wider selection of hill country farmers.

2: To determine from a wide sample of farmers, perceptions of their advisory needs for a range of different advisory services.

3: To investigate the role of attitudes in preventing farmer needs for advisory services becoming demands for services.

5.3 METHODOLOGY

To satisfy the objectives of Study Two, an extensive survey of farmers was chosen as a study method.

An extensive survey was chosen for two principle reasons. Firstly, it was recognised that the usefulness of findings from Study One were constrained by the small number of farms involved in the FFR study. An extensive survey would be able to investigate whether the characteristics displayed by farmers involved in the FFR programme, were also found in the wider population. It was also recognised that farmer's specific needs for advisory services were diverse. Hence, a large number of farmers should be studied to gain an appreciation of the full range of their advisory service needs, and any possible relationships with factors identified as likely to influence consumer needs and demands.

The findings of Study One were used as a basis for the objectives of Study Two. To ensure the findings of Study One were applicable to Study Two, the original population frame from which the FFR sample was drawn, was used as the population on which the second study was based.

5.3.1 Choice of survey method.

The two survey methods considered suitable for this study were mail or telephone delivered surveys. Both methods conferred the advantage of comparative low cost for surveying large numbers of farmers. The specific advantages of a telephone administered survey over a postal survey were;

1: With direct contact with respondents, interviewers had the opportunity to explain questions (Aaker & Day, 1991).

2: Telephone surveys have been found to have higher response rates than mail administered surveys (Yu & Cooper, 1983).

However, a mail survey was deemed to be the most suitable method for this study for the following reasons;

1: Primarily, the procedure involved in conducting a mail survey fitted better within the time constraints of the research programme. The process of telephoning a large number of farmers was considered to be too expensive of researcher time.

2: The likelihood of more accurate responses without the presence of an interviewer (Parker & Hughes, 1989). This was believed to be particulary important when people were questioned on issues on which strong or emotive feelings were held (Aaker & Day, 1991). This was considered to be a relevant consideration for this study, as both the FFR interview transcripts and Engelbrecht (1991) indicated that many farmers held strong views on the role of farm advisors.

3: Mail surveys allowed for a larger, more detailed questionnaire to be presented to farmers than would be the case for a survey conducted over the telephone.

5.3.2 Construction of the questionnaire.

A basic criteria for any survey is that the questionnaire should gather sufficient accurate information to satisfy the objectives of the study (Aaker & Day, 1991).

In addition, any questionnaire that is to be completed by the respondent without assistance, should also be quick and simple to complete (Parker & Hughes, 1989). It was therefore decided that the questionnaire should be able to be completed within twenty minutes. For this reasons it was decided that questions should not rely on farmers having to compute statistics or refer to annual accounts (where annual accounts were recognised as being the only historical records likely to have been available on most farms). Referring to annual accounts was not only considered to make the completion of a questionnaire more tiresome, but financial records have been shown to vary in the quantity and quality of information available (Lockhart, 1990). This restriction precluded the collection of some data comparable to that collected through the FFR study. However, this trade-off was made with the belief that the collection of less data would be preferable to the collection of a greater amount of erroneous data.

5.3.2.1 Purpose and content of the questionnaire.

The purpose of the questionnaire was to collect the information required to satisfy the research objectives of the study.

The questionnaire therefore firstly sought information on which to validate the findings of Study One. Study One described how a randomly selected sample of farmers could be classified into four distinctive advisory needs groups, each of which was associated with distinctive situational and management style characteristics.

The questionnaire therefore firstly sought to;

a: identify comparable advisory needs groups amongst surveyed farmers.

b: collect data on the characteristics of farmers in each of the advisory needs groups, to see whether they shared similar characteristics to farmers studied in Study One.

The identified advisory needs groups then formed the basis for ascertaining the specific advisory needs of farmers and the source of differences in attitudes towards advisory services. Hence, the questionnaire then sought to;

c: identify the nature of the specific advisory needs of farmers in each of the advisory needs groups.

d: document farmer's attitudes towards advisory services, to identify whether differences in farmer attitudes could be traced to a distinctive source.

5.3.2.2 Distinguishing advisory needs.

The questionnaire sought to categorise respondents into advisory needs groups comparable to those identified in Study One. Farmers in each of these groups were then asked for further details on the specific nature of their advisory needs, and of their attitudes towards advisory services. The questionnaire was also constructed to identify farmers who did not fit within the classification scheme developed in Study One.

An individuals actions are described as providing the most useful indication of an individuals beliefs regarding that object, or service (Labaw, 1980). Hence, farmers use of advisory services reflects their beliefs of whether they perceive benefits resulting from the use of advisory services. The questionnaire therefore firstly sought to establish farmer use of advisory services.

Users of advisory services (Group IV type farmers) were distinguished from non-users by asking respondents[30];

> *Do you currently have <u>on-going</u> contact with a farm consultant or farm advisory service?*[31]

Those farmers who did not use advisory services where categorised into groups with characteristics similar to Group I, II and III farmers of Study One. These farmers were identified by the three following questions;

> *Do you believe farm advisors;*
>
> *are not useful in your current farming situation?*
>
> yes no
>
> *are only useful for specific tasks (such as evaluating land purchases etc.)?* yes no
>
> *are potentially useful in your farming situation?*
>
> yes no

The respective groupings of farmers categorised by these questions are herein referred to as Group A, B, C and D farmers respectively[32]. Respondents were then directed towards specific questions for each group, designed to determine the specific nature of their perceived needs for advisory services.

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[30] This question was also able to distinguish those farmers unclassified in Study One, who had unique contact with advisory services.

[31] As farm advisors in the area were commonly referred to as farm consultants, the questionnaire referred to advisory services as consultancy services. Farm consultants have long been regarded in New Zealand as synonymous to farm advisors (Squire & Hughes, 1973; Squire, 1985).

[32] While the four Groups A, B, C, and D are based on the four groups classified in Study One, they are referred to by different titles, as they cannot be considered as directly synonymous.

Group A;

These respondents had no on-going contact with a farm advisory service, and recognised no need for such services. It was recognised that the self-administered questionnaire would be unable to probe farmers to identify possible areas of advisory need.

Group B;

These farmers perceived a need for specialist type advisory services in specific situations. It was of interest to learn what these services were, and the strength of farmer intention to make use of those services.

These farmers were asked to rank how likely they were to use ten specialist advisory services. The services were services mentioned by farmers surveyed by during the FFR programme, and supplemented by additional services offered by JRAC, an advisory firm active in the region, that collaborated with the study.

Group C;

Those farmers who indicated that advisors would be potentially useful, were asked to rank how useful they perceived 13 general advisory services to be in their current farming situation[33].

Group D:

Farmers who had on-going contact with advisory services were directed towards a list of 14 advisory services offered by farm advisory services in the region[34].

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[33] These thirteen services were based on a list of services offered by JRAC, and supplemented with additional services offered by rival advisory firms.

[34] These fourteen services were the same as those presented to the farmers who perceived potential benefits from the use of advisory services, with one addition. Discussions with advisors and the FFR research officer indicated that many users of advisory services perceived benefits from advisory services in general terms, providing feedback on all aspects of the farms operations. Thus, a question relating to this view was presented to farmers, which asked farmers to rank the potential usefulness of advisory services in "developing policies and strategies for the whole farm business". It was expected that this question would be one that non-users of advisory services would not readily identify with.

For each service farmers were asked to indicate which of the following statements best described their use of the service;

No need for this service on the farm.	Don't use advisor for this service	Intend using advisor for this service	Advisor employed for this service

The options distinguished whether farmers; recognised a need for that service, whether they saw a need for that service but not for the use of an advisor (i.e. they preferred alternative sources of advice), whether they intended, or were currently using an advisor for that service. Where farmers used an advisory service, they were asked to rank how useful they found that service[35].

While farmers may demonstrate perceived needs for advisory services, their behaviour either involved the use of advisory services, or no use at all. Thus, the overall attitude of farmers was either for, or against, the use of advisory services. The assessment of farmers overall attitudes towards advisory services was of interest in explaining whether perceived needs were complemented with the use of those services. To measure farmers attitudes towards advisory services, a Likert scaling system was used (Lewin, 1979). Farmers were asked to rank their agreement or disagreement with seven attitude statements, which were then summed to provide an assessment of respondents overall attitude towards advisory services. The seven statements relating to advisory services were based on literature reviewed (including Engelbrecht's 1991) report on East Coast advisory programme) and the FFR interview transcripts. Item analysis of farmers responses to the attitude statements then allowed the identification of those areas where differences in overall attitudes were founded.

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[35] Presenting all respondents with the same list of specialist and general advisory services was an option considered in the construction of the questionnaire. However, this option was rejected for two reasons. Firstly, it was considered that directing farmers to questions in line with their initial responses would be a more logical manner in which to present questions to surveyed farmers. For example, there could be difficulties in obtaining logical responses to questions on general services, from farmers who only recognised a need for specialist services. Secondly, it was felt that the farmers who were interested in, or who made use of generalist advisory services, would tend to make use of the specialist services as well. Thus, to avoid redundancy, these farmers were not asked to respond to the questions put to Group B farmers.

5.3.2.3 Identifying factors associated with farmer's situation and management style.

The first objective of Study Two was to see whether relationships observed in Study One between the advisory needs groups and factors recognised as influencing behaviour, could be identified in a wider sample of farmers. The second objective of the study was to see whether situational and management style factors were also associated with specific advisory needs. Thus, the questionnaire recorded factors identified in Study One as associated with the advisory needs groups.

Farmer situation;

Study One found several situational variables were closely associated with farmer use of advisory services. Farmers were questioned about their age, years spent in financial control of their farm businesses and number of dependant children.

The situational variable most strongly associated with the advisory needs groups was the stage of farmers in their respective farming cycles. Farmer stage in the farming cycle for Study One was assessed jointly by the FFR research officer and farmers participating in the FFR programme. As a consequence, in Study Two it was not possible to derive a comparable indication of farmers stage in their respective farming cycles. For this study an indicative measure was derived. Farmers were asked to consider a farming cycle (consisting of establishment, consolidation and exit phases) as being represented by a "time" line. The far left of the line represented the day they first gained financial control of a farm business and the extreme right represented the day they relinquished financial control. Farmers were then asked to indicate on a line presented, where they perceived themselves to be in their current farming situation. Measuring the position of where farmers marked the line, and dividing by the length of the line, gave an interval measure of farmers perceived position in the farming cycle.

An additional measure was included in the questionnaire to indicate the amount of changes farmers were intending to make to their farming systems. Farmers were presented with a further line, and asked to consider it as representing the stage of their farms development through time. In this instance, the extreme left of the line indicated the state of farm development when they assumed control of the property, and the far right of the line the desired state of development when they relinquished control of the property. Farmers were asked to indicate where they currently saw the current state of farm development. A farmer who marked towards the left of the line therefore indicated an intention to further develop the farm.

Farm management style;

Farmer goals were described in 3.3.1 as being major determinants of farm management style. In the FFR programme, farmer goals were assessed over successive visits, where the research officer was able to question farmers about the reasons behind their on-going management decisions. On the basis of the experiences involved in assessing farmer goals (detailed more extensively in Brazendale *et al*, 1993 and Reid *et al*, 1993), it was concluded that farmer goals were unlikely to be accurately assessed by any form of questionnaire. Given this, and the lack of consistent relationships found between farmer goals and farmer's perceived needs for advisory services in Study One, the questionnaire made no attempt to assess farmer goals.

Farm performance levels were also considered to be an aspect of management style that would be too difficult to obtain accurate and comparable information from a questionnaire, due to differences in recording procedures between farms (Lockhart, 1990). Questions which asked for details of physical and financial performance were omitted on the grounds that; relationships between productivity, profitability and farmer use of advisory services were shown in Study One to be weak, and questioning farmers on levels of personal performance may have adversely affected the response rate.

Farm resources however, could be more easily quantified. Farmers were asked to list their effective farm area, the number and classes of livestock farmed, and their principle farm policies.

Farmer behaviour has been described as an important facet of farm management style. In particular, farmer use of technology was highly associated with use of advisory services. The questionnaire presented farmers with the same list of technologies used for the FFR programme, and asked farmers to indicate which of the technologies formed a regular part of management practices. A technology adoption index was then calculated for each respondent.

Moore (1990) found relationships between the educational attainment of farmers, their use of technology and a management index. As farmer use of technology was associated with use made of advisory services, farmers were asked for the number of years of post-primary education they received to assess whether there were any relationships between farmer education and use of advisory services.

Experiences were also recognised as an important influence on farmers management styles. Hence, farmers were asked to list major changes undertaken on their property in the past three years, and whether advisory services had been involved in making these changes. This was considered an important question, as previous behaviour is regarded as an important indicator of future behaviour (Labaw, 1980).

A service developed by advisory firms in the three years prior to this study, involved the administration of contract grazing schemes, established through processing companies[36]. It was of interest to know farmer perception of the usefulness of these activities. The question on this subject asked farmers to indicate whether they believed advisory services played a useful role in establishing links with processing companies.

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[36] For example, the 18 month bull beef contract grazing scheme operated by JRAC and Riverlands Foods Ltd in 1990 (Day, 1991).

These questions were deliberately kept simple. While this reduced the detail of the survey and the statistical techniques which could be used, it was envisaged that the ease of completion would result in an increased response rate. In this instance, more data of less detail was considered more useful than less data of greater detail.

5.3.2.4 Questionnaire layout.[37]

The layout of the questionnaire was designed to maximize the ease of completion, and minimize the time involved in completion. The majority of the questions therefore required respondents to indicate which option of a series, was their preferred response. A short-coming of set-choice questions, is the potential risk of failing to provide a desired response (Aaker & Day, 1991). Thus, open-ended questions were provided at the end of set-choice sections to allow farmers to provide unsolicited responses. The fact that very few farmers made use of the upon-ended questions provides some evidence that the questions asked where comprehensive.

All questionnaires contained a stamped return envelope and a covering letter explaining the nature of the study. The questionnaire was divided into three separate sections;

Section One:

All respondents were instructed to complete Section One, printed on white paper. This section comprised of all questions relating to farmers situation and management styles. The section contained four parts which asked for; property details, personal details, the farmers use of technology and recent changes made to the farm system. Farmer response to the final question in Section One dictated which of the remaining two sections was to be completed.

Section Two:

On-going users of advisory services were directed to complete Section Two, printed on yellow paper. Section Two requested details of the services used by

[37] A full questionnaire and covering letter is included in Appendix B.

farmers, and how useful farmers found those services. Members of discussion groups were also requested to detail their attitudes towards involvement in discussion groups. All farmers were also requested to indicate their attitudes towards advisory services.

Section Three:

Those farmers who did not maintain on-going contact with a farm advisor were directed to Section Three which was printed on blue paper. This section contained the questions which identified farmers in advisory needs group A, B and C, and the questions relating to the specific advisory needs of farmers in these groups. The above mentioned attitude statements were also presented to farmers in each of these categories.

5.3.3 Survey administration and response.

The administration of the survey involved pre-testing of the questionnaire, construction of the mailing list and reminder procedures used to increase the survey response rate.

5.3.3.1 Pre-testing.

Pretesting of the questionnaire was primarily concerned with testing the readability and validity of questions. Extensive discussions were conducted with the FFR research officer to ensure that the responses would distinguish between the groups of farmers identified in Study One. Ideally, a pre-test would have been conducted with farmers who participated in the FFR programme, to provide a more accurate assessment of the validity of responses. This was rejected as an option however, as it was felt that it would be an unfair request made of farmers who had already committed a great deal of their time to research conducted through the University.

Following completion of the questionnaire, a list of five farmers was drawn up for pre-testing. The farmers all differed in their contact and use of advisory services, and their

respective stage in farming cycles. Farmers were identified with the assistance of JRAC advisory staff, or were known to the author. Questionnaires were posted to farmers and their responses discussed with the author. Slight modifications were made to question wording following pre-testing.

5.3.3.2 Survey administration, response rate and reminders.

The original list of Taihape and Hunterville hill country farmers from which the FFR sample was drawn consisted of 298 farm properties. From this list, a mailing list of 256 farmers was derived. Missing were the thirty farmers involved in the FFR programme and twelve farms for whom mailing addresses were unavailable. Questionnaires were posted to farmers on the mailing list on the 22nd of December 1992.

A reminder postcard was sent to 190 farmers who had not responded on the 18th of January 1993[38]. At that time 52 completed questionnaires had been received, and 14 had been returned un-opened.

On the 1st of February 1993, a series of telephone reminders were made to a random sample of non-respondents. At this point a total of 89 farmers had responded, leaving 153 non-respondent farmers. Telephone reminders have been used in surveys, primarily as a means of assessing the characteristics of the non-respondents, to determine the presence of any non-response bias (Cameron pers. comm., 1992). However, this was not the primary objective of the telephone reminders, as it was felt that given the negative attitudes held towards advisory services (Engelbrecht, 1991), questions regarding the advisory use survey would be too intrusive. Instead, respondents were simply informed of the intention to close off the survey, and their participation requested. The results of the telephone reminder is shown in Table 5.1.

[38] A copy of the reminder card used is presented in Appendix B.

TABLE 5.1 Farmer intentions from telephone reminder.

FROM TELEPHONE CALLS TO 64 RANDOMLY SELECTED NON-RESPONDENTS		NUMBER RESPONDING
- Farmers intending to respond	20	12
- Farmers not intending to respond	17	2
- Farmers who felt survey was not applicable	8	
- Farmers who claimed to have returned the questionnaire	5	
TOTAL FARMERS CONTACTED	50	14

Of those who did not intend to respond, ten stated that they had insufficient time to complete the questionnaire. Of the eight farmers who considered the questionnaire to be not applicable to them, four farmers had handed over some control of the farm's operation to family members, two were involved in part-time farming operations and two would not elaborate on their reasons for non-participation.

A surprise finding were those five farmers who claimed to have returned questionnaires. All response envelopes were numbered, and respondents removed from the mailing list as their completed questionnaires arrived at Massey. No clear explanation exists for the absence of these questionnaires. A possible explanation is that farmers claimed to have returned the questionnaire, in an effort to terminate the conversation with the author.

Those questionnaires which came in following a telephone reminder were identified in the data set, and studied for potential differences.

Of the 103 final responses, 16 were rejected as invalid, as they were from farms smaller than the specified 200ha. The telephone reminders identified further frame inefficiencies. Five farmers were found to have been sent two questionnaires, as a result of questionnaires being sent to identified farm businesses, as well as the individual farmers, or managers.

The response rate for the survey is summarised in Table 5.2.

TABLE 5.2 Survey response rate.

POSTED QUESTIONNAIRES		256
	Returned unopened	14
	Invalid on basis of size	16
	Recognised double-up	5
EFFECTIVE SAMPLE SIZE		221
VALID RESPONSES		87
RESPONSE RATE		39.4%

Various guides are given as to expected response rates for mail surveys. While Wright (1986) reports that response rates between 60 and 80% should be expected from mail surveys, Ambler (1977) reports response rates for agricultural surveys have been as low as 20 to 30%.

The low response rate came in spite of considerable attention being given to factors identified as being important in improving response rates (Ambler, 1977; Wright, 1986). Reasons for the low response were fairly clear, and were believed to be due to two principle factors, the nature and timing of the survey. As mentioned previously, evidence suggests that response rates can be expected to be lower for studies which have little interest to survey participants (Aaker & Day, 1991). The FFR transcripts showed that this was likely to be a factor in the advisory services study.

Evidence that this was the case in Study Two, was shown by comparison of the characteristics of late and early respondents. This technique is often used as an indicator of the characteristics of non-respondents, where the assumption is made that the characteristics of late respondents will be more closely resemble the characteristics of late respondents (Aaker & Day, 1991). A comparison was made of the characteristics of the early respondents, those who responded following the posted reminder card, and those who responded followed the telephone reminder. Of most interest were differences between respondents attitudes towards advisory services. The attitudes of

those who responded following the telephone reminder, were significantly less favourable than those who responded earlier, as shown in Table 5.3.

TABLE 5.3 Differences in attitudes towards advisory services by time of response.

CHARACTERISTICS OF RESPONDENTS	OVERALL ATTITUDE RANKING
Early respondents	3.1^{α}
Respondents reminded by mail	3.1^{β}
Respondents reminded by telephone	$2.3^{\alpha\beta}$

Where: 1 = Very unfavourable
5 = Very favourable

Characters representative of significant differences:
α: P = 0.014
β: P = 0.007

The timing of the survey was largely due to the nature of the authors study programme, which involved completion of course requirements within a single academic year. This resulted in the delaying of the development of the second study until the end of 1992, with the survey questionnaire being posted in late December. The timing of the survey was considered to be unfortunate for several reasons;

1: the arrival of the questionnaire coincided with a traditionally busy time on sheep farms in the area. Many farmers are involved in weaning and drafting lambs, shearing etc.

2: the questionnaire would have arrived with Christmas mail, and may have been treated with the same disdain given to advertising circulars.

3: Some farmers may have been on holiday over the Christmas, New Year period.

The low response rate restricted the ability for the inference of findings back to the original population. It also had implications for the use of statistical procedures used to investigate relationships between farmers advisory needs and situational and management style factors.

5.3.4 Variables and statistical analysis.

All survey responses received by the 22 of February were analyzed for Study Two. Data was entered onto a series of computer spreadsheets for ease of manipulation, and were analyzed on the computer package SPSS/PC+.

5.3.4.1 Response bias.

Given the low proportion of farmers who responded to the questionnaire, and the noted differences in the characteristics of late respondents, some form of response bias was expected. Response bias was an important consideration with regard to the statistical tests used in data analysis.

In Study One, K-W and M-W tests were used to indicate where different advisory needs groups were associated with situational and management style variables. However, prior to their utilisation in Study Two, careful consideration had to be given to the assumptions necessary for their use. Where response bias indicated that survey respondents did not represent an independent sample with respect to variables of interest, K-W and M-W tests could not be used.

Response bias was assessed by comparing the characteristics of farms in the FFR study (which was randomly selected and assumed to indicate independent observations with respect to variables of interest), to those of farmers who responded to the survey in Study Two. Where significant differences were found between the two populations a response bias was deemed to exist. The following section compares the characteristics

of both samples to provide an overview of the characteristics of the survey sample, and indicate evidence of response bias.

5.3.4.2 Characteristics of survey respondents.

Both samples were similar in terms of the distribution of farm sizes. In both samples large "outlier" farms had a significant impact on the average farm size. However, even without outlier observations, a K-W test indicated that the average size of farms was not significantly different (P = 0.323).

TABLE 5.4 Summary of average farm size: Study One & Study Two.

STUDY	AVERAGE SIZE	RANGE
Study One	609 ha	180 - 4000 ha
Study Two	633 ha	207 - 5059 ha
Study One - less one very large farm	479 ha	180 - 1300 ha
Study Two - less two very large farms	532 ha	207 - 2711 ha

Farmers were asked in the questionnaire to estimate the proportion their farms that was flat, medium and steep hill country. The range of estimates fitted within the range of estimates made by the FFR officer. As the topography data was assessed from different sources, it was recognised that it would not be appropriate to conduct a significance test. The average proportions of flat, medium and steep country for both studies is shown in Table 5.5 are therefore only useful as an indication that the farms in both studies were on a similar class of country.

TABLE 5.5 Summary of topography of surveyed farms: Study One & Study Two.

	FLAT	MEDIUM	STEEP
STUDY ONE	18%	57%	24%
STUDY TWO	20%	45%	33%

Table 5.6 shows that there was a lower proportion of owner-operators in Study Two. However, the differences in management roles between the two studies was not significantly different (P=0.1243). Of the eight percent of farmers who described alternative management roles, five farmers described themselves as working partners and two farmers described themselves as owner-supervisors.

TABLE 5.6 Summary of management roles of surveyed farmers: Study One & Study Two.

MANAGEMENT ROLES OF FARMERS	STUDY ONE n = 30	STUDY TWO n = 87
OWNER-OPERATORS	97%	79%
MANAGERS	3%	13%
OTHER	-	8%

The average age of farmers in the Study Two sample was 45 years, which was not statistically different from the average of 46 from the Study One sample (P=0.630). However, there was an observable difference in the distributions of respondents ages, as shown in Table 5.7. In previous surveys, it has been suggested that the lower response of older farmers was due to these farmers often believing surveys were more applicable to younger family members were managing family farms (Hughes pers. comm., 1992). Comments recorded from farmers during the telephone reminders provided some indication that this was also the case for the survey questionnaire.

TABLE 5.7 Summary of farmer age: Study One & Study Two.

FARMER AGE	STUDY ONE n = 30	STUDY TWO n = 87
25 - 34 years	7 %	18 %
35 - 44 years	33 %	28 %
45 - 54 years	33 %	40 %
> 54 years	27 %	14 %

Male farmers dominated survey responses. Only 1 of the 87 respondent farmers (1.1%) gave their sex as female.

These summary statistics provide no indication that the survey sample represents an atypical profile of the hill country farming population, and with 87 observations, the sample provided a useful basis from which to investigate a wide range of advisory needs.

However, of concern was the possibility of response bias with respect to variables of interest, namely, farmer advisory needs. The first objective of Study Two sought to investigate whether factors associated with advisory needs in Study One were evident across a wider population. This investigation was conducted by firstly identifying advisory needs groups similar to those presented in Study One. Table 5.8 shows that of the 87 farmer who completed questionnaires, 75 were classified into one of the four advisory use classification groupings. The responses of twelve farmers to this portion of the questionnaire was deemed invalid, as they answered questions directed towards both farmer in both Groups B and C.

TABLE 5.8 Advisory use classifications.

STUDY TWO ADVISORY NEEDS GROUPS	NO. OF FARMERS	% OF STUDY TWO FARMERS	STUDY ONE ADVISORY NEEDS GROUPS	% OF STUDY ONE FARMERS
GROUP A	17	19%	GROUP I	30%
GROUP B	21	24%	GROUP II	20%
GROUP C	15	17%	GROUP III	17%
GROUP D	22	25%	GROUP IV	20%

Respondent farmers were evenly proportioned into each of the advisory needs groups. The relative sizes of each of the groups in Study Two showed only slight differences in the proportions of groups in Study One, although a K-W test showed that the differences were not statistically significant (P=0.245).

Ten other variables were investigated by both studies. Two of these, the percent sheep farmed and technology adoption, were found to have significant differences between studies, as shown in Table 5.9.

TABLE 5.9 Sources of survey response bias.

	STUDY ONE		STUDY TWO		SIGNIFICANCE
	MEAN	S.D.	MEAN	S.D.	
PERCENT SHEEP	79.60	5.70	67.88	14.90	P = 0.000
TECHNOLOGY ADOPTION SCORE	0.38	0.20	0.47	0.18	P = 0.023

This response bias is of importance to the study, as both the proportion of sheep farmed and technology adoption were found to be associated with the different advisory needs

groups. In particular, the proportion of sheep farmed was found to be strongly associated with Group III farmers, and high technology adoption scores were characteristic of Group IV farmers.

Given the nature of the response bias, it would be expected that the sample would include a lower proportion of Group IV (D) farmers, and a lesser proportion of Group III (C) farmers. However, the K-W test indicated that the proportions of the advisory needs groups were not significantly different. This indicates that the characteristics of the advisory needs groups in the survey sample were different with regard to these characteristics.

Nevertheless, this finding places severe restriction on the analysis that can be conducted into the factors associated with the various advisory needs groups. As the response bias occurs in characteristics found to be associated with farmers advisory needs, it cannot be assumed that the sample is independent with respect to farmers perceived needs for advisory services.

The first objective of Study Two was to investigate which situational and management style factors were associated with different advisory needs. As the study sample was not independent with regard to the advisory needs groups, the statistical procedures used in Study One could not be used to diagnose factors that were associated with the advisory needs groups. Without the use of statistical tests, the ability to identify differences between the advisory needs of farmers was restricted to an investigation of summary statistics.

The results presented therefore concentrate on the identification of specific advisory service needs. The specific advisory needs of farmers in each of the advisory needs groups is presented. Cluster analysis formed an important part in the identification of groups of farmers with similar specific advisory needs.

5.3.4.3 Cluster analysis.

Cluster analysis was employed to identify groups of farmers who had responded to questions in a similar manner. Thus, clusters identified farmers within the advisory needs groups, who demonstrated similar specific advisory needs.

Cluster analysis;

Cluster analysis is a mathematical procedure used to sort elements into groups not suggested by *a priori* expectations, where the groups of elements clustered together are similar, and those in different clusters are dissimilar. Where discriminant analysis identifies the variables which determine differences between previously identified groups, cluster analysis identifies similar groups from a series of related variables. Cluster analysis can be applied to variables recorded at all levels of measurement, the only assumptions required is that there is some justification for grouping variables, (i.e. that variables which are used to identify groups are related in some manner to the output groups).

The various procedures by which clusters are formed are based on different means of assessing similarity or dissimilarity between cases. This study used one of the simplest methods, known as the single linkage, or "nearest neighbour" technique. The method forms clusters between cases with the largest similarity. Although alternative procedures have been recommended as providing superior performance in most circumstances, the single linkage method is recommended as an unbiased method for exploratory data analysis, where no expectations are held as to the number of clusters likely to be formed (SAS/STAT, 1990).

The analysis used was a version of *agglomerative hierarchial clustering*, which begins with all observations considered as separate clusters (Norusis M.J./SPSS INC, 1988). The first step groups the two most similar cases together to form a cluster. In the second step, the next two most similar observations are clustered together by either adding a further case to first cluster, or beginning another. At each step, clusters are formed by the sequential adding of cases to

clusters, or merging existing clusters. At the end point, all cases are merged into a single cluster.

The major difficulty in conducting cluster analysis is determining when a useful and meaningful number of clusters has been reached. Aaker and Day (1991) describe several approaches to determine the appropriate number of clusters. These are; the prior specification of the appropriate number of clusters, specification of levels of clustering according to the clustering criteria specified, or, based on the pattern of clustering. As no prior expectations were held as to an appropriate number of clusters, the final option was the only useful option for this study. At this point researcher discretion is involved. In this study, output from the software package (consisting of agglomeration schedules and dendenograms) is presented to justify the decision to halt the clustering procedure at specific points. For all cluster analyses performed, supporting output is included in appendices.

The potential danger of cluster analysis is that the procedure will produce groups where logically none exist. Thus, the procedure should be used with caution, and groups produced should be carefully checked for integrity.

5.4 RESULTS

The results of the Study Two survey are presented in a series of sections. Section 5.4.1 presents a discussion of the relationships between the advisory service needs of respondents and those factors identified in Study One as being associated with consumer behaviour. Section 5.4.2 presents an investigation of the specific advisory service needs of survey respondents. Farmers attitudes towards advisory services are then presented in Section 5.4.3.

5.4.1 Characteristics of advisory use groupings.

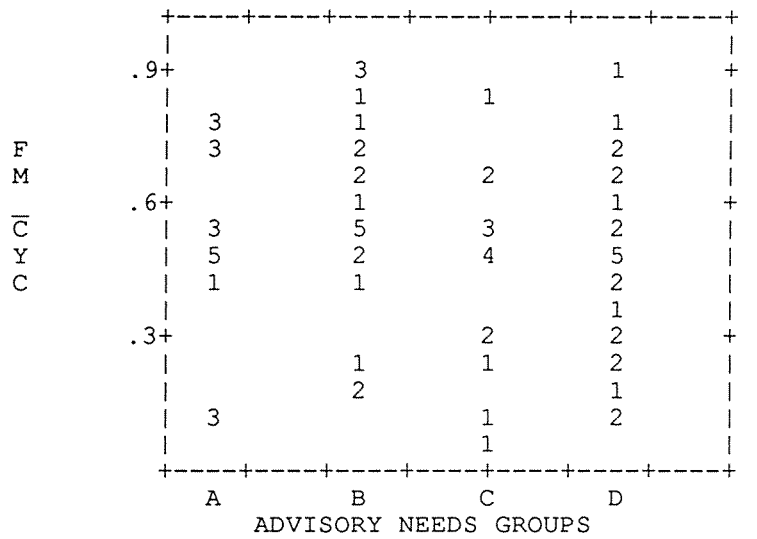
The response bias discussed in Section 5.3.3.2 precluded the use of the K-W and M-W tests used in Study One to identify characteristic features of the advisory needs groups. Summary statistics and scatter-plots are presented in this section to describe the characteristics of farmers in each of the advisory needs groups.

5.4.1.1 Situational variables.

Of the situational variables assessed in Study One, the Study Two questionnaire measured; farmers stage in the farming cycle, farmer age, the number of dependant children and years spent in financial control of farm businesses.

Study One found farmers needs for advisory services to be strongly associated with their stage in the farming cycle. However, the measure of farming cycle in Study Two showed slightly different results, as is shown in Figure 5.1.

FIGURE 5.1 Farming cycles of farmers in the different advisory needs groups.



Numbers represent the number of observations at each point.

Figure 5.1 shows a large range in the farming cycles of respondent farmers in each of the advisory needs groups. In Study One the farmers most advanced in their farming cycles were those who perceived no needs for advisory services, while those establishing farm businesses tended to be those who recognised advisory needs but had not acted upon them.

In contrast to Study One, Group A farmers occupy a range of farming cycles and Group B contains the greatest proportion of farmers tending towards retirement. While Group C does not contain a comparatively high proportion of establishment phase farmers, it does contain fewer farmers in retirement phases. As in Study One, those farmers who maintained on-going contact with a farm advisory service were predominantly in consolidation phases.

The weak trends shown in Figure 5.1 provide only limited validation of the relationships observed in Study One.

As in Study One, farmers stage in their farming cycles were closely related to farmer age, the number of years spent in control of their farming business and their number of dependent children[39].

5.4.1.2 Management style variables.

The questions related to aspects of farmers management style firstly concentrated on collecting information about farm resources and policies. This was due to anticipated difficulties in obtaining reliable and valid measures of management style variables pertaining to farm performance.

Unfortunately, few of the management style variables were associated to different advisory needs groups. There were no differences between the advisory needs groups with respect to farm sizes, stocking rates, the amount of farm labour or the proportion of sheep farmed. Descriptions of farm production policies were too varied to allow any useful comparison between farms.

However, Table 5.10 shows that users of advisory services considered themselves to be facing a greater debt constraint than farmers in Groups A, B and C.

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[39] Correlation coefficients presented in the table below demonstrate the association between farmers stages in the farming cycle (FM_CYC), age (AGE), years spent in the financial control of farm businesses (YIFC) and number of dependent children (DEPS). Scatter-plots of AGE, YIFC and DEP_S presented in Appendix B.

	FM_CYC	AGE	YIFC	DEP_S
FM_CYC		0.535**	0.656**	-0.323
AGE	0.535**		0.849**	-0.484
YIFC	0.656**	0.849**		-0.417
DEP_S	-0.323	-0.484	-0.417	

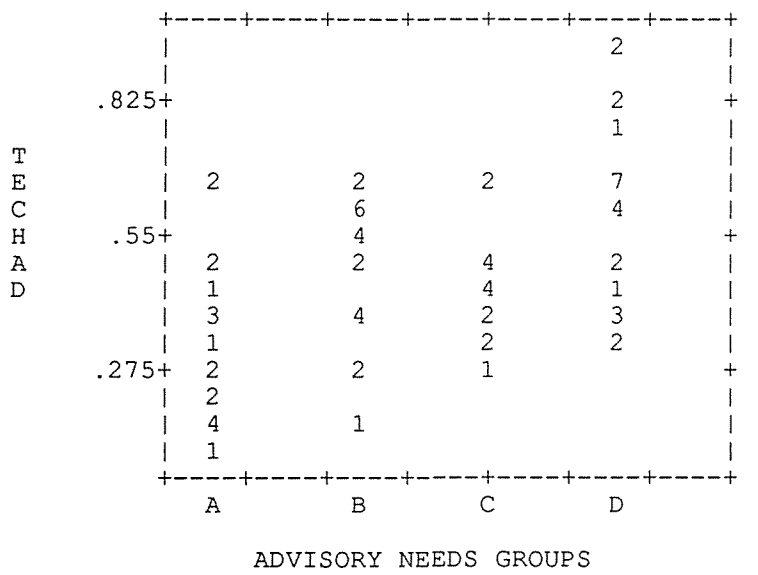
** Denotes 1-tailed significance > 0.001. Significance levels not computed for DEP_S variable due to it's non-normal distribution.

TABLE 5.10 Debt constraints faced by farmers in the different advisory needs groups.

ADVISORY NEEDS GROUPS	OBSERVATIONS FOR EACH RANK				
	Debt a severe constraint				Debt no constraint
	1	2	3	4	5
GROUP A	1	2	5	5	6
GROUP B	3	5	1	4	8
GROUP C	-	3	7	3	2
GROUP D	7	7	6	2	2

Farmers who made use of advisory services were also distinguished by their use of recommended technologies. As in Study One, farmers who maintained contact with advisory services made the greatest use of recommended technologies, while those who saw no need for advisory services made the lowest use of new technologies.

FIGURE 5.2 Technology adoption index of farmers in the different advisory needs groups.



A measure of farmers experience of farm advisory services was provided by questions which enquired whether farmers had made use of an advisor in the previous five years.

As expected, it was found that farmers who maintained on-going contact with an advisory firm had made use of advisors in assisting with on-farm changes in the previous five years.

TABLE 5.11 Previous use of advisory services by farmers in the different advisory needs groups.

	GROUP A	GROUP B	GROUP C	GROUP D
NO USE MADE OF ADVISOR	17	14	10	5
USE MADE OF ADVISOR	2	5	5	17

Of the remaining factors assessed by the questionnaire, none were associated to the advisory needs groups. These factors included; farmers previous and intended use of fertiliser, farmers level of education, level of farm development, and the number of years spent on the farm.

5.4.1.3 Summary of factors associated with the advisory needs groups.

The results of the survey questionnaire were only able to provide limited validation of the findings of Study One. Thus, the survey was unable to repeat the completion of a model capable of suggesting reasons for differences in the recognition of advisory needs.

The response bias prevented the use of statistical techniques to identify clear relationships between the advisory needs groups and situational and management style factors. However, it was clear that there were few factors which appeared likely to yield statistically significant relationships between variables. The reasons for this could be due to either; the determinants of differences in behaviour were due to factors other than those investigated by the survey instrument, or, the survey instrument was not

sufficiently sensitive in detecting the determinants of farmer behaviour. It is likely that both of these factors may have played some part in producing the above findings.

The nature of the response bias indicated that the farmers who perceived no needs for advisory services were not as well represented in the Study Two sample. These farmers tended to have distinctive management style and situational characteristics. With fewer of these "extreme" observations, differences in characteristics of respondent farmers may have been more subtle. In this respect it was considered that the survey questionnaire was not sufficiently sensitive to detect possible factors influencing differences in farmers advisory needs. The complexity of the issues involved in determining farmer needs has been demonstrated by the FFR programme (Brazendale *et al*, 1993; Reid *et al*, 1993). This indicates that attempting to determine the advisory needs of farmers through the use of a survey would always be ambitious.

5.4.2 The specific advisory needs of farmers.

It was recognised that the advisory needs groups presented in Study One represented the recognition of a need for advisory services, but little indication was given as to the exact nature of these needs. The second objective of Study Two therefore, was to identify the specific nature of farmers advisory needs. This information would provide a more detailed description of the advisory service needs seen by farmers. This would enable the providers of farm advisory services to target and develop advisory services to meet the demands of the market. The question raised by the identification of specific advisory needs groups asks whether specific needs might be determined by the situational and management style factors collected by the survey. However, as there was evidence of response bias, it was felt that it would not be possible to assume that the specific nature of needs within these groups was also independent. Given also the weak relationships discussed in the previous section, it was considered that the questionnaire would not provide meaningful insights into factors related to the specific advisory needs of farmers.

The four advisory needs groups identified by the questionnaire form the basis for the investigation into the specific nature of advisory needs. Farmers who were categorised into each of the above advisory needs groups, also identified which of a series of specific services they perceived needs for. The responses of the respective advisory needs groups are investigated in sections 5.4.2.1 to 5.4.2.3.

5.4.2.1 The specific advisory needs of Group B farmers: those who perceived needs for specialist advisory services.

Farmers who comprised Group B recognised a need for specialist advisory services. These farmers were asked to rank the likelihood that they would be use each of ten specialist services. The questions can be considered as covering three broad areas (although these should not be seen as discrete, nor exclusive).

1: *Services related to technical expertise.* In these cases the advisory service centred around advice on areas of technical expertise, such as advice on fertilisers, pasture species, or for the design or installation of water supply systems etc. Such services can be considered an area of discrete specialist expertise, often not requiring knowledge of other parts of the farming system. These were questions 4 and 5 in the questionnaire.

2: *Services related to farmer initiated changes.* Four questions asked farmers how likely they would be to use advisory services as part of changes they had initiated on their farms. These questions covered feasibility studies for land purchase, the initiation of contract grazing schemes etc. These were questions 1, 6 8, and 9 in the questionnaire.

3: *Services related to decisions likely to be faced.* Farmers were asked how likely they were to use advisory services associated with changes that most farmers could be expected to be confronted with during their farming life. These questions covered areas such as establishing family members on the farm, the

passing on of the farm, and budget preparations. These questions were listed on the questionnaire as 2, 3, 7 and 10.

Table 5.12 summarises farmers responses to each of the questions. Farmers ranked how likely they were to use each of the ten services on a five point scale (with 1 = very likely, 5 = very unlikely).

TABLE 5.12 Specific advisory services likely to be used by Group B farmers.

QUESTION		AVE RANK	OBSERVATIONS FOR EACH RANK (n=21)				
			1	2	3	4	5
TECHNICAL SERVICES							
1:	Advice on fertilisers, crops, pasture species	2.7	5	4	6	4	2
2:	The design of water supply, irrigation systems etc.	2.3	7	6	5	1	2
SERVICES RELATED TO FARMER INITIATED CHANGES							
3:	Evaluation of land purchase, lease options etc.	2.7	6	4	5	2	4
4:	Evaluation of alternative livestock policies	3.1	1	6	7	3	4
5:	Advice on share-farming or contract grazing	2.7	5	5	2	4	5
6:	Assistance in farm development/diversification	3.0	3	6	3	5	4
SERVICES RELATED TO ISSUES LIKELY TO BE FACED							
7:	Assistance in establishing family on the farm	3.6	1	3	5	1	10
8:	Assistance in refinancing	3.6	1	5	4	2	9
9:	Assistance in the passing-on, or sale of the farm	3.7	2	2	5	4	8
10:	Assistance in the preparation of budgets	3.7	-	5	3	6	7

WHERE: 1 = very likely
2 = very unlikely

Table 5.12 shows that most farmers recognised a need for advisory services of a technical nature. While farmers recognised a need for advisory services in assisting with farmer initiated change, this was not a strong result. There was a negative response to

the use of advisory services in assisting in changes likely to be faced in the cycle of the farm business (services 7 to 10 in Table 5.12).

The short-comings of basing an assessment of farmer needs for specific advisory services on the average responses to questions, is that distinctive groups of farmers who may have responded atypically to the norm are ignored. These farmers may have distinctive advisory service needs, and thus represent distinctive markets. Cluster analysis was used to group farmers who responded to questions in a similar manner.

The cluster analysis was halted with the division of three major clusters containing 5, 7 and 3 cases, and with 5 un-clustered observations[40].

TABLE 5.13 Clusters of farmers with similar needs for specialist advisory services.

SPECIFIC AREAS OF ADVISORY USE	AVERAGE RANK				AVERAGE RANK
	CLUSTER 1	CLUSTER 2	CLUSTER 3	OTHERS	
	n = 7	n = 3	n = 5	n = 5	
Services related to technical expertise	2.3	2.7	2.5	2.9	2.5
Services related to farmer initiated changes	2.1	3.1	4.1	3.1	3.0
Services on issues likely to be faced	3.0	3.7	4.6	3.9	3.7
AVERAGE RANK	2.5	3.3	4.0	3.3	3.2

RANKS: 1.0 = very likely to use advisor for this service.
5.0 = very unlikely to use advisor for this service.

[40] Of the 21 farmers who completed this section of the questionnaire, 1 case was rejected due to a missing value, with the cluster analysis performed on the remaining 20 observations.

The decision to halt the clustering procedure at stage 13 was based on a plateau of distance coefficients. This was represented by a clustering of 3 cases at the same level on the dendenogram. Agglomeration schedule and dendenogram are included in Appendix B.

All three clusters were favourable to the use of technical services, although Cluster 1 farmers were most in favour and Cluster 2 farmers were only marginally in favour. All farmers saw less needs for services assisting in change likely to be faced on the farm.

Cluster 1 contained farmers who recognised needs for a greater range of specialist advisory services, including services in assisting with farmer initiated changes, as well as technical services. Cluster 3 farmers however, recognised no need for advisory services other than those related to specific technical skills. Cluster 2 farmers fell between these two extremes, recognising needs for technical services, but less needs for other specialist advisory services.

The conclusion drawn is that farmers who recognise a need for specialist advisory services only, tend to hold needs for technical advisory services. A small, but distinctive proportion recognise benefits from the use of advisors in other services.

5.4.2.2 The specific advisory service needs of Group C farmers: those who recognised advisory needs, but had not acted on them.

Those farmers who stated that they believed farm advisory services could be potentially useful in their current farming situation were asked to rank how potentially useful they viewed thirteen advisory services to be.

The services were classified into four categories;

1: *Specialist expertise:* three questions which enquired about the potential usefulness of plant and soil testing, the provision of market information and assistance in the development of breeding programmes (questions 1, 2 and 3 in the questionnaire).

2: *On-going monitoring:* four questions related to on-going monitoring services. These services included budget preparation, accounts analysis, comparative analysis of the farm to similar properties and the overall monitoring of farm policies (questions 8, 6, 5 and 4 in the questionnaire).

3: *Specialist services related to farmer initiated changes:* four questions on specialist services related to farmer initiated changes were included. These asked farmers to rate the potential usefulness of the evaluation of alternative livestock policies, farm development, assistance in refinancing and assistance in planning exiting from farming (questions 7, 11, 12 and 13 in the questionnaire).

4: *Supervision/share-farming services:* two questions were included which were expected to cover two additional areas in which farm advisors worked but which were not expected to be applicable to all farmers. As some farmers may have been managing farms, farmers were asked the usefulness of advisory services acting in a supervisory role. Farmers were also asked to rate the potential usefulness of advisors in the establishment of share farming or contract grazing schemes (questions 9 and 10 in the questionnaire).

TABLE 5.14 Specific advisory services likely to be used by farmers. The responses of Group C farmers.

QUESTIONS		AVE RANK	OBSERVATIONS FOR EACH RANK (n=15)				
			1	2	3	4	5
SERVICES RELATED TO SPECIALIST EXPERTISE							
1:	Soil testing/fertiliser recommendations	1.7	8	5	1	1	-
2:	The provision of market information	3.1	5	-	4	5	1
3:	Advice on breeding programmes	2.9	3	1	6	4	1
SERVICES INVOLVING ON-GOING MONITORING							
4:	Monitoring of farm policies	2.6	3	3	7	1	1
5:	Comparative analysis of farm relative to others	1.9	7	5	1	1	1
6:	Analysis of annual accounts	2.7	3	3	5	3	1
7:	preparation of budgets and cashflows	2.6	5	3	2	3	2
SERVICES RELATED TO FARMER INITIATED CHANGES							
8:	Evaluation of alternative of livestock policies	2.7	4	3	5	2	1
9:	Advice on farm development/diversification	3.0	4	2	5	3	1
10:	Assistance in securing farm finance	2.7	4	3	4	2	2
11:	Assistance in planning retirement or sale of the farm	2.6	2	5	3	2	2
SUPERVISION/SHARE-FARMING SERVICES							
12:	Advice on share-farming/contract grazing schemes	2.7	5	3	1	2	4
13:	Supervision of property for absentee owner	2.8	2	5	3	4	1

WHERE: 1: very useful
5: not useful at all

All service categories were regarded as being potential useful. However, one service (assistance in the planning of development or diversification) received a neutral score, and an overall unfavourable response was recorded for the provision of market information. This can be seen as an indication that either; farmers have adequate alternative sources of market information, or, farmers don't see advisors as being useful sources of information.

The surprise result were the responses to the question on supervision. It was anticipated that only those who were involved in supervision would comment on these advisory roles.

As above, cluster analysis was performed to provide profiles of farmers views on the potential role of advisory services. The clustering procedure was halted with two major clusters formed of 6 and 3 farmers respectively, while 4 farms were left un-clustered[41].

A summary of cluster characteristics are shown below in Table 5.15.

TABLE 5.15 Clusters of farmers who recognised similar potentially useful advisory services.

SPECIFIC AREAS OF ADVISORY USE	CLUSTER 4	CLUSTER 5	OTHERS	AVERAGE RANK
	n = 6	n = 3	n = 4	
Services related to specialist expertise	1.8	2.8	3.1	2.5
Services involving on-going farm monitoring	1.6	3.1	2.9	2.5
Services related to farmer initiated changes	1.8	3.4	3.4	2.6
Additional services	1.7	3.5	3.6	2.8
AVERAGE RANK	1.7	3.2	3.2	2.5

The results of the cluster analysis provide a new perspective on the characteristics of farmers who regarded a potential role for advisory services on their farms. Only those farmers in Cluster 4 displayed an overall favourable attitude towards the use of all advisory services. Conversely, Cluster 5 farmers were against the use of all but

[41] Due to missing observations, only 13 of the 15 cases were used in the clustering procedure. The agglomeration schedule in Appendix B. shows that the clustering procedure was halted when distances between clusters jumped to a new plateau at clustering stage 7.

specialist advisory services. Of the 13 services presented, these farmers saw needs for two services only; advice on soils and fertilisers, and comparative analysis of farm accounts.

With the strongly favourable response to the potential role of advisory services by Cluster 4 farmers, it is clear that this group were responsible for the slightly favourable overall indication presented in Table 5.14.

5.4.2.3 The specific advisory services used by Group D farmers: those who maintained on-going contact with farm advisory services.

This section investigates the responses by Group D farmers, who maintained on-going contact with farm advisory services.

Group D farmers indicated which services out of a list of fourteen, whether they;

a: had no need for that particular service on the farm.

b: did not use an advisor for that service. Such a response implies that the farmer had a need for the service, but did not see sufficient benefits coming from the use of a farm advisor.

c: they intended using an advisor for that service.

d: an advisor was employed for that service. Where farmers responded in this manner, farmers were asked to rand how useful they found that service.

As described earlier (in Section 5.3.2.2), the services that were put to farmers were essentially the same as those put to Group C farmers. Table 5.16 presents a summary of the advisory services farmers used.

TABLE 5.16 The advisory services used by Group D farmers.

QUESTIONS		OBSERVATIONS FOR EACH RANK (n=22)			
		NO USE FOR SERVICE	NO NEED FOR ADVISOR	INTEND USING ADVISOR	USING ADVISOR
SERVICES RELATED TO SPECIALIST EXPERTISE					
1:	Soil testing/fertiliser recommendations	2	3	-	17
2:	The provision of market information	1	14	3	4
3:	Advice on breeding programmes	2	6	3	11
SERVICES INVOLVING ON-GOING MONITORING					
4:	Monitoring of farm policies	-	3	2	18
5:	Comparative analysis of farm relative to others	1	5	3	13
6:	Analysis of annual accounts	1	5	3	14
7:	preparation of budgets and cashflows	3	9	-	11
8:	policy development for the farm business	1	4	3	15
SERVICES RELATED TO FARMER INITIATED CHANGES					
9:	Evaluation of alternative of livestock policies	-	5	3	15
10:	Advice on farm development/diversification	1	6	7	9
11:	Assistance in securing farm finance	5	10	2	6
12:	Assistance in planning retirement or sale of the farm	2	7	8	6
SUPERVISION/SHARE-FARMING SERVICES					
13:	Advice on share-farming/contract grazing schemes	10	4	4	2
14:	Supervision of property for absentee owner	15	3	-	3

With the exception of the supervision and share-farming category, all categories had services with high advisory usage. The most distinctive aspects of the questions were

those which farmers perceived service needs, but not for the use of an advisor; in the provision of market information, and in obtaining farm finance. Budgets and cashflows were a further area where farmers did not use advisory services.

There were few services which farmers made little use of. As expected, there were few farmers who made use of advisors through involvement in farm supervision and share-farming or contract grazing schemes. Most services had a few farmers who intended using advisory services. The two services which stood out (with >30% of farmers) involved assistance in farm development or expansion, and assistance in planning for retirement or exit from farming.

Farmer ranking of the usefulness of the advisory services tended to be in the favourable end of the rating scale. To discriminate between the usefulness ratings, the scale was divided into the 'highly useful' category (comprising those farmers who rated the service with '1') and a 'less useful' category (encompassing all ratings less than '1')[42]. Farmers ranking of the advisory services they used are presented in Table 5.17.

[42] It is recognised that the usefulness of advisory services would be dependant upon the advisory service provider. However, the questionnaire did not require farmers to identify who provided their advisory services.

TABLE 5.17 Farmer rating of the usefulness of advisory services.

QUESTIONS		RANKING OF USEFULNESS OF SERVICES		
		USING ADVISOR	VERY USEFUL	LESS USEFUL
SERVICES RELATED TO SPECIALIST EXPERTISE				
1:	Soil testing/fertiliser recommendations	17	53%	47%
2:	The provision of market information	4	100%	-
3:	Advice on breeding programmes	11	54%	46%
SERVICES INVOLVING ON-GOING MONITORING				
4:	Monitoring of farm policies	18	50%	50%
5:	Comparative analysis of farm relative to others	13	46%	54%
6:	Analysis of annual accounts	14	71%	29%
7:	preparation of budgets and cashflows	11	73%	27%
8:	policy development for the farm business	15	60%	40%
SERVICES RELATED TO FARMER INITIATED CHANGES				
9:	Evaluation of alternative of livestock policies	15	47%	53%
10:	Advice on farm development/diversification	9	67%	33%
11:	Assistance in securing farm finance	6	67%	33%
12:	Assistance in planning retirement or sale of the farm	6	33%	67%
SUPERVISION/SHARE-FARMING SERVICES				
13:	Advice on share-farming/contract grazing schemes	2	100%	-
14:	Supervision of property for absentee owner	3	67%	33%

There was no obvious pattern to the services farmers found more useful than others. The only service found to be less useful overall, was the comparison of the farm relative to other similar properties, and assistance in planning for retirement or exit from farming.

As with the other advisory use groups, cluster analysis was used to determine whether farmers displayed characteristic patterns of advisory service use.

The scale used to show advisory service usage was a nominal scale. However, for this section the 1 to 4 ranking is viewed as an interval scale, measuring the likelihood of advisory service use[43].

TABLE 5.18 Clusters of farmers who made similar use of advisory services.

SPECIFIC AREAS OF ADVISORY USE	CLUSTER 6	CLUSTER 7	CLUSTER 8	OTHERS	AVE. RATING
	n = 7	n = 3	n = 5	n = 4	
Services related to specialist expertise	3.2	2.3	3.3	2.7	3.0
Services involving on-going farm monitoring	3.8	2.6	1.7	3.6	3.2
Services related to farmer initiated changes	3.6	2.6	1.8	2.4	2.6
Supervision/share -farming services	1.8	1.5	1.3	1.7	1.7
AVERAGE RATING	3.2	2.3	2.0	2.7	2.8

RANKINGS
1 = no need for service
2 = no need for an advisor
3 = intend using an advisor
4 = currently using an advisor

The three clusters represent a continuum. Farmers included in the largest cluster, Cluster 6, used the widest range of advisory services. Cluster 8 farmers were the lowest

[43] Due to missing observations, only 19 of the 22 cases were used in the clustering procedure. The agglomeration schedule in Appendix B. shows that the clustering procedure was halted when distances between clusters jumped to a new plateau at clustering stage 14.

users of advisory services, although they were high users of technical type services. Cluster 7 comprised a group of farmers in between these two extremes.

5.4.3 Farmer attitudes towards advisory services.

The advisory needs groups and their respective clusters, provide strategic insights as to the advisory service needs of farmers. Yet, while 72% of the respondent farmers recognised some form of need for advisory services, only 38% of farmers maintained on-going contact with advisory services. Farmer use, or non-use of advisory services is likely to be reflected in different farmer attitudes towards advisory services. Figure 5.3 shows that the attitudes towards advisory services of advisory service users, was more favourable than those of non-users.

FIGURE 5.3 Attitudes towards advisory services of farmers in the different advisory needs groups.

```
          +----+----+----+----+----+----+----+
          |                                  |
          |                           3      |
       4.5+  1                        2      +
          |           1       1       4      |
T         |                           4      |
O         |           3       5       5      |
T         |           3       4       3      |
_        3+  2        5       1              +
A         |  2        4       2       1      |
T         |           1                      |
T         |  1                1              |
          |  2        1                      |
       1.5+  3        1       1              +
          |  2        1                      |
          |  4        1                      |
          |                                  |
          +----+----+----+----+----+----+----+
             A        B       C       D
                 ADVISORY NEEDS GROUPS
```

WHERE: 1 = very unfavourable
5 = very favourable

Figure 5.3 shows that farmer attitudes towards advisory services is a potent discriminator between users and non-users of advisory services[44].

The various attitude components which comprised the attitude scale were studied to see if insights could be gained into the reasons for differences in advisory services usage made by the respective advisory service use groups, and the identified clusters[45]. The selective investigation of attitude statements is termed item analysis (Aaker & Day, 1991).

It was hoped that extreme attitudes towards particular statements would indicate sources of farmer's overall attitudes. For example, it would be of interest to learn if negative attitudes towards advisory service use by Group A farmers, was due to attitudes towards, say, the expense involved in hiring an advisor. However, item analysis revealed a consistent pattern of responses to the statements, which reflected the average ratings for all statements presented in Figure 5.3. This pattern involved;

1: Group A farmers displaying consistently neagtive attitudes, conclusively agreeing with *all* reasons for not using advisory services.

2: Group D farmers displaying consistently positive attitudes, strongly disagreeing with *all* reasons for not using advisory services.

3: There were no differences between the responses of Group B and C farmers, whose attitudes towards the use of advisory services fell between these two extremes.

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[44] The single Group A farmer who expressed favourable attitudes towards advisory services represents a special case. The reason for what appears to be a discrepancy between his attitudes and beliefs regarding his advisory needs, is due to the fact that the farmer was a former farm advisor. Thus, while having favourable attitudes towards use of an advisor, the farmer saw no needs for outside advisory services.

[45] Attitude statements are included in the sample questionnaire presented in Appendix B.

Group A farmers were the most distinctive of all advisory use groups. Not only were farmers consistent in their agreement with all reasons given for not using advisory services, but these attitudes were shown by ratings across each of the attitude statements.

Group B farmers were more favourable towards the use of farm advisors, however mean ranks for all attitude statements were around the middle of the range, indicating that farmers were on-average, indifferent towards the statements. There were no significant differences between the responses of Group B and C farmers to the attitude statements. The responses of Group C farmers to the attitude statements were in the middle of the range for most statements.

Group D farmers disagreed with all reasons for the non-use of advisory services. For most statements, differences were statistically significant between advisory use groups. Group C farmers had similar responses to Group D farmers on statements 1 and 3. Both groups felt farm advisory services had good track records, and did not view a lack of intended changes as a plausible reason for not using advisory services.

The distinctive clusters found within each of the advisory needs groups were studied to see if they contained any differences in their attitudes towards the use of advisory services. However, the attitudes of farmers in each of the clusters reflected the attitudes of their parent advisory needs groups.

5.5 CONCLUSIONS FROM STUDY TWO

This section presents a summary of the objectives and methodology involved in Study Two. Conclusions drawn from the results of the study are presented. A discussion of the implications of these findings are also presented.

5.5.1 Objectives of Study Two.

Study Two was conducted to investigate a series of issues raised in Study One. Study One provided detailed information on factors likely to influence consumer behaviour, but provided less information on the exact nature of farmer needs.

The primary purpose of Study Two was to further investigate the specific nature of consumer demand, and factors which give rise to consumer needs. Three specific objectives were identified for this study; validation of the relationships observed in Study One, determination of the specific advisory service needs of farmers and a study of the effect of farmer's attitudes in influencing the use or otherwise of farm advisory services.

5.5.2 Study Two methodology.

The study method employed used a mail survey of Taihape and Hunterville hill country farmers to extract information on farmer needs for advisory services, and situational and management style variables which may influence different advisory needs.

Construction of the survey questionnaire was based on the findings of Study One. Respondent farmers were classified according to the same classification scheme developed in Study One. The broad advisory needs classifications then formed the basis of questions which extracted farmers perceptions as to which advisory services they believed would be likely to benefit from.

5.5.3 Findings of Study Two.

The first specific objective of Study Two set out to establish whether the findings of Study One reflected characteristic features of hill country farms. Only a few relationships found in Study One were also found in Study Two. It was recognised that these relationships did not provide sufficient basis on which to describe possible reasons

for differences in farmer needs or behaviour. It was concluded that the self administered survey was not sufficiently sensitive in extracting the necessary information on which to make assumptions regarding the factors which influenced farmer's advisory needs.

The second objective of Study Two was to provide a description of farmers perceptions of their their specific advisory service needs. The third of objective of the study involved assessing farmer attitudes towards advisory services, to see where different attitudes were associated with different advisory needs.

GROUP A;

comprised farmers who saw no need for advisory services. Their beliefs were reflected by negative responses to attitude statements on advisory service use. These farmers were negative towards every aspect of advisory service use presented in the attitude statements.

GROUP B;

was comprised of farmers who acknowledged that advisory services were useful in specific situations. These were predominantly in services orientated around the provision of technical expertise. Cluster analysis identified three distinctive clusters of farmers within this group. Cluster 3 consisted of farmers who saw benefits only from the use of technical advisory services. Cluster 1 farmers however, recognised a need for advisory services in assisting with farmer initiated changes, but perceived less benefits from the use of advisory services in changes likely to be experienced during a farming cycle. The characteristic advisory needs of Cluster 2 farmers fell between these two extremes. The attitudes of Group B farmers towards the use of advisory services can be described as intermediate, lying between those of the non-users and the farmers who maintained on-going contact with advisory services.

GROUP C;

was comprised of farmers who described farm advisory services as potentially useful. Each of the service categories put to Group C farmers were rated as

potentially useful. However, this result was largely due to one cluster of farmers (cluster 4), who responded positively to all services. The second cluster within this group (cluster 5), believed only the technically orientated services would be of potential benefit.

GROUP D;

was comprised of farmers who maintained on-going contact with farm advisory services. These farmers indicated that the range of advisory service used covered all areas on which questions were asked, although few farmers made use of advisory services through property supervision, contract grazing or share-farming agreements. Advisory services used by farmers were generally regarded as useful. The distinctive clusters included within Group D, represented a continuum from high to low advisory service use. Cluster 6 consisted of those farmers who made use of the widest range of advisory services. These farmers also had the most regular contact with farm advisory services. Cluster 8 farmers made the least use of the various farm advisory services, with their advisory service use concentrated on technical advisory services. The different advisory use clusters were evident in spite of farmers displaying similar favourable responses to the attitude statements.

5.5.4 Limitations of the study method.

As introduced above, one of the objectives of Study Two was to investigate whether relationships existed between specific advisory service needs of farmers, and the situational and management style variables associated with advisory service use in Study One. Study Two findings were not effective in explaining differences between advisory use groups. The possible reasons for this were;

1: that farmers who responded to the questionnaire displaying different characteristics to those tested on the basis of Study One findings.

2: the failure of the survey questionnaire to detect differences in the situational and management style factors which were outlined in Section 3.4 as influencing farmer needs.

The second of the two arguments appears to be most likely to explain the failure of the variables collected by the questionnaire to distinguish differences in advisory service needs. The intensive and on-going nature of the FFR study programme amongst a random sample of farmers lends considerable weight to the accuracy and validity of the findings of that study. The FFR study program also concluded that any factors influencing consumer behaviour were likely to be extremely complex. Thus, the possibility of identifying those factors which resulted in differences in consumer needs and behaviour through a self administered questionnaire were always likely to be small. This is despite of the fact that the Study One findings allowed the questionnaire to concentrate on issues and factors already identified as likely to be relevant.

CHAPTER SIX

Conclusions

6.1 OBJECTIVES OF RESEARCH

Little research has been conducted into the advisory services available to sheep and beef farmers since Government withdrew from the provision of public funded advisory services. This withdrawal meant that the only advisory services available to farmers were those demanded by farmer consumers. In recognition of this fact, this research study has investigated farmer needs for advisory services. The objective of this study was to develop an understanding of, and document, farmers needs for advisory services. It was recognised that a study set within a marketing framework would be more likely to provide results useful to the providers of advisory services, than a study which concentrated studying aspects of advisory service products.

6.2 THE ROLE OF FARMERS AS CONSUMERS OF ADVISORY SERVICES.

Literature reviewed reinforced the importance of the current role of the farmer in dictating the nature of the farm advisory services market.

In New Zealand traditional advisory services were publicly funded. Hence, the needs of Governments could be seen to influence not only the services provided, but also the mass extension techniques used. Advisory services from the 1960's to the early 1980's were dominated by an emphasis on increased pastoral production, and the adoption of technological innovations.

The changes which occurred in the advisory services market (which can be traced to the development of the FIC movement in the 1950's) showed the dominant swing to advisory services with a orientation towards the needs of consumers. Schmenner's SPM describes how such moves towards professional services indicates that the constraint facing organisations providing advisory services, was in their ability to provide services capable of satisfying consumer's needs.

Literature on consumer behaviour was reviewed to provide a framework for studying farmer needs for advisory services. Farmer needs were described as arising from efforts to attain, maintain or enhance desired management styles within a given situation. While it was recognised that farmer use of advisory services represented the best means of ascertaining farmers needs, the translation of needs into demands for advisory services was described as being as a result of a complex process.

This process begins with the *recognition of a need.* Farmers are recognised as attempting to move towards a desired management style. Within a given situation, farmers perceive their actual state, and their desired state. The discrepancy between the two determines the recognition of a need.

The *recognising a need for advisory services* arises from a belief that a farm advisory service can provide benefits in eliminating or reducing the discrepancy between actual and desired states.

An *action decision* occurs when the perceived discrepancy between a consumers actual and desired state is of sufficient magnitude or importance to warrant action. An action decision represents the formation of a demand from a recognised need. The nature of the action decision is also reliant upon consistent and favourable attitudes towards means of eliminating or reducing a perceived discrepancy.

The literature reviewed provided a framework for studying farmer needs, and identified material from previous research likely to influence farmer needs.

6.3 RESEARCH STUDIES UNDERTAKEN.

Two research studies were undertaken to investigate farmer needs for advisory services. The first study was exploratory and involved analyzing data previously collected from an intensive study of thirty randomly selected hill country farms.

6.3.1 Study One.

Study One found that 90% of farmers studied could be classified into one of four distinctive advisory needs groups;

Group I:

consisted of 33% of the sample farmers, who perceived no needs for advisory services.

Group II:

consisted of 20% of sample farmers, who perceived needs for specialist services, such as feasibility studies for farm purchase, or technical services such as advice on pasture species or fertilisers.

Group III:

consisted of 17% of sample farmers, who recognised a need for advisory services but were not employing an advisor at the time of the study.

Group IV:

consisted of 20% of sample farmers, who maintained on-going contact with farm advisors. The advisory services involved general on-going advice, although levels of contact ranging from quarterly to annual visits.

Group I farmers tended to be older and in retirement phases of their respective farming cycles. It was concluded that extensive farming experience and little desire to make changes to farming systems was the likely reason for these farmers perceiving no needs for advisory services.

Group II farmers were most clearly distinguished by their high productivity and profitability. This provided an explanation for these farmers only perceiving needs for specialist services in specific situations.

It was suggested that Group III farmer's recognition of needs for advisory services would be due to their limited experience farming experience, (shown by their early stage in their farming cycles) and their poorer farm performance. Low profitability, and hence competition for available funds, was a likely reason for their failure to initiate contact with a farm advisory service.

Group IV farmers were only distinguished by their greater use of recommended technologies. It was proposed that these farmers advisory use could be associated with their different information seeking behaviour.

Study One provided a description of different types of advisory service needs, and situational and management style factors associated with those needs. However, no information was available on the what farmers perceived their advisory service needs to be, and hence, the types of advisory services needed.

6.3.2 Study Two.

Study Two was undertaken to establish what services farmers perceived needs for. It also provided an opportunity to validate the relationships found in Study One between farmer's advisory needs and their situation and management style factors.

This less detailed, but more extensive study, provided only limited validation of the relationships found in Study One. It is concluded that the self-response questionnaire was an inappropriate medium for collecting detailed information capable of identifying factors responsible for differences in the needs of respondent farmers.

The most important findings of Study Two was the description provided on the specific nature of farmer's perceived needs for advisory services.

Farmers in Group B perceived needs for specialist advisory services only. These farmers indicated that they were most likely to use technical services (such as fertilizer recommendations), but saw less need for assistance in making decisions they were likely to face during the course of the farm business cycle (such as refinancing, passing on of the farm etc). A distinctive proportion of these farmers were also receptive to specialist services related to farmer initiated changes (such as the evaluation of land purchase, farm developments etc.).

Group C comprised those farmers who recognised potential benefits from the use of advisory services, but did not have on-going contact with an advisory service. A proportion of these farmers were interested solely in specialist services (such as soil testing, fertiliser recommendations etc.), but 27% perceived benefits from a wide range of advisory services.

Group D comprised of farmers who maintained on-going contact with advisory services. These farmers used a wide range of services offered by advisory firms. Those services which received only limited use were those which involved supervision, share-farming, refinancing and the provision of market information. A significant proportion of farmers intended using their advisor to assist in planning farm developments and the succession of farming businesses. Farmers were generally satisfied with all the services they made use of.

A study was made of the attitudes of farmers in each of the advisory needs groups. As expected, it was found that farmers who made use of advisory services held positive

attitudes towards advisory services, while negative attitudes were held by those farmers who perceived no need for such services. The fact that the attitudes held by farmers who saw no need for the use of an advisor were consistently negative for all attitude statements, indicates that substantial attitude change would be necessary before these farmers would make use of an advisory service.

6.4 IMPLICATIONS FOR PROVIDERS OF FARM ADVISORY SERVICES.

Market theory prescribes that an understanding of farmer needs for product services should be the primary focus for the targeting of farm advisory service products. Hence, the findings of this research should provide marketing insights for the providers of farm advisory services.

The findings with the most obvious potential for the providers of advisory services are those which outline the size of the advisory services market, and detail the needs which farmers perceive. Study One showed that the potential market comprised the 57% of farmers perceived some need for advisory services. However, only 20% of farmers maintained on-going contact with advisory services.

Study Two found that of the farmers who perceived needs for specialist advisory services, their needs were predominantly for technical services, with few farmers recognising needs for advice in areas in which they were likely to be involved in making decisions. To provide advisory services for these farmers, advisory firms should be conscious of maintaining their level of technical expertise, and the profile of their technical proficiency within the farming community. For firms of sufficient scale, an option may be to establish a specialist technical branch which concentrates on providing services such as soil testing, recommendations on pasture species, fertilizers etc. The provision of specific technical services represents a movement along Schmenner's SPM "diagonal". Schmenner describes such specialisation as a strategic move as a means of increasing output per unit of labour input. This is an important consideration for

professional services, where labour resources typically represent a major capital investment.

Study Two found that Group C farmers (who recognised that advisory services could be beneficial in their current farming situation) comprised of two groups; those interested in a range of advisory services, and those interested in specialist services. Farmers described above who recognised specialist advisory needs, were generally interested in technical services. Thus, as above, advisory firms should pay attention to establishing a high level of technical expertise. The remainder of farmers were receptive to a wide range of services, which should be able to be provided by advisory service firms.

Study Two also identified that a wide range of services were used by farmers who maintained on-going contact with advisory firms. Of interest to the providers of advisory services were those services farmers were intending to make use of. Of the clients of advisory services, 32% intended consulting their advisor regarding farm development or diversification, while 36% of farmers intended using advisors for planning the succession of their farms. The providers of advisory services should note that those farmers who were already using advisors for assisting in farm succession at the time of the study, rated these services as "less useful". This is in contrast to farmer rating of satisfaction with the remainder of advisory services received, with which farmers were generally satisfied with advisory services.

The discussion above provides an outline of where attention should be paid to provide service products to match the needs of potential advisory service clients. Kotler and Armstrong (1989) describe this as one of four areas to which attention should be paid to attract custom. In addition to producing products capable of satisfying demand, attention should also be paid to *promotion, placement* and *pricing* of services. These factors are important considerations if it is wished to attract the custom of those farmers who perceived needs for advisory services, but were not using advisory services at the time of the study. These farmers comprised 37% of farmers involved in Study One, and 41% of farmers involved in Study Two.

While these findings indicate areas which advisory firms should be targeting to improve patronage and satisfaction with the services they provide, it is the view of the author that the most important findings for farm advisors were those pertaining to farmer goals. Analysis of the FFR data showed that while distinctive management style and situational variables were associated with the different advisory needs groups (in particular, different stages in farming cycles and levels of farm performance), these factors were not related to farmer's goals. Nor were farmers goals associated with the different advisory needs groups. Farmers in similar situations, with similar levels of farm performance were trying to achieve different ends, and hence their requirements for advisory services were likely to be different. The providers of advisory services must therefore be aware that what may be compelling features of a farms characteristics (such as low performance, difficulties associated with farm establishment), may not be related to the goals and objectives of the farmer.

In view of these findings it is interesting to note that in recent years advisory services have promoted services aimed at helping farmers improve their profitability (MAF, 1987; Read pers. comm., 1992). Yet, Study One showed that only 23% of farmers had profit orientated goals. While farm profitability is an important consideration to farm businesses, where this is promoted in conflict to other goals held by farmers, the advisory service is not likely to result in a satisfied customer, or may result in a customer being lost. Intensive, individually orientated advisory services are recognised as the only likely means by which an advisor can ascertain the unique goals and objective of farmer clients.

The question raised by this discussion asks, what type of approach should be adopted by advisory firms to enable them to deliver services capable of satisfying farmer needs? The findings of this research has shown that the needs of many farmers often involves specialist technical services. It was suggested that these may be offered by specialist personnel, who would offer a less individualised "package" type service. However, such services (similar to those offered during the 1970's and 1980's e.g.CGS), are limited in their flexibility and will only assist farmers when the "package" is compatible with farmers goals. If, however, it is wished to provide services which aim to actively assist

farmers in the management of their farms (such as planning livestock policies etc.), these should be consistent with the objectives of the farmer, and hence, will benefit from an individual, personalised approach.

It is proposed that successful relationships between advisors and farmers will develop were advisors can readily identify with the goals of farmers and provide suitable services. Hence, it is considered likely that advisory practices will have characteristic management styles compatible with those of farmer clients.

This proposal is suggested as an interesting area for further study, and one which could have implications for professional services in a range of disciplines. Such a study could investigate, for example, whether advisors and farmers shared similar goals or perceptions of farmer's situation. It is in this context that the work of Paine (1991) provides a useful contribution, in seeking to study factors associated with successful farmer and advisor relationships. Knowledge of factors which contribute to successful advisory services are of obvious benefit to both advisors and farmers.

It is recognised that the results of the studies presented, represent farmer's advisory needs at a given "point-in-time". Farmer's needs are influenced by situational factors, and hence are constantly changing. It is therefore important for advisory services to recognise the influence of changing economic and social factors on farmer needs. Successful advisory practices will be those which keep abreast of these changes and move to offer services that match farmers changing needs. Again, it is recognised that individually orientated advisory services provide the best means of keeping in touch with changing farmer needs.

6.5 IMPLICATIONS FOR FUTURE RESEARCH.

The research reported in this thesis had the objective of developing an understanding of, and documenting, farmers needs for advisory services. While the research was able to provide a description of the different advisory needs of farmers (hitherto unreported),

an understanding of the reasons for differences in farmers needs was not greatly advanced.

The approach taken by the research was fairly broad. Literature on consumer behaviour literature provided an outline of how a range of factors were recognised as influencing needs through influencing desired management styles. Findings from qualitative research identified which pieces of the model appeared likely to be important and unimportant in influencing farmer needs for an advisory service.

Despite this detailed study being able to identify areas on which to concentrate further study, a wider, less detailed study programme was not able to identify reasons for differences in farmer needs. This was taken as an indication of the complexity of factors which determine farmer needs.

These findings have major implications for other research into farmer behaviour. Given that a large number of factors are recognised as influencing farmer's needs and behaviour, research should not be conducted on isolated aspects of needs or behaviour, without consideration of other factors. Conclusions drawn from observations of isolated factors will be of limited use, as they will not identify the influence of other factors. Future research programmes will benefit from the use of intensive research studies which ensure a global perspective is taken of factors likely to influence needs. This is important given that it is impossible to isolate the effects of one factor of interest in "real world" observations.

The research undertaken had the advantage of an intensive study of farmers and a broad investigative approach to refine issues likely to be important in studying farmer use of advisory services. Even with these advantages, issues were too complex to allow decisive findings in all of the areas studied. However, it is pointed out that results from studies which do not take such an approach are likely to be of less use.

It is interesting to contrast the approach used in this research and that used in previous research in the field of agricultural extension. Studies conducted by Kampenallas (1981)

and Greer (1982) investigated isolated aspects of farmers technology adoption behaviour (farmer attitudes and motivation respectively). These studies investigated areas recognised as important, identified primarily from published literature. They were also conducted without consideration of the ability of the technologies to satisfy farmer needs.

Even with the background qualitative research data used in this study, research methods used in Study Two were unable to identify possible reasons for different advisory needs. It is concluded that the self-administered questionnaire was a tool insufficiently sensitive to elucidate reasons for different advisory service needs. It was felt that this provides further reason for concentrating on the use of intensive qualitative research methodologies. An example of the benefits gained from the use of such an approach is given by comparison of two research studies which used different approaches. Greer (1981) reported that following the 2 hour interviews he conducted as part of his research, that he believed that he had a good feeling for the reasons why farmers behaved in the manner they did (pp81). This contrasts with the findings of the FFR research officers who, like Greer, had several years experience as farm advisors. The experiences of the FFR staff were that robust information on farmer goals was only derived after on-going contact with farmers, through which farmers could be questioned as to the reasons behind decisions made on the farm (Brazendale & Reid pers. comm., 1992).

Farmers currently face a free market situation, in which their livelihoods, and those of their families are constantly at risk form fluctuations in world trade and economic events. What assistance farmers need by way of services and products, to sustain their businesses in a form that will meet their goals, should remain an area of interest to researchers. Further attempts to better understand how farmers's needs are generated through efforts to attain, maintain or enhance desired management styles, should form the context of any future research in this field.

Appendix A

APPENDIX A CONTENTS

A.1 DIFFERENCES BETWEEN ADVISORY NEEDS GROUPS

TABLE A.1.1 Significance levels for differences in technology adoption by advisory needs groups.

ADVISORY SERVICES GROUP	n	MEAN RANK	STD DEV	SIGNIFICANCE LEVELS			
				GRP I	GRP II	GRP III	GRP IV
GRP I	10	0.30	0.17		0.43	0.95	0.00
GRP II	6	0.38	0.09	0.43		0.66	0.01
GRP III	5	0.31	0.23	0.95	0.66		0.08
GRP IV	6	0.61	0.17	0.00	0.01	0.08	

TABLE A.1.2 Significance levels for differences in farming cycles by advisory needs groups.

ADVISORY SERVICES8 GROUP	n	MEAN RANK	STD DEV	SIGNIFICANCE LEVELS			
				GRP I	GRP II	GRP III	GRP IV
GRP I	10	2.7	0.7		0.07	0.04	0.22
GRP II	6	2.2	0.4	0.07		0.08	0.70
GRP III	5	1.4	0.9	0.04	0.08		0.08
GRP IV	6	2.3	0.5	0.22	0.70	0.08	

TABLE A.1.3 Significance levels for differences in farmer age by advisory needs groups.

ADVISORY SERVICES GROUP	n	MEAN AGE	STD DEV	SIGNIFICANCE LEVELS			
				GRP I	GRP II	GRP III	GRP IV
GRP I	10	53	10		0.04	0.01	0.18
GRP II	6	43	7	0.04		0.03	0.48
GRP III	5	35	2	0.01	0.03		0.02
GRP IV	6	46	10	0.18	0.48	0.02	

TABLE A.1.4 Significance levels for differences in years spent in financial control of farm businesses by advisory needs groups.

ADVISORY SERVICES GROUP	n	MEAN YIFC	STD DEV	SIGNIFICANCE LEVELS			
				GRP I	GRP II	GRP III	GRP IV
GRP I	10	24	10		0.31	0.00	0.31
GRP II	6	18	7	0.31		0.00	0.94
GRP III	5	5	4	0.00	0.00		0.00
GRP IV	6	19	8	0.31	0.94	0.00	

TABLE A.1.5 Significance levels for differences in proportion of sheep stock units farmed by advisory needs groups.

ADVISORY SERVICES GROUP	n	MEAN %SHP	STD DEV	SIGNIFICANCE LEVELS			
				GRP I	GRP II	GRP III	GRP IV
GRP I	10	80%	5%		0.30	0.02	0.05
GRP II	6	77%	5%	0.30		0.02	0.93
GRP III	5	86%	4%	0.02	0.02		0.00
GRP IV	6	76%	5%	0.05	0.93	0.00	

TABLE A.1.6 Significance levels for differences in wool production (kg greasy per ssu) by advisory needs groups.

ADVISORY SERVICES GROUP	n	MEAN WOOL WT/su	STD DEV	SIGNIFICANCE LEVELS			
				GRP I	GRP II	GRP III	GRP IV
GRP I	10	6.0	1.1		0.04	0.61	0.70
GRP II	6	7.7	1.0	0.04		0.01	0.05
GRP III	5	5.6	1.1	0.61	0.01		0.79
GRP IV	6	5.8	1.0	0.70	0.05	0.79	

TABLE A.1.7 Significance levels for differences in lambing percentage by advisory needs groups.

ADVISORY SERVICES GROUP	n	MEAN LMBG %age	STD DEV	SIGNIFICANCE LEVELS			
				GRP I	GRP II	GRP III	GRP IV
GRP I	10	102%	18%		0.44	0.08	0.95
GRP II	6	105%	15%	0.44		0.05	0.33
GRP III	5	87%	17%	0.08	0.05		0.17
GRP IV	6	102%	5%	0.95	0.33	0.17	

TABLE A.1.8 Significance levels for differences in economic farm surplus per stock unit by advisory needs groups.

ADVISORY SERVICES GROUP	n	MEAN EFS S/SU	STD DEV	SIGNIFICANCE LEVELS			
				GRP I	GRP II	GRP III	GRP IV
GRP I	10	4.99	4.90		0.01	0.70	0.11
GRP II	6	14.10	2.54	0.01		0.01	0.25
GRP III	5	2.33	9.49	0.70	0.01		0.18
GRP IV	6	10.58	5.25	0.11	0.25	0.18	

A.2 CORRELATIONS AND SCATTER-PLOTS

TABLE A.2.1 Correlations between farmer age (AGE), years spent in financial control of a farm business (YIFC), number oif dependants (DEP_S) and stage in the farming cycle (FM_CYC).

Correlations:	AGE	YIFC	DEP_S	FM_CYC
AGE	1.0000	.8937**	-.5826	.6136**
YIFC	.8937**	1.0000	-.5508	.6490**
DEP_S	-.5826	-.5508	1.0000	-.6853
FM_CYC	.6136**	.6490**	-.6853	1.0000

N of cases: 30 1-tailed Signif: * - .01 ** - .001

FIGURE A.2.1 PLOT OF AGE WITH FM_CYC

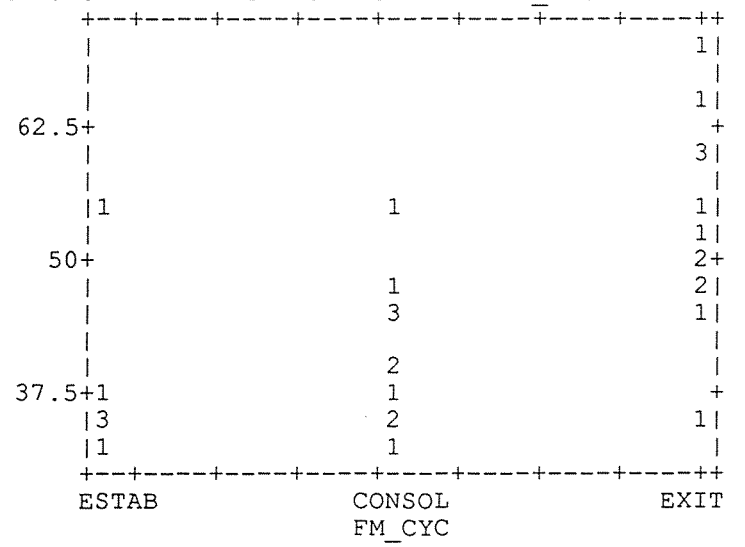


FIGURE A.2.2 PLOT OF YIFC WITH FM_CYC

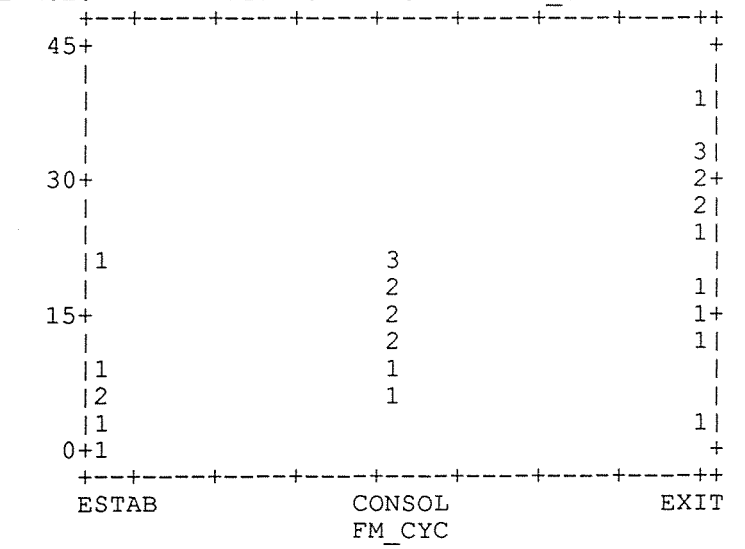


FIGURE A.2.3 PLOT OF DEP_S WITH FM_CYC

```
          +--+----+----+----+----+----+----+----++
       4.5+                                      +
          |                                      |
          |2                2                    |
          |                                      |
          |                                      |
 D       3+2                6                    +
 E        |                                      |
 P        |                                      |
 _        |1                2                    |
 S        |                                      |
       1.5+                                      +
          |                                      |
          |                                     4|
          |                                      |
          |                                      |
         0+1                1                   9+
          +--+----+----+----+----+----+----+----++
         ESTAB            CONSOL            EXIT
                          FM_CYC
```

FIGURE A.2.4 PLOT OF AGE WITH YIFC

```
          ++----+----+----+----+----+----+----+--+
          |                                 1    |
          |                                      |
          |                           1          |
      62.5+                                      +
          |                       1  11          |
          |                                      |
 A        |                 11        1          |
 G        |                         1            |
 E      50+          1            1              +
          |              1   1 1                 |
          |           12    1                    |
          |                                      |
          |         1      1                     |
      37.5+      1        1                      +
          | 12 1   1   1                         |
          |     1  1                             |
          ++----+----+----+----+----+----+----+--+
                6       18        30        42
                           YIFC
```

FIGURE A.2.5 PLOT OF DEP_S WITH YIFC

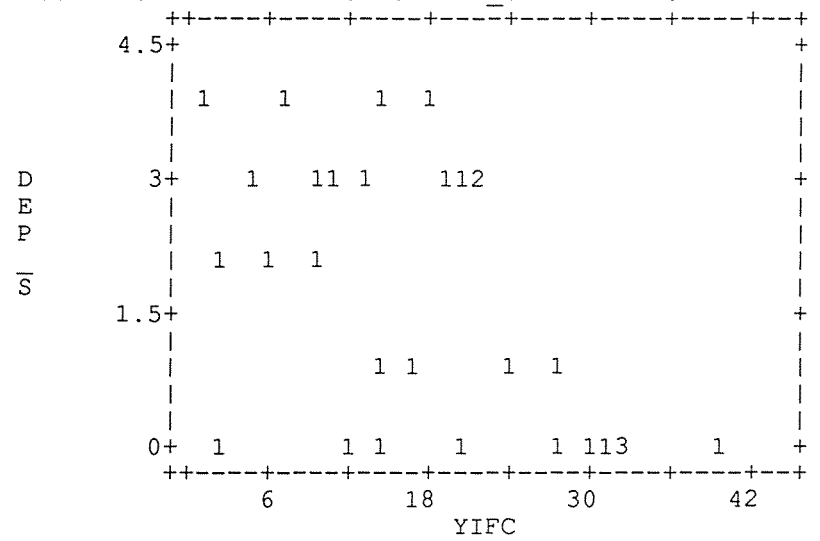


FIGURE A.2.6 PLOT OF DEP_S WITH AGE

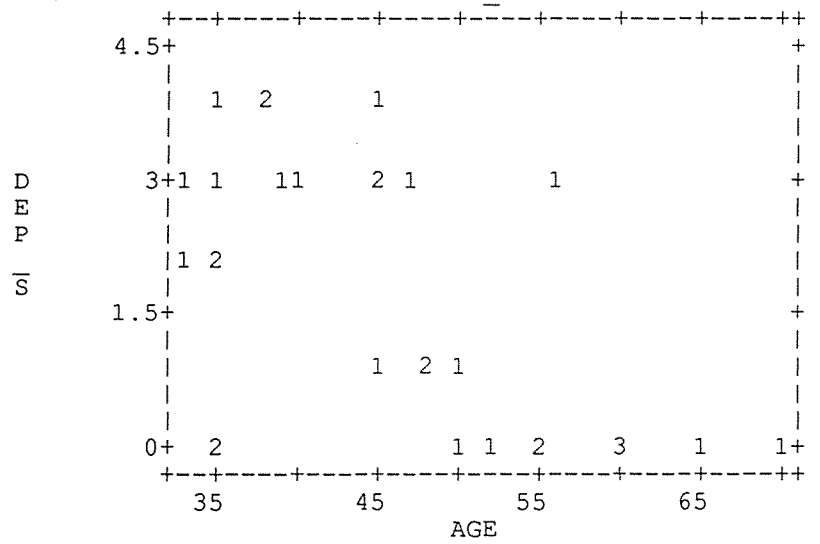


TABLE A.2.2 Correlations between greasy wool production (WOOL), lambing percentage (LMBG) and sheep income per sheep stock unit (SINC).

Correlations:	WOOL	LMBG	SINC
WOOL	1.0000	.5849**	.4845*
LMBG	.5849**	1.0000	.8450**
SINC	.4845*	.8450**	1.0000

N of cases: 27 1-tailed Signif: * - .01 ** - .001

FIGURE A.2.7 PLOT OF LMBG WITH WOOL

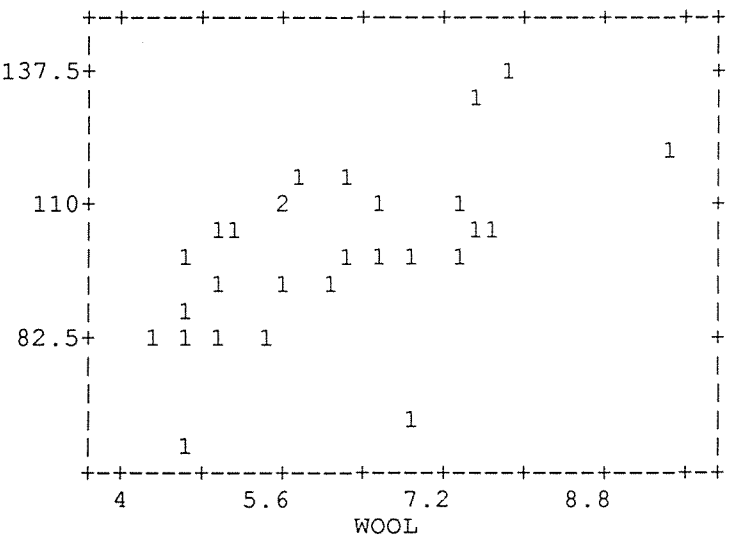


FIGURE A.2.6 PLOT OF SINC WITH WOOL

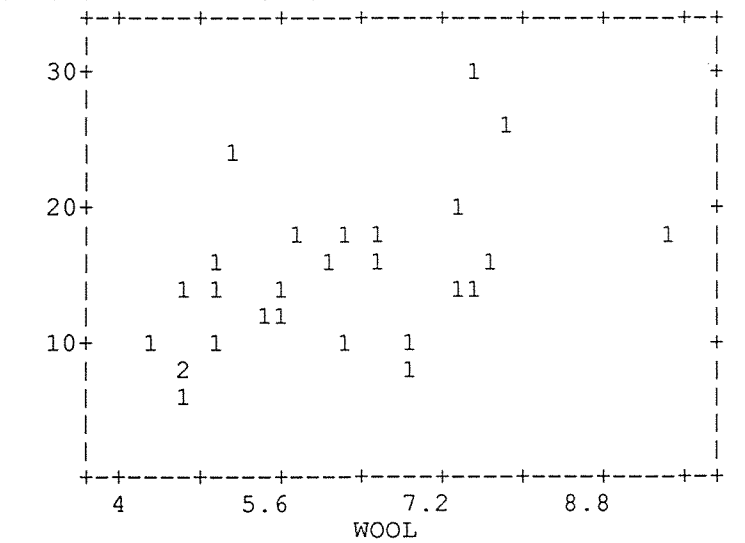


FIGURE A.2.8 PLOT OF WOOL WITH SINC

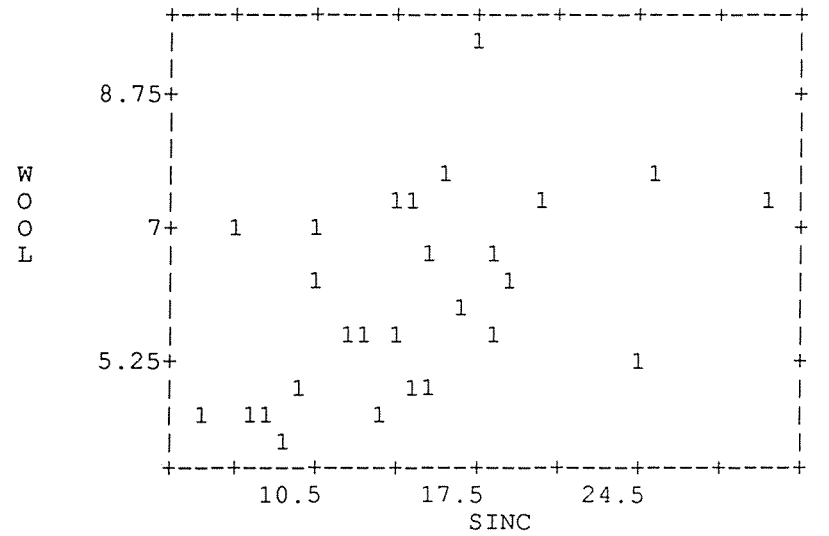


TABLE A.2.9 PLOT OF LMBG WITH SINC

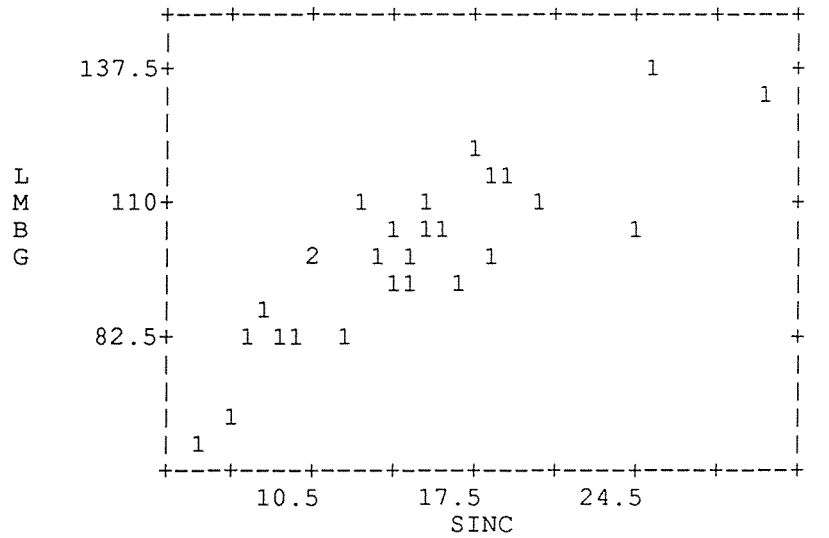


TABLE A.2.3 Correlations between farm size (SIZE) and total stock units wintered (TSU).

Correlations:	SIZE1	TOTAL1
SIZE1	1.0000	.9773
TOTAL1	.9773	1.0000

N of cases: 27

FIGURE A.2.10 PLOT OF SIZE WITH TSU

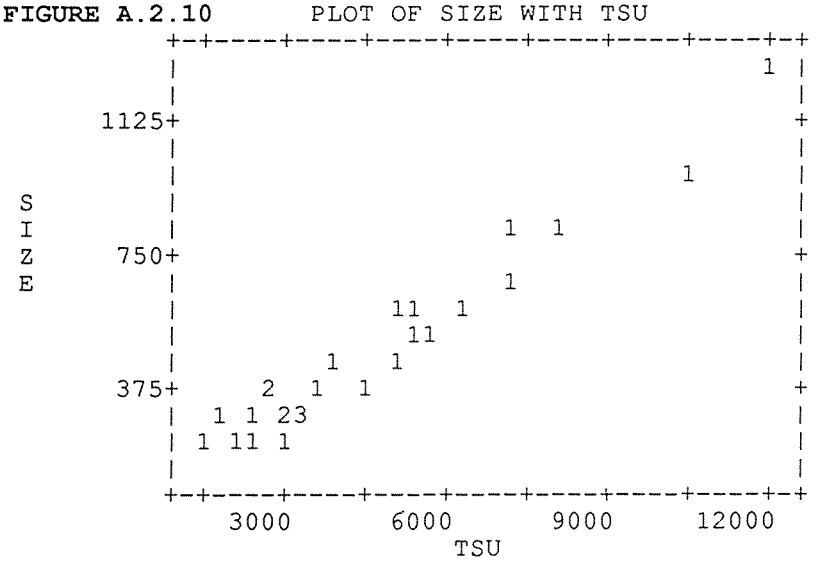


TABLE A.2.4 Correlations between wool production per sheep stock unit between seasons.

WHERE: Wool2 = 1981/82, Wool5 = 1984/85, Wool8 = 1987/88, Wool1 = 1990/91

Correlations:	WOOL2	WOOL5	WOOL8	WOOL1
WOOL2	1.0000	.7147**	.5165*	.3717
WOOL5	.7147**	1.0000	.7731**	.7311**
WOOL8	.5165*	.7731**	1.0000	.7739**
WOOL1	.3717	.7311**	.7739**	1.0000

N of cases: 20 1-tailed Signif: * - .01 ** - .001

FIGURE A.2.11 PLOT OF WOOL2 WITH WOOL5

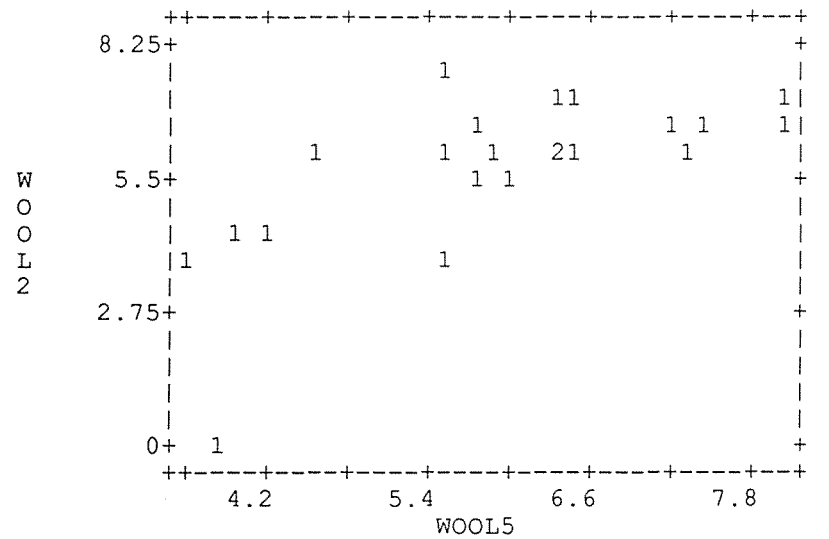


FIGURE A.2.12 PLOT OF WOOL8 WITH WOOL1

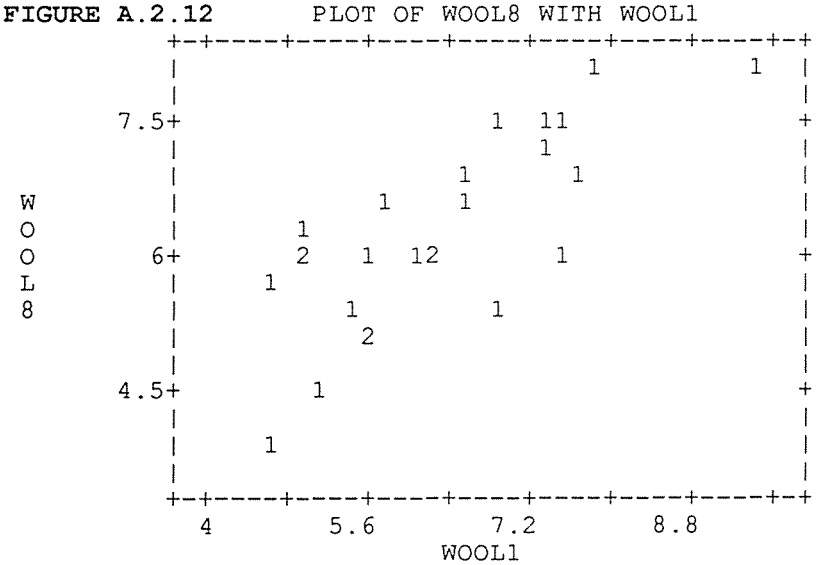


TABLE A.2.5 Correlations between lambing percentage between seasons.

WHERE: Lmbg2 = 1981/82, Lmbg5 = 1984/85, Lmbg8 = 1987/88, Lmbg1 = 1990/91

Correlations:	LMBG2	LMBG5	LMBG8	LMBG1
LMBG2	1.0000	.8079**	.6356*	.6825**
LMBG5	.8079**	1.0000	.7890**	.7918**
LMBG8	.6356*	.7890**	1.0000	.8571**
LMBG1	.6825**	.7918**	.8571**	1.0000

N of cases: 19 1-tailed Signif: * - .01 ** - .001

FIGURE A.2.13 PLOT OF LMBG2 WITH LMBG5

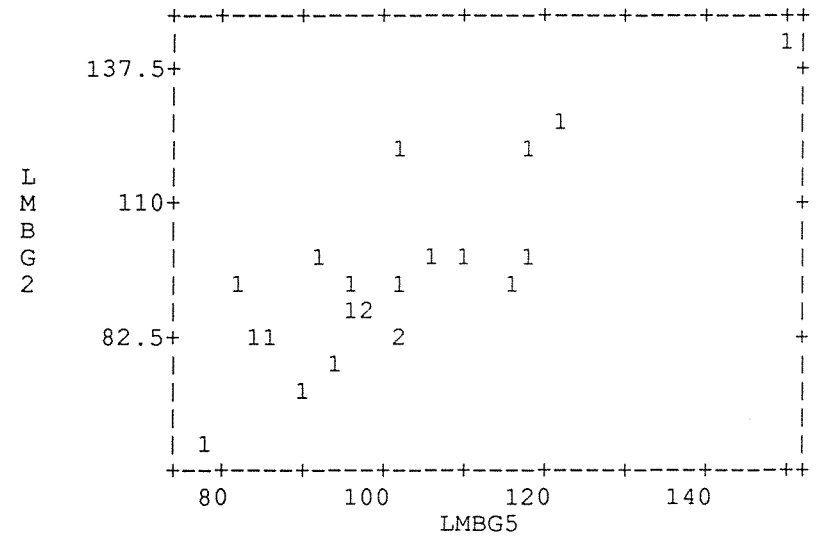


FIGURE A.2.14 PLOT OF LMBG8 WITH LMBG1

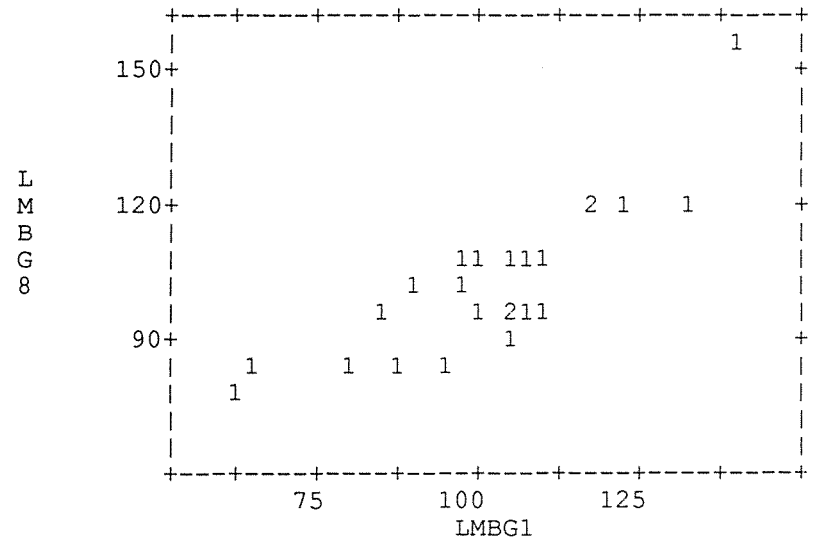


TABLE A.2.6 Correlations between economic farm surplus per hectare between seasons.

WHERE: EFSH2 = 1981/82, EFSH5 = 1984/85, EFSH8 = 1987/88, EFSH1 = 1990/91

Correlations:	EFSH2	EFSH5	EFSH8	EFSH1
EFSH2	1.0000	.4396	.6078*	.3080
EFSH5	.4396	1.0000	.5605*	.3141
EFSH8	.6078*	.5605*	1.0000	.6073*
EFSH1	.3080	.3141	.6073*	1.0000

N of cases: 20 1-tailed Signif: * - .01 ** - .001

FIGURE A.2.15 PLOT OF EFSH2 WITH EFSH5

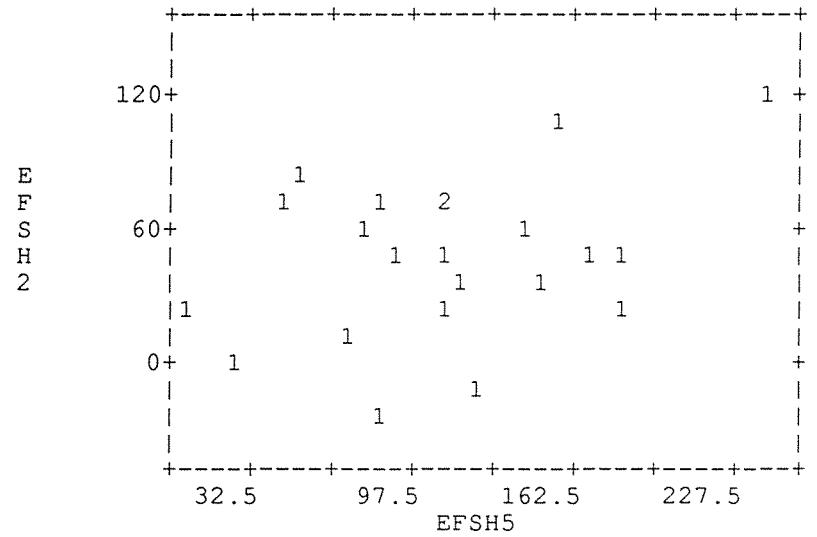
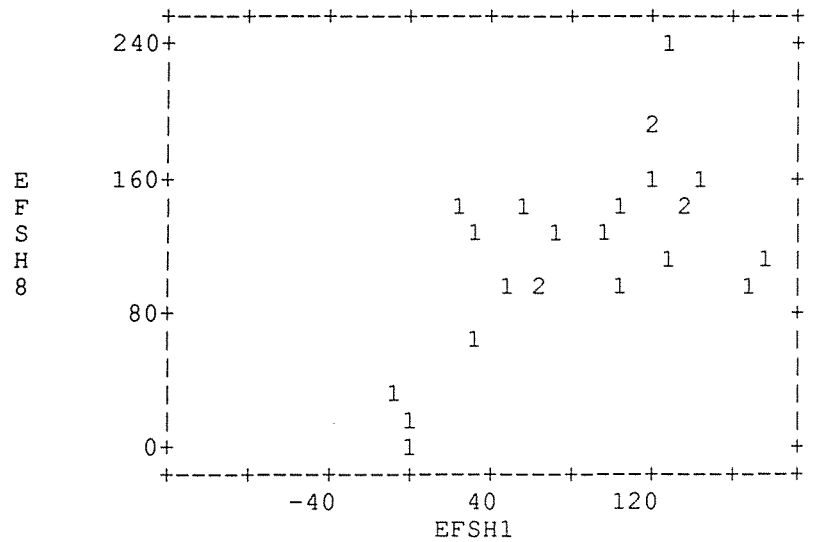


FIGURE A.2.16 PLOT OF EFSH8 WITH EFSH1



A.3 TECHNOLOGY ADOPTION INDEX

The FFR officer established (in conjunction with farmers) which of the following technologies were a regular part of farm management practices. The number of technologies farmers used was scored out of a possible total of 22 for farmers with breeding cattle, and a total of 19 for farmers without breeding cattle.

AS A REGULAR PART OF CATTLE POLICIES;
1: Use of cross-breeding
2: Use of exotics (incl. Friesian)
3: First mating heifers at 15 months
4: Use of breeding indices for selecting breeding bulls
5: Run bull beef

AS A REGULAR PART OF SHEEP POLICIES;
6: Use of exotics or terminal sires
7: Use of breeding indices as the principle criteria for selecting breeding rams
8: Weighing of hogget fleeces
9: Sale of male lambs as rams/cryptorchids
10: 8-monthly shearing

AS A REGULAR PART OF ANIMAL HEALTH POLICIES;
11: Testing for drench resistance
12: Systematic changing of drench families
13: Monitoring of faecal egg numbers

AS A REGULAR PART OF FERTILISER USAGE;
14: Use of nitrogen fertilisers
15: Use of reactive phosphate rock fertilisers
16: Use of soil tests

EQUIPMENT REGULARLY USED;
17: Computer
18: Scales for making sale decisions
19: Scales for monitoring liveweights throughout the year

GENERAL FARM MANAGEMENT PRACTICES
20: Practice rotational grazing through the winter
21: Preparation of written feed budgets
22: Monitoring of feed levels through the year in reference to feed budgets

A.4 DISCRIMINANT ANALYSES

A.4.1 Discriminant analysis for situational variables

On ADVISROY NEEDS GROUPS

30 (unweighted) cases were processed.
3 of these were excluded from the analysis.
3 had missing or out-of-range group codes.
27 (unweighted) cases will be used in the analysis.

Pooled Within-Groups Correlation Matrix

	AGE	YIFC	ESTAB	CONSOL	EXIT
AGE	1.00000				
YIFC	.85965	1.00000			
ESTAB	.03497	-.02266	1.00000		
CONSOL	-.71671	-.61637	-.04380	1.00000	
EXIT	.56599	.51893	-.57424	-.79275	1.00000

Summary Table

Step	Action Entered	Removed	Vars In	Wilks' Lambda	Sig.	Label
1	ESTAB		1	.41727	.0001	
2	EXIT		2	.23415	.0000	
3	AGE		3	.12575	.0000	

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr		After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					:	0	.1257	46.653	9	.0000
1*	4.0344	87.44	87.44	.8952	:	1	.6331	10.287	4	.0359
2*	.5790	12.55	99.99	.6055	:	2	.9996	.010	1	.9213
3*	.0004	.01	100.00	.0208	:					

* marks the 3 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1	FUNC 2	FUNC 3
AGE	-1.05394	.40954	.88191
ESTAB	1.39185	.24278	.29830
EXIT	1.34328	.78791	-.79937

Structure Matrix:

Pooled-within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

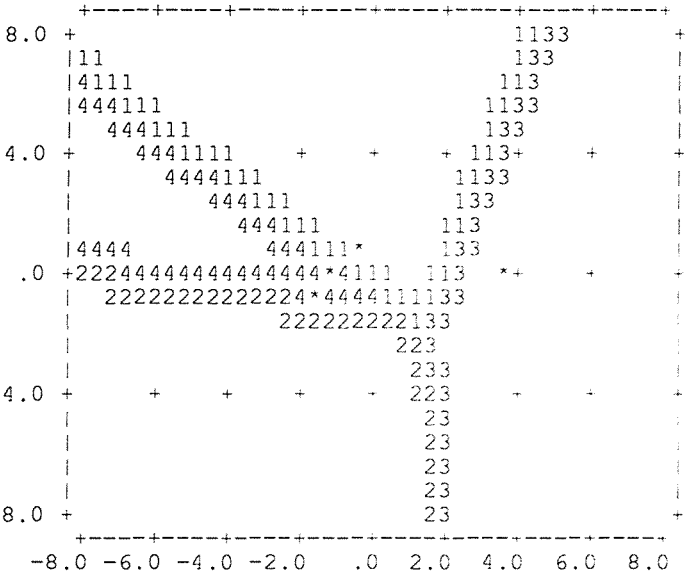
	FUNC 1	FUNC 2	FUNC 3
CONSOL	-.37047	-.92877*	-.01144
EXIT	-.05249	.88029*	-.47152
AGE	-.24499	.86398*	.43991
YIFC	-.24050	.75543*	.33656
ESTAB	.58362	-.19535	.78818*

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1	FUNC 2	FUNC 3
1	-.23176	.88974	-.00541
2	-1.40359	-.80494	-.02441
3	3.73866	-.39924	.00189
4	-1.32570	-.34526	.03185

Symbols used in territorial map

Symbol	Group	Label
1	1	
2	2	
3	3	
4	4	
*		Group Centroids



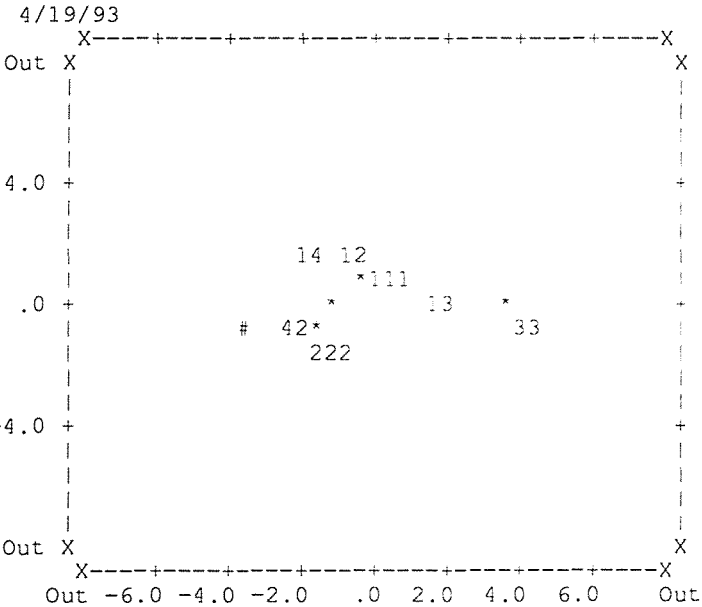
Territorial Map

* indicates a group centroid

Across: Function 1
Down: Function 2

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	
3	3	
4	4	
#		All Ungrouped Cases
*		Group Centroids



All-groups Scatterplot

* indicates a group centroid

Across: Function 1
Down: Function 2

A.4.2 Discriminant analysis of management style variables.

```
          30 (unweighted) cases were processed.
           6 of these were excluded from the analysis.
              3 had missing or out-of-range group codes.
              3 had at least one missing discriminating variable.
          24 (unweighted) cases will be used in the analysis.
```

Pooled Within-Groups Correlation Matrix

	@SHEEP1	WOOL1	NTECHAD	TINCS1	EFSH1
@SHEEP1	1.00000				
WOOL1	-.11754	1.00000			
NTECHAD	.50969	-.05156	1.00000		
TINCS1	.07968	.76754	.21533	1.00000	
EFSH1	-.07774	.33177	.13363	.54439	1.00000

Summary Table

Step	Action Entered	Removed	Vars In	Wilks' Lambda	Sig.	Label
1	@SHEEP1		1	.61320	.0185	
2	NTECHAD		2	.28849	.0004	
3	WOOL1		3	.19568	.0002	

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr		After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					:	0	.1957	31.810	9	.0002
1*	2.1152	77.69	77.69	.8240	:	1	.6096	9.652	4	.0467
2*	.5470	20.09	97.78	.5946	:	2	.9430	1.144	1	.2847
3*	.0604	2.22	100.00	.2388	:					

* marks the 3 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1	FUNC 2	FUNC 3
@SHEEP1	-1.01611	-.04030	.57643
WOOL1	.02719	.95059	.33128
NTECHAD	.99885	-.23143	.54757

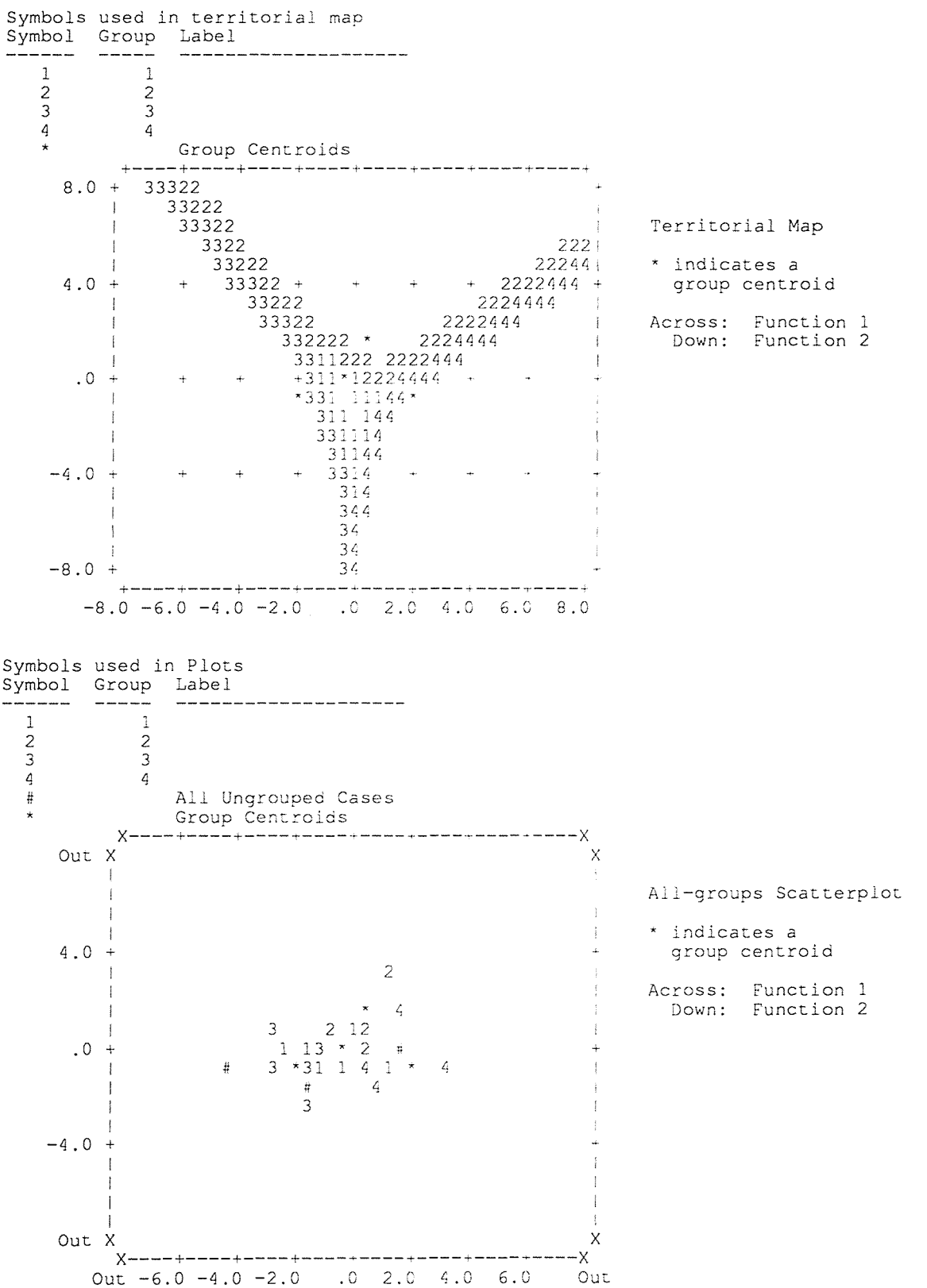
Structure Matrix:

Pooled-within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

	FUNC 1	FUNC 2	FUNC 3
WOOL1	.09512	.96726*	.23530
TINCS1	.15498	.67657*	.41811
EFSH1	.22148	.28759*	.13827
NTECHAD	.47955	-.30098	.82428*
@SHEEP1	-.51020	-.26999	.81658*

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1	FUNC 2	FUNC 3
1	-.59628	-.08502	-.27018
2	.41574	1.25064	.11673
3	-2.03212	-.46928	.33093
4	1.90271	-.60182	.08737


Symbols used in territorial map
Symbol Group Label
1 1
2 2
3 3
4 4
* Group Centroids
Territorial Map
* indicates a group centroid
Across: Function 1
Down: Function 2
Symbols used in Plots
Symbol Group Label
1 1
2 2
3 3
4 4
All Ungrouped Cases
* Group Centroids
All-groups Scatterplot
* indicates a group centroid
Across: Function 1
Down: Function 2
Out
-8.0 -6.0 -4.0 -2.0 .0 2.0 4.0 6.0 8.0

A.4.3 Discriminant analysis of situational and management style variables.

```
30 (unweighted) cases were processed.
 5 of these were excluded from the analysis.
    3 had missing or out-of-range group codes.
    2 had at least one missing discriminating variable.
25 (unweighted) cases will be used in the analysis.
```

Pooled Within-Groups Correlation Matrix

	@SHEEP1	WOOL1	NTECHAD	ESTAB	EXIT	AGE
@SHEEP1	1.00000					
WOOL1	-.11715	1.00000				
NTECHAD	.50438	-.05175	1.00000			
ESTAB	.10418	-.22009	-.07352	1.00000		
EXIT	-.07157	.25306	-.06833	-.45750	1.00000	
AGE	-.07769	.20622	-.11837	.00549	.63230	1.00000

Summary Table

Step	Action Entered	Removed	Vars In	Wilks' Lambda	Sig.	Label
1	ESTAB		1	.23810	.0000	
2	EXIT		2	.13992	.0000	
3	WOOL1		3	.09209	.0000	
4	AGE		4	.06037	.0000	
5	NTECHAD		5	.04488	.0000	
6	@SHEEP1		6	.03225	.0000	

Canonical Discriminant Functions

Fcn	Eigenvalue	Pct of Variance	Cum Pct	Canonical Corr		After Fcn	Wilks' Lambda	Chisquare	DF	Sig
					:	0	.0323	65.248	18	.0000
1*	6.5116	75.74	75.74	.9311	:	1	.2423	26.935	10	.0027
2*	1.2578	14.63	90.37	.7464	:	2	.5470	11.462	4	.0218
3*	.8281	9.63	100.00	.6730	:					

* marks the 3 canonical discriminant functions remaining in the analysis.

Standardized Canonical Discriminant Function Coefficients

	FUNC 1	FUNC 2	FUNC 3
@SHEEP1	.37087	-.57966	-.43489
WOOL1	.07513	.32636	-.81878
NTECHAD	-.30459	.73227	.63991
ESTAB	1.06520	.37702	.25772
EXIT	.92766	-.40567	.56958
AGE	-.83889	-.25692	-.04023

Structure Matrix:

Pooled-within-groups correlations between discriminating variables and canonical discriminant functions
(Variables ordered by size of correlation within function)

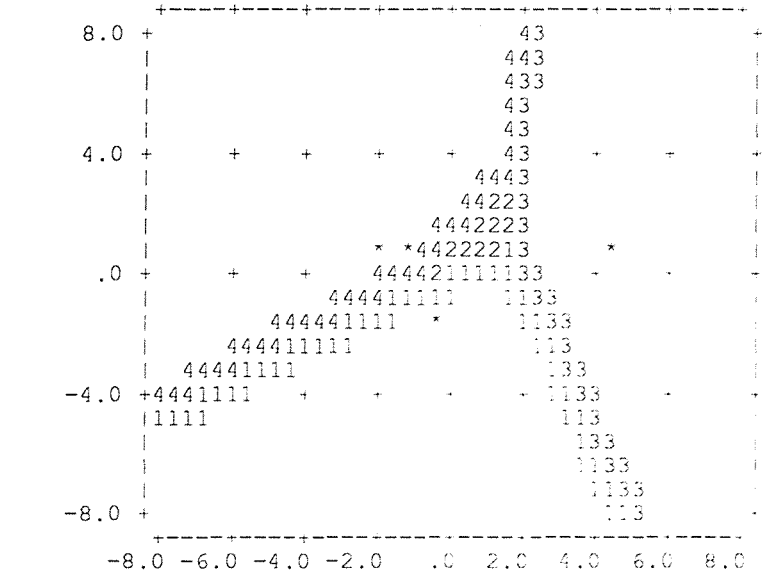
	FUNC 1	FUNC 2	FUNC 3
ESTAB	.68068*	.37515	.08477
@SHEEP1	.31820*	-.16028	-.02700
EXIT	-.07681	-.66656*	.20644
AGE	-.22374	-.48570*	.11053
NTECHAD	-.16382	.45343*	.40983
WOOL1	-.12523	.11775	-.72183*

Canonical Discriminant Functions evaluated at Group Means (Group Centroids)

Group	FUNC 1	FUNC 2	FUNC 3
1	-.47665	-1.34672	.11689
2	-1.39493	.68312	-1.49253
3	4.54181	.48351	.07193
4	-1.90743	1.04789	1.00850

Symbols used in territorial map

Symbol	Group	Label
1	1	
2	2	
3	3	
4	4	
*		Group Centroids



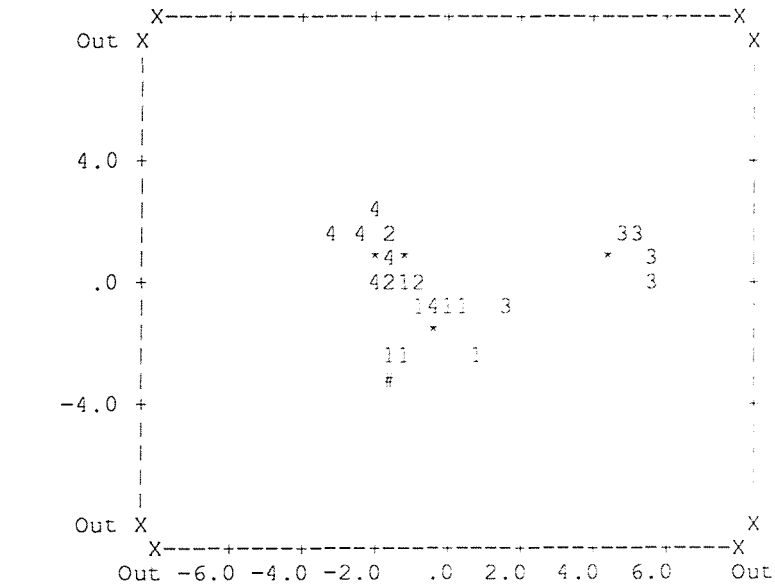
Territorial Map

* indicates a group centroid

Across: Function 1
Down: Function 2

Symbols used in Plots

Symbol	Group	Label
1	1	
2	2	
3	3	
4	4	
#		All Ungrouped Cases
*		Group Centroids



All-groups Scatterplot

* indicates a group centroid

Across: Function 1
Down: Function 2

Appendix B

APPENDIX B CONTENTS

B.1 SURVEY COVERING LETTER AND QUESTIONNAIRE

B.1.1 Covering letter.

MASSEY
UNIVERSITY

Private Bag 11222
Palmerston North
New Zealand
Telephone 0-6-356 909
Facsimile 0-6-350 560

FACULTY OF
AGRICULTURAL
AND
HORTICULTURAL
SCIENCES

DEPARTMENT OF
AGRICULTURAL
AND
HORTICULTURAL
SYSTEMS
MANAGEMENT

Ref:quest.let/afm2*/ca
17 December 1992

Dear Farmer

Agricultural research should concentrate on what farmers require from it. The Farmer First Research Programme at Massey University is working with farmers trying to establish their needs, and giving them a central role in deciding what should be done.

One important part of this programme is concerned with farmers' needs for, and views on, consultants. This information is being collected in a survey conducted by Nick Daniels, a postgraduate student at Massey. Nick would like you to assist by completing the attached questionnaire. In asking for your help please note that:

- the questionnaire does not require you to present any details of your personal financial situation,
- you are required to answer only two of the three sections posted,
- all responses will be treated as strictly confidential, and no results will be published that allow recognition of farmers involved,
- completion of the questionnaire should take about 20 minutes.

Please feel free to contact Nick (06 356 9099 ext. 8066 or (06) 357 6797 A/H) if you have any queries or concerns. Completed questionnaires can be returned directly to Massey in the enclosed envelope.

Your involvement in this work is greatly appreciated.

Yours sincerely

A F McRae
Project Leader
Farmer First Research Programme

B.1.2 Survey questionnaire.

(N.B.: FONT SIZE HAS BEEN REDUCED TO ALLOW FOR THESIS BINDING)

COULD THE PERSON MOST RESPONSIBLE FOR THE PHYSICAL AND FINANCIAL MANAGEMENT OF THE FARM PLEASE ANSWER THE QUESTIONNAIRE.

A: PROPERTY DETAILS

1) Tenure: Sole trader Partnership Private Lease
Company Trust Crown or Maori lease
(please circle where appropriate)

2) Which of the following best describes your position on the farm;

(✓) _____Owner-operator
_____Manager
_____Other (please specify)_____

3) Effective farm size:_____acres/hectares (delete which not applicable)

4) Topography: Please estimate the proportion of your farm which is flat to rolling, medium hill country and steep hill country.

proportion flat to rolling _____%
proportion medium hill country _____%
proportion steep hill country _____%

5) Labour: Number of paid full-time farm workers (excluding self) _____
Number of paid part-time farm workers _____

6) Fertiliser: **Have you fertilised the majority of your property in the past 3 years?**
(please circle) yes no

Do you expect to apply fertiliser to the majority of your farm in the next 3 years?
(please circle) yes no

7) Farm enterprises: Sheep Cattle Deer Goats Other (please circle)
if other please specify_____

8) Please fill in details of your stock numbers and principle stock policies;

Principle sheep policies_____
(e.g. breeding ewes, selling lambs store)

Sheep numbers (1/7/92)

Breeding ewes	_____
Ewe hoggets	_____
Ram/wether hoggets	_____
Breeding rams	_____

Principle cattle policies_____
(e.g. Breeding cows, selling weaners, bull beef)

Cattle numbers (1/7/92)

Breeding cows	_____	Weaner steers	_____
Weaner heifers	_____	Other steers	_____
Other heifers	_____	Breeding bulls	_____
Weaner bulls	_____		
R-2year bulls	_____		
R-3year bulls	_____		

Other policies_____
(e.g Deer, goats)

Numbers (1/7/92)

Breeding hinds	_____	Does	_____
Weaner hinds	_____	Wether goats	_____
Weaner stags	_____	Bucks	_____
R-2year stags	_____		
Older stags	_____		

Other (please specify)_____

B: PERSONAL DETAILS

1) **Your age** _____ years **2) Sex** Male Female

3) **Number of children living at home** _____
4) **Number of family members supported by the farm business (incl. children living away from home, parents)** _____
5) **At what age did you begin your first farm job?** _____years
6) **At what age did you gain financial control of your farm business?** _____years
7) **How long have you been settled on this farm?** _____years
8) **How many years of secondary education did you have?** _____years
9) **Have you had any tertiary education?** (e.g. University, Polytechnic) yes no
if yes, please specify_____

10) **Could you please indicate to what extent do you believe your current level of indebtedness provides a constraint on your desired farming activities?** (please circle)

A severe constraint 1 2 3 4 5 No constraint at all

11) **Please indicate where you see yourself in the "farm business cycle". The farm business cycle is often viewed as having three stages, an establishment phase, a consolidation phase and an exit phase. Imagine that the line below represents the business cycle of your farm. The left hand side represents the day on which you assumed financial control of the business, and the right hand side of the line represents the day you relinquish control of the farm business. Where do you currently see yourself? Please indicate with a cross.**

Gaining control of the farm business_____Relinquishing control of the farm business

Establishment Consolidation Exit

12) **Could you mark on the line below where you see the current stage of development of your farm? In this instance, the far left would indicate the stage of development when you assumed responsibility for your farm, and the far right would indicate the level of development you would like to achieve before you relinquish responsibility for your property.**

Stage of development when you assumed control_____State of development when you leave property

C: USE OF TECHNOLOGY

Please indicate which of the following practices form a *regular* part of your farm practices.

1: As part of your cattle policies do you;

- Cross-breed yes no (please circle)
- Use exotics (incl Friesian) yes no
- First mate heifers at 15 months (to calve as 2 year-olds) yes no
- Use breeding indices as the principle criteria for selecting breeding bulls yes no
- Run bull beef yes no

2: As part of your sheep policies do you;

- Use exotics breeds or terminal sires yes no
- Use breeding indices as the principle criteria for selecting breeding rams yes no
- Weigh hogget fleeces yes no
- Sell male lambs as rams/cryptorchids yes no
- Please indicate which of the following most closely matches your shearing policy
  _____Annual shearing (full wool) _____Second shearing _____8-monthly shearing

3: As part of animal health programmes, do you;

- Test for drench resistance yes no
- Systematically change drench families yes no
- Monitor faecal egg numbers yes no

4: As part of fertiliser usage, do you;

- Make use of nitrogen fertilisers yes no
- Make use of reactive phosphate rock fertilisers yes no
- Conduct soil tests yes no

5: Which of the following items of equipment do you make use of;

- Computer yes no
- Scales for making sale decisions yes no
- Scales for monitoring liveweights throughout the year yes no

6: As part of general farm management, do you;

- Practice rotational grazing through the winter. yes no
- Prepare a written feed budget yes no
- Monitor feed levels through the year in reference to feed budgets yes no

D: USE OF CONSULTANTS

pg 5

The following sections of the questionnaire ask for details of any contact you may have with professional farm advisors, or consultants. These would include MAFTech consultants or private consultants, but excludes sales reps (such as those acting for fertiliser companies etc), and veterinarians.

1: **Firstly, could you list below any major changes you have made on the farm during the past five years. Could you also indicate whether a consultant was involved in making the change (through evaluation or implementation of the change).**

a) **What changes have you made to livestock policies?**

_____

_____

_____

Was a consultant involved in making these changes? yes no (please circle)

b) **What changes have you made to farm size?**

_____

_____

Was a consultant involved in making these changes? yes no

c) **What changes have you made to the ownership structure of your farm?**

_____

_____

Was a consultant involved in making these changes? yes no

d) **What changes have you made to the financial structure of your farm business? (eg: refinancing)**

_____

_____

Was a consultant involved in making these changes? yes no

e) **What major developments have you undertaken on your farm?**

_____

_____

Was a consultant involved in making these developments yes no

2: **Do you know (approximately), the cost of hiring a farm consultant?** yes no

3: **Do you expect to be farming on your current property in five years time?** yes no

p4: **If YES to Question 3 above, do you expect that major changes will have to be made to your farming operation in the next five years?** yes no

5: **Do you currently have *on-going* contact with a farm consultant or farm consultancy service?**

yes no (please circle)

If **YES**, please answer questions on the **YELLOW** pages.
If **NO**, please answer questions on the **BLUE** pages.

E: PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU HAVE ON-GOING CONTACT WITH A FARM CONSULTANT OR FARM CONSULTANCY SERVICE

Please indicate (✓) which statement best describes your contact with farm consultants;

_____ Contact through membership of a discussion group only.

_____ Regular personal consultancy only (if so, please indicate how regular the contact is).
_____monthly ____quarterly ____biannually ____annually ____less than annually

_____ Both regular consultancy and discussion group membership (if so how regular is your personal consultancy?).
_____monthly ____quarterly ____biannually ____annually ____less than annually

_____ Through involvement in contract grazing schemes only.

_____ Consultant acts as a supervisor only.

_____ Other, please specify
_____

****

The following questions ask for details on the consultancy services you use. Several services are listed below. For each of the following services, please circle the statement which most accurately describes your use of the service.

For each service for which you do employ a consultant, could you also indicate how useful you find the consultancy service provided.

1: Soil and/or plant testing, as part of determining fertiliser programmes

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

↘
If using a consultant, how useful do you find the service provided?

Very useful 1 2 3 4 5 Not useful at all

2: The provision of market information (e.g. information on works schedules, wool auctions etc) 7

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do you find the service provided?
Very useful 1 2 3 4 5 Not useful at all

3: Assistance in developing and/or managing breeding programmes

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do you find the service provided?
Very useful 1 2 3 4 5 Not useful at all

4: Monitoring of current farm policies

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?
Very useful 1 2 3 4 5 Not useful at all

5: Provision of a comparative analysis of the farm relative to other similar properties

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?
Very useful 1 2 3 4 5 Not useful at all

6: Analysis of the farms annual accounts

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?
Very useful 1 2 3 4 5 Not useful at all

7: Evaluation of alternative livestock policies

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?

Very useful 1 2 3 4 5 Not useful at all

8: Preparation of farm budgets and cash flows

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?

Very useful 1 2 3 4 5 Not useful at all

9: Establishment and/or implementation of share-farming or contract grazing schemes

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?

Very useful 1 2 3 4 5 Not useful at all

10: Supervision of property for absentee owner

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?

Very useful 1 2 3 4 5 Not useful at all

11: Assistance in planning farm development and/or expansion

No need for this service on the farm	Don't use consultant for above service	Intend using consultant for above service	Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?

Very useful 1 2 3 4 5 Not useful at all

12: Assistance in obtaining farm finance pg 9

No need for this service on the farm | Don't use consultant for above service | Intend using consultant for above service | Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?
Very useful 1 2 3 4 5 Not useful at all

13: Assistance in planning for: the passing on of the farm / retirement from farming

No need for this service on the farm | Don't use consultant for above service | Intend using consultant for above service | Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?
Very useful 1 2 3 4 5 Not useful at all

14: Developing policies and strategies for the whole farm business

No need for this service on the farm | Don't use consultant for above service | Intend using consultant for above service | Consultant employed for above service

(please circle one of the above)

If using a consultant, how useful do find the service provided?
Very useful 1 2 3 4 5 Not useful at all

15: What do you believe to be the dollar return from your investment in a farm consultant? In other words, for every dollar you spend on a consultant, how much extra does the farm earn?

$1.00 invested gives a return of: less than $1 | $1 | $2 | $5 | $10 | $20 | more than $20 (please circle)

16: Which other services, not mentioned above, do you utilise consultants for, and how useful do you find them?

Service_____ Very useful 1 2 3 4 5 Not useful at all

Service_____ Very useful 1 2 3 4 5 Not useful at all

17: Which services (if any) would you like available (from any source), to assist in the running of your farm?

Desired services_____

The statements below are some reasons farmers have given for not using consultants. It is wished to know how these apply to you in your current farming situation. Please rank how strongly you agree or disagree with the following reasons for *not* using a consultant, in your current farming situation.

18: Consultants have a poor track record

Strongly agree 1 2 3 4 5 Strongly disagree

19: Consultants are too expensive (fail to provide an economic return)

Strongly agree 1 2 3 4 5 Strongly disagree

20: A consultant is of no use to me as I am not interested in making any changes to my current farming system

Strongly agree 1 2 3 4 5 Strongly disagree

21: A consultant is of no use to me as I prefer to get advice from other sources

Strongly agree 1 2 3 4 5 Strongly disagree

22: I have no interest in establishing contact with a consultant as I have not met a consultant in whom I have sufficient confidence

Strongly agree 1 2 3 4 5 Strongly disagree

23: I believe that consultants are more interested in serving their own needs, than my own

Strongly agree 1 2 3 4 5 Strongly disagree

24: A consultant is of no use to me as I am fully confident in my own ability to run my farm, and need no other input

Strongly agree 1 2 3 4 5 Strongly disagree

****

25: Do you believe that consultants serve a useful role in establishing links with processing companies? (eg: through developing contract grazing schemes, collective selling pools etc.)

(please circle) yes no

IF YOU ARE A MEMBER OF A DISCUSSION GROUP, PLEASE INDICATE HOW MUCH YOU VALUE EACH OF THE FOLLOWING, IN RELATION TO YOUR INVOLVEMENT IN DISCUSSION GROUPS;

27: Contact with the ideas/views of professional consultant

Value highly 1 2 3 4 5 Don't value at all

28: Contact with other farmers to discuss production aspects of farming

Value highly 1 2 3 4 5 Don't value at all

29: Contact with farmers to discuss financial aspects of farming

Value highly 1 2 3 4 5 Don't value at all

30: Opportunity to discuss markets and prospects

Value highly 1 2 3 4 5 Don't value at all

31: Opportunity to keep in touch with new farming developments

Value highly 1 2 3 4 5 Don't value at all

32: The opportunity to maintain social contacts with fellow farmers

Value highly 1 2 3 4 5 Don't value at all

33: What other factors, not mentioned above, do you value highly about your involvement with discussion groups?

_____

_____

34: What do you view as negative aspects of your involvement with discussion groups?

_____

_____

THAT CONCLUDES THE QUESTIONNAIRE, THANK-YOU FOR YOUR ASSISTANCE

F: PLEASE ANSWER THE FOLLOWING QUESTIONS IF CURRENTLY, YOU HAVE NO ON-GOING CONTACT WITH CONSULTANTS

Do you believe consultants;

1: **Are only useful for specific tasks (such as evaluating land purchase etc)** yes no
(if **YES** continue with questions on **THIS PAGE**)

2: **Are not useful in your current farming situation** yes no
(if **YES** continue with questions on **PAGE 13**)

3: **Are potentially useful in your farming situation** yes no
(if **YES** continue with questions on **PAGE 14**)

****

G: PLEASE ANSWER THE FOLLOWING QUESTIONS IF YOU BELIEVE CONSULTANTS WOULD ONLY BE USEFUL FOR SPECIFIC TASKS

Please rank how likely you would be to use a consultant for each of the following services.

1: The evaluation of land purchase or lease options

Very likely				Very unlikely
1	2	3	4	5

2: Assisting in establishing family members on the farm

Very likely				Very unlikely
1	2	3	4	5

3: Assistance in refinancing

Very likely				Very unlikely
1	2	3	4	5

4: Providing advice on fertiliser policies, alternative crops or pasture species

Very likely				Very unlikely
1	2	3	4	5

5: The design of water supply, irrigation or drainage systems (or similar)

Very likely				Very unlikely
1	2	3	4	5

6: Information on, or assistance in establishing share-farming or contract grazing agreements

Very likely				Very unlikely
1	2	3	4	5

7: Assistance in the planning the passing on, or sale of the farm

Very likely				Very unlikely
1	2	3	4	5

8: Assistance in farm development or diversification

Very likely				Very unlikely
1	2	3	4	5

9: Evaluation of alternative livestock policies

Very likely				Very unlikely
1	2	3	4	5

10: The preparation of budgets

Very likely				Very unlikely
1	2	3	4	5

PLEASE CONTINUE WITH THE QUESTIONS ON PAGE 13

H: A NUMBER OF REASONS ARE GIVEN BELOW WHY FARMERS DON'T HAVE ON-GOING CONTACT WITH FARM CONSULTANTS. PLEASE RANK (BY CIRCLING), HOW STRONGLY DO YOU AGREE WITH EACH OF THE STATEMENTS BELOW.

1: Consultants have a poor track record

Strongly agree 1 2 3 4 5 Strongly disagree

2: Consultants are too expensive (fail to provide an economic return)

Strongly agree 1 2 3 4 5 Strongly disagree

3: A consultant is of no use to me as I am not interested in making any changes to my current farming system

Strongly agree 1 2 3 4 5 Strongly disagree

4: A consultant is of no use to me as I prefer to get advice from other sources

Strongly agree 1 2 3 4 5 Strongly disagree

5: I have no interest in establishing contact with a consultant as I have not met a consultant in whom I have sufficient confidence

Strongly agree 1 2 3 4 5 Strongly disagree

6: I believe that consultants are more interested in serving their own needs, than my own.

Strongly agree 1 2 3 4 5 Strongly disagree

7: A consultant is of no use to me as I am fully confident in my own ability to run my farm, and need no other input

Strongly agree 1 2 3 4 5 Strongly disagree

****

8: Do you believe that consultants serve a useful role in establishing links with processing companies? (eg: through developing contract grazing schemes, collective selling pools etc.)

(please circle) yes no

9: Which services (if any) would you like available (from any source) to assist in the running/operation of your farm?

Desired services_____

_____

_____

THAT CONCLUDES THE QUESTIONNAIRE, THANK-YOU FOR YOUR ASSISTANCE

I: PLEASE ANSWER THE FOLLOWING IF YOU BELIEVE CONSULTANTS *COULD* BE BENEFICIAL IN YOUR CURRENT SITUATION.

How potentially useful do you see each of the following services in your current situation?

1: Soil and/or plant testing services as part of determining fertiliser programmes

Very useful 1 2 3 4 5 Not useful at all

2: The provision of market information (e.g. schedule information, details from wool auctions etc.)

Very useful 1 2 3 4 5 Not useful at all

3: Assistance in developing and/or managing breeding programmes

Very useful 1 2 3 4 5 Not useful at all

4: Monitoring of farm policies

Very useful 1 2 3 4 5 Not useful at all

5: Provision of comparative analysis of farm relative to other, similar properties

Very useful 1 2 3 4 5 Not useful at all

6: Analysis of farms annual accounts

Very useful 1 2 3 4 5 Not useful at all

7: Evaluation of alternative livestock policies

Very useful 1 2 3 4 5 Not useful at all

8: Preparation of farm budgets and cash flows

Very useful 1 2 3 4 5 Not useful at all

9: Establishing and/or implementation of share-farming or contract grazing schemes

Very useful 1 2 3 4 5 Not useful at all

10: Supervision of property for absentee owner

Very useful 1 2 3 4 5 Not useful at all

11: Assistance in planning farm development and/or expansion

Very useful 1 2 3 4 5 Not useful at all

12: Assistance in securing farm finance

Very useful 1 2 3 4 5 Not useful at all

13: Assistance with planning for: the succession of the farm / retirement from farming (delete where applicable)

Very useful 1 2 3 4 5 Not useful at all

****

Which of the following best describes the reasons why you currently don't employ a consultant.

14: Consultants have a poor track record

Strongly agree 1 2 3 4 5 Strongly disagree

15: Consultants are too expensive (fail to provide an economic return)

Strongly agree 1 2 3 4 5 Strongly disagree

16: A consultant is of no use to me as I am not interested in making any changes to my current farming system

Strongly agree 1 2 3 4 5 Strongly disagree

17: A consultant is of no use to me as I prefer to get advice from other sources

Strongly agree 1 2 3 4 5 Strongly disagree

18: I have no interest in establishing contact with a consultant as I have not met a consultant in whom I have sufficient confidence

Strongly agree 1 2 3 4 5 Strongly disagree

19: I believe that consultants are more interested in serving their own needs, than my own.

Strongly agree 1 2 3 4 5 Strongly disagree

20: A consultant is of no use to me as I am fully confident in my own ability to run my farm, and need no other input

Strongly agree 1 2 3 4 5 Strongly disagree

****

21: **Do you believe that consultants serve a useful role in establishing links with processing companies? (eg: through developing contract grazing schemes, collective selling pools etc.)**

(please circle) yes no

22: **Which services (if any) would you like available (from any source) to assist in the running/operation of your farm?**

Desired services_____

_____

_____

THAT CONCLUDES THE QUESTIONNAIRE, THANK-YOU FOR YOUR ASSISTANCE

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FACULTY OF
AGRICULTURAL
AND
HORTICULTURAL
SCIENCES

DEPARTMENT OF
AGRICULTURAL
AND
HORTICULTURAL
SYSTEMS
MANAGEMENT

Dear Farmer,

Massey University has initiated a research programme asking farmers for what they believe to be important research areas. As part of this study we are attempting to learn more about the use of farm advisors by farmers in the Taihape-Hunterville region.

Recently you should have received a questionnaire in the mail requesting your views on farm advisors. If you have not already done so, I would like to urge you to return the questionnaire in the return envelope. Please note that;

- The questionnaire does not require you to present any details of your personal financial situation.
- You are required to answer only two of the three questions posted.
- All responses will be treated as confidential, and no results will be published that allow recognition of farmers involved.
- Completion of the questionnaire should only take about 20 minutes.

If you have not received a questionnaire, or it has been mislaid, please contact me on (06) 356-9099 ext. 8066 or (06) 357-6797 (A/H), so a further questionnaire can be forwarded.

Your involvement in this work is greatly appreciated.

Yours sincerely, Nick Daniels
Post-graduate student.

B.3 CORRELATIONS AND SCATTER-PLOTS

TABLE B.3.1 Correlations between farmer age (AGE), years spent in financial control of a farm business (YIFC), number of dependent children (DEP_S1) and stage in the farming cycle (FM_CYC).

Correlations:	AGE	YIFC	DEP_S1	FM_CYC
AGE	1.0000	.8472**	-.4839	.5294**
YIFC	.8472**	1.0000	-.4167	.6558**
DEP_S1	-.4839	-.4167	1.0000	-.3227
FM_CYC	.5294**	.6558**	-.3227	1.0000

N of cases: 82 1-tailed Signif: * - .01 ** - .001

FIGURE B.3.1 PLOT OF AGE WITH FM_CYC

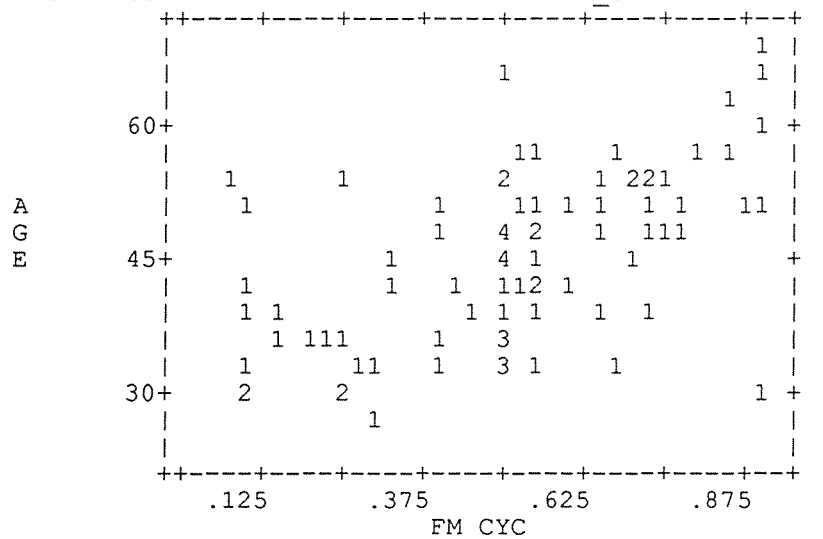


FIGURE B.3.2 PLOT OF YIFC WITH FM_CYC

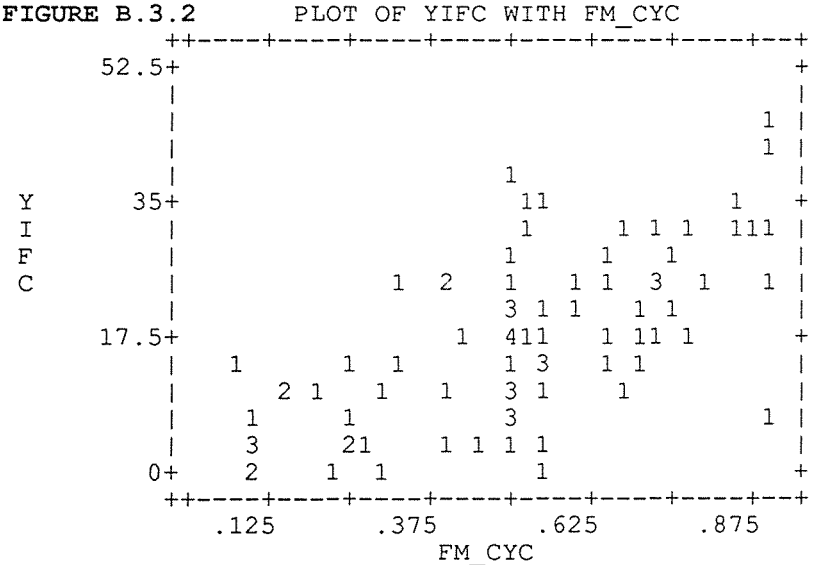


FIGURE B.3.3 PLOT OF DEP_S1 WITH FM_CYC

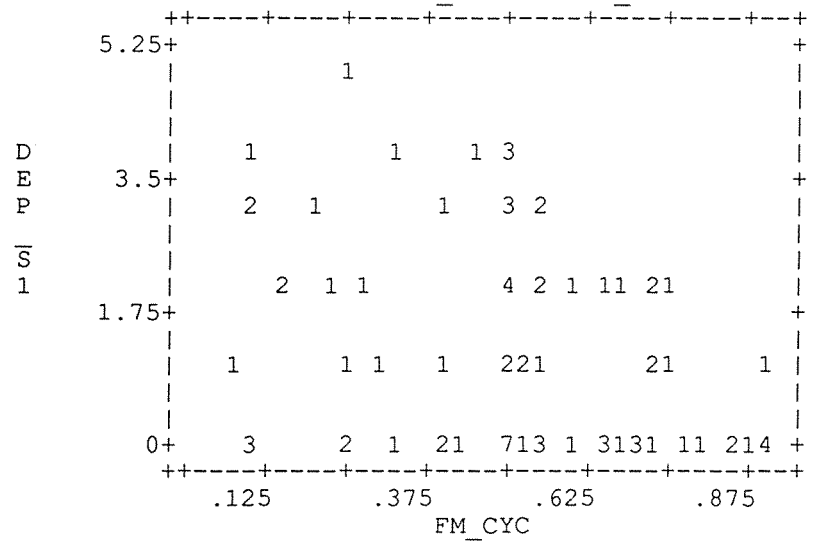
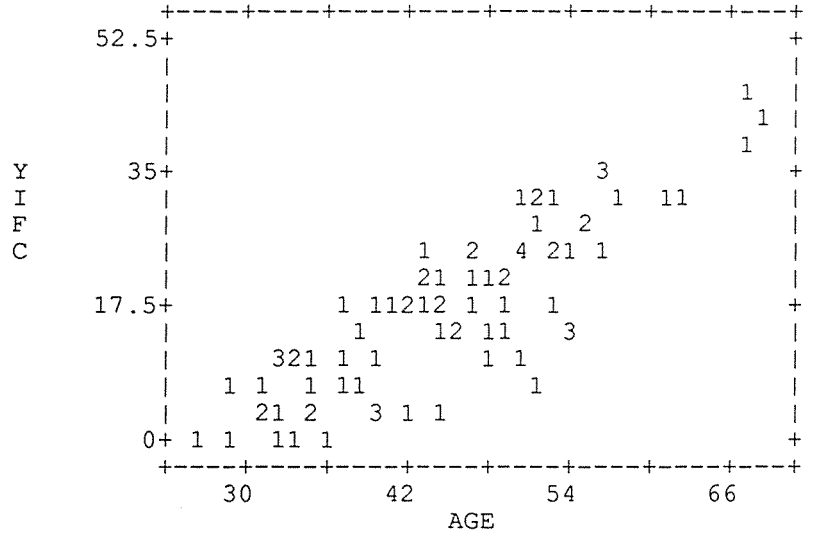


FIGURE B.3.4 PLOT OF YIFC WITH AGE



B.4 CLUSTER ANALYSIS

B.4.1 Criteria assessed for halting the clustering procedure for Group B farmers.

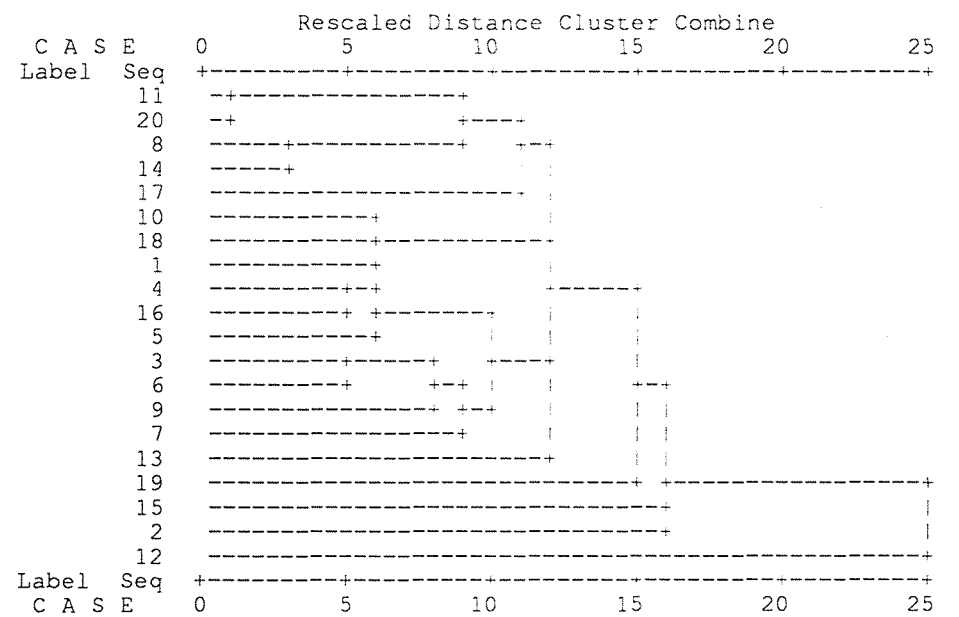
```
Data Information
        20 unweighted cases accepted.
         1 cases rejected because of missing value.
Squared Euclidean measure used.

Clustering procedure halted at Stage 16, due to a plateau of distance
coefficents (marked below by bold characters)
```

Agglomeration Schedule using Single Linkage

	Stage	Clusters Cluster 1	Combined Cluster 2	Coefficient	Stage Cluster 1st Appears Cluster 1	Cluster 2	Next Stage
	1	11	20	3.000000	0	0	9
	2	8	14	6.000000	0	0	9
	3	4	16	9.000000	0	0	7
	4	3	6	9.000000	0	0	8
	5	10	18	10.000000	0	0	6
	6	1	10	10.000000	0	5	14
	7	4	5	10.000000	3	0	11
	8	3	9	12.000000	4	0	10
	9	8	11	13.000000	2	1	12
	10	3	7	14.000000	8	0	11
	11	3	4	15.000000	10	7	13
	12	8	17	16.000000	9	0	14
	13	3	13	17.000000	11	0	15
	14	1	8	17.000000	6	12	15
	15	1	3	17.000000	14	13	16
→	**16**	**1**	**19**	**21.000000**	**15**	**0**	**17** ←
	17	1	15	22.000000	16	0	18
	18	1	2	22.000000	17	0	19
	19	1	12	34.000000	18	0	0

Dendrogram using Single Linkage



B.4.2 Criteria assessed for halting the clustering procedure for Group C farmers.

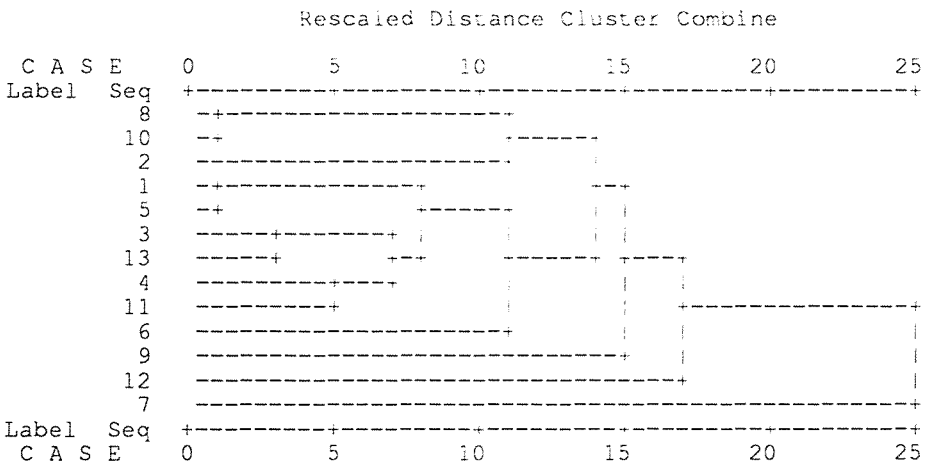
```
Data Information
         13 unweighted cases accepted.
          2 cases rejected because of missing value.
Squared Euclidean measure used.

Clustering procedure halted at Stage 6, due to a plateau of distance
coefficents (marked below by bold characters)
```

Agglomeration Schedule using Single Linkage

	Clusters Combined			Stage Cluster 1st Appears		Next
Stage	Cluster 1	Cluster 2	Coefficient	Cluster 1	Cluster 2	Stage
1	8	10	10.000000	0	0	7
2	1	5	10.000000	0	0	6
3	3	13	12.000000	0	0	5
4	4	11	14.000000	0	0	5
5	3	4	16.000000	3	4	6
→ **6**	**1**	**3**	**17.000000**	**2**	**5**	**8**
7	2	8	20.000000	0	1	9
8	1	6	20.000000	6	0	9
9	1	2	22.000000	8	7	10
10	1	9	23.000000	9	0	11
11	1	12	25.000000	10	0	12
12	1	7	33.000000	11	0	0

Dendrogram using Single Linkage



B.4.3 Criteria assessed for halting the clustering procedure for Group D farmers.

Data Information

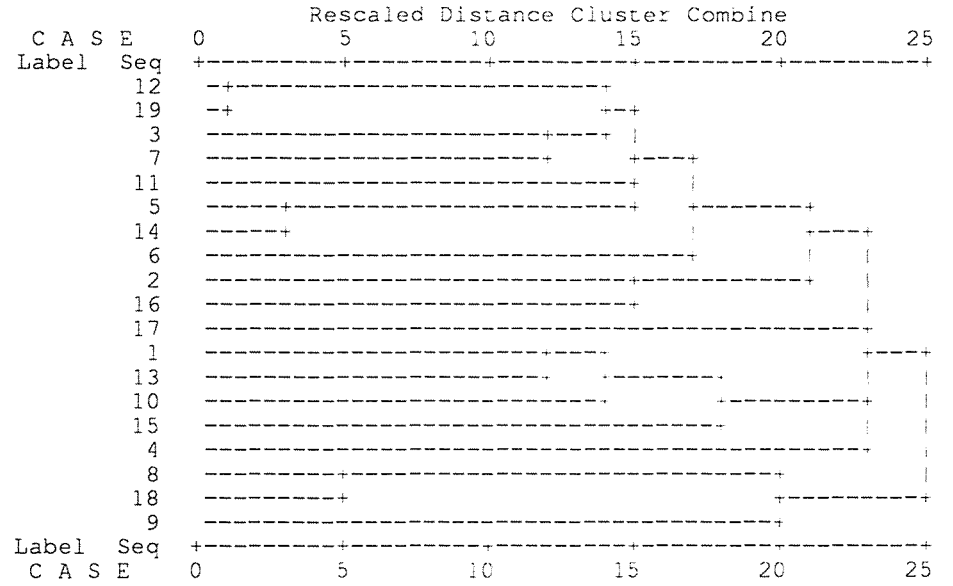
19 unweighted cases accepted.
5 cases rejected because of missing value.
Squared Euclidean measure used.

Clustering procedure halted at Stage 14, due to a plateau of distance coefficents (marked below by bold characters)

Agglomeration Schedule using Single Linkage

	Clusters Combined			Stage Cluster 1st Appears		Next
Stage	Cluster 1	Cluster 2	Coefficient	Cluster 1	Cluster 2	Stage
1	12	19	.000000	0	0	6
2	5	14	2.000000	0	0	10
3	8	18	3.000000	0	0	13
4	1	13	8.000000	0	0	7
5	3	7	8.000000	0	0	6
6	3	12	9.000000	5	1	9
7	1	10	9.000000	4	0	12
8	2	16	10.000000	0	0	14
9	3	11	10.000000	6	0	10
10	3	5	10.000000	9	2	11
11	3	6	11.000000	10	0	14
12	1	15	12.000000	7	0	16
13	8	9	13.000000	3	0	18
→ **14**	**2**	**3**	**14.000000**	**8**	**11**	**15**
15	2	17	15.000000	14	0	17
16	1	4	15.000000	12	0	17
17	1	2	15.000000	16	15	18
18	1	8	17.000000	17	13	0

Dendrogram using Single Linkage



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