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Contract Growing in the New Zealand Nursery Industry: An Attitude and Belief Survey of Woody Plant Growers

A thesis presented in partial fulfilment of the requirements for
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Abstract

Although the New Zealand nursery industry has a long history of exporting live plants, export only earns a small proportion of industry revenue. Many reports have identified promising market opportunities, but the reputed export potential remains unfulfilled. One reason is the reluctance of growers to enter formal growing arrangements with overseas customers. The increasing prominence of retail nursery chains, who also use contractual arrangements, met the same opposition in the domestic market. Growers prefer to retain flexibility and autonomy. Why does this aversion prevent growers capitalising on the opportunities that exist?

This study sought to explain the behaviour of woody plant growers towards formal growing arrangements. The Fishbein-Ajzen Theory of Reasoned Action claimed that behaviour is ultimately heavily influenced by beliefs associated to the likely outcome of the behaviour and the evaluations of these beliefs. Survey work on the domestic scene was more appropriate, collecting behavioural, attitudinal and demographic data. The model explained the behaviour satisfactorily. Analysis found eight important components of behaviour. Logistic regression quantified the strength of influence that each component had on the behaviour.

A conclusion was that changing the component scores of respondents was feasible, and this should ultimately lead to a behaviour change. Increasing the number of growers producing plants under negotiated agreements would mean more growers willing and capable of producing plants for export. However, efforts to increase the proportion of income earned through contractual arrangements may be more rewarding than efforts to increase the number of growers performing the behaviour. Future extension work should use the components identified in this study as the basis of the message.

Keywords: Nursery; contract; attitude; Fishbein-Ajzen; plant.

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This thesis is dedicated to the three strand cord, two known, one to come.

"A cord of three strands is not quickly broken."

Ecclesiastes 4:12.

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Chapter One

Introduction

The arrival of the first European explorers heralded the birth of the New Zealand nursery industry. From rough, frontier beginnings to modern production enterprises, plants have always been grown for trade and consumption. While the household spending on gardening products is among the highest in the world (P. Huddleston, personal communication, 1994), export earnings are small. (Seiler, 1994). Unlike most primary industries in New Zealand, the nursery industry is predominantly domestic focused (Cameron, 1993).

Reports describing large potential markets for live plants exported from New Zealand have circulated within the horticultural community for many years (eg Richards, 1977; Export Opportunity Team, 1978; MacIntyre, 1978; Kitson, 1980). However, statistical evidence reveals that the performance has been mediocre, or even poor, when compared to the growth of other export industries. The value of live plant export sales in 1991-1992 was approximately 5% of the value of live plants sold in the domestic market. Compared to the flower, pipfruit, meat or dairy industries, the nursery industry has indeed remained strongly focused on the local market. The expectations were either too optimistic or the potential went unfulfilled.

In 1993, semi-structured interviews with nursery growers investigated this situation (Seiler, 1994). Industry participants, both exporters and non-exporters, believed there was potential for live plant exports. However, they also believed industry members were either insufficiently skilled to conduct business with overseas customers or were unconcerned with export trade. For the few (approximately 10%) growers with some experience of plant exporting, exports amounted to an insignificant proportion of sales (Cameron, 1993; Seiler, 1994).

The unspectacular performances of New Zealand in the international live plant trade are partially a result of the apparent unwillingness of New Zealand growers to enter contractual arrangements with foreign customers; or the inability to meet the conditions once a contract has been made (Seiler, 1994). While overseas customers specify requirements precisely, New Zealand growers prefer more casual and flexible arrangements (Seiler, 1994).

Retail nursery chains are exerting an increasing influence on the New Zealand domestic market (W. Brett, personal communication, 1994; P. Huddleston, personal communication, 1994). These chains are increasingly using contractual arrangements to ensure the reliable supply of plants. Growers who wish to deal with these chains will have to enter formal growing arrangements and consistently meet customer requirements.

Export behaviour cannot readily be studied. There are relatively few growers with experience of exporting live plants, and overseas customers are too distant to research and survey work. It was decided to use formal growing arrangements within New Zealand as a model for understanding formal growing arrangements with foreign customers. If more nursery growers could produce plants for a local customer according to the requirements of a formal arrangement, it is reasonable to suppose that more growers could produce plants for a foreign customer according to the requirements of a formal arrangement.

Producing plants under formal growing arrangements would appear crucial to the success of nursery growers supplying either the domestic or the export market. However, it is not known why New Zealand growers have been reluctant to commit to formal arrangements with both overseas and domestic customers. This is essentially a problem of understanding human behaviour.

The field of social psychology deals with the reasons behind people's behaviour. One model from this field, the Theory of Reasoned Action (Fishbein & Ajzen, 1975), says that people's behaviour is ultimately influenced by their beliefs

towards the outcomes of the behaviour and the evaluation of these outcomes. Developed by social scientists Martin Fishbein and Icek Ajzen, the ultimate goal of this a model is to predict and understand the behaviour in question. This is achieved through investigating several intervening variables, such as behavioural intention and attitude.

This Theory identifies the important components of "behavioural intention" (ie the intention to perform a certain behaviour). If enough of these components are changed, the behavioural intention and, ultimately, the behaviour is likely to change. This knowledge can become the basis for an extension programme, where accurate information is presented to people to help them form sound opinions and make rational decisions (Van den Ban & Hawkins, 1988).

The aim of this study was to investigate the behaviour and attitude of woody plant growers with respect to formal growing arrangements. The identification of influential factors, and the quantification of the strength of these will form the basis for future extension activities. Earlier work had selected growers involved with woody plant production in New Zealand as the target for study (Cameron, 1993). For continuity and comparative purposes, the same target population was adopted for this study.

The specific research objectives of this study were:

1. To derive a definition for the "formal growing of woody plants" in terms of the conditions required by New Zealand retail chains of their suppliers.
2. To describe the woody plant growing sector of the New Zealand nursery industry in terms of the characteristics of the growers and their businesses.
3. To use the Theory of Reasoned Action (Fishbein & Ajzen, 1975) to gain an understanding of the attitude of nursery growers in relation to

performing or not performing the behaviour "formal growing of woody plants."

4. To identify the important components of attitude for use in future extension programmes, which would have as an aim "increasing the number of businesses producing plants under formal growing arrangements and therefore able to meeting the requirements of overseas customers."

Chapter Two reports the history of the New Zealand nursery industry. Chapter Three provides an overview of social psychology literature, covering the importance of attitude in understanding human behaviour, and its measurement. The Fishbein-Ajzen Theory of Reasoned Action is explained in detail. Also covered is other attitude research in the New Zealand primary sector and a concise coverage of non-experimental research methods. A description of the method followed this study occurs in Chapter Four. Results of this research are presented in Chapter Five and discussed in Chapter Six. Conclusions are presented in Chapter Seven.

Chapter Two

History of the New Zealand Nursery Industry

2.1 THE EARLY YEARS: 1769-1913

In 1769, James Cook, captain of HMS Endeavour, became the first European to land on Aotearoa, "Land of the Long White Cloud" (Delpar, 1980). He wrote "the face of the Country is of a hilly surface and appears to be clothed with wood and Verdure" (Beaglehole, 1968, p. 124). The wealth of new plant material in New Zealand fascinated the expedition naturalists, Joseph Banks and Daniel Solander (Reed & Reed, 1951). Although the cultivation and trading of plants occurred during the pre-European period of New Zealand's history, these early naturalists became our first plant exporters to the Northern Hemisphere. Uncultivated native plants, after being sketched and catalogued, were removed directly from the bush (Glenn, 1950).

Conversely, some naturalists devoted their lives to collecting plant material from around the world for growing in New Zealand. We can attribute much of the diversity of plant material in New Zealand to the activities of these "plantsmen." They brought plant material to New Zealand from all parts of the globe (Hammett, 1993).

In this early period, the native inhabitants grew most of the produce and traded it for tools, weapons and alcohol (Olssen, 1984). Maori quickly recognised that "seamen" required fresh food to eat and provisions for their journey home (Reed & Reed, 1951). Plants were grown for trade as early as 1809, although it was the harvested fruits and vegetables rather than whole plants that were initially traded (Olssen, 1984). Robert Murray reported Maori growing potatoes in an area near Foveaux Straight to trade with the "tongata bulla" (the people of the boats) for iron axes, adzes and fish hooks (Olssen, 1984).

The development of the country turned from the coastal activities of sealing and whaling in the early 1800's, towards the land-based industries of forestry, gold mining and farming. This brought a new type of immigrant, one who ventured further inland and stayed longer (Olssen & Stenson, 1989). Initially these immigrants depended on the local population for their food supply. John Wallace, who landed at Petone in January 1840, reported "Pigs, potatoes, and fish are to be had in abundance. The native chief supplies them. Pork is 6d. per lb., potatoes 1/- per basket It all depends on the circumstances" (Hale, 1955, p. 17).

However, these immigrants were soon growing their own food and even a surplus to sell. Thus it was the early settlers and missionaries who became the first white growers and suppliers of plants (Sykes, 1974). Coming to New Zealand with the intention of making a new home, they brought with them all that was necessary to start life in a new country. They carried pips, fruit stones and seeds on the long journey from Europe, Australia and America, to establish gardens upon arrival (Hale, 1955).

Hale (1955) reports sales such as: grafted apple trees by Stephen Stockbridge of the Hutt Valley in 1847; cabbages and beetroot by David Bower of Otago in 1849; and rhubarb, cauliflower and cabbage by William Hale from Nelson in 1850. Clearly, the need for food was more urgent than that for ornamental plants.

Settler numbers increased markedly during the 1840's and 1850's, due to the efforts of the New Zealand Land Company (Olssen & Stenson, 1989). In Nelson, Auckland and Otago, the demand for nursery products was driven by the needs of the settlers. Nurseries sprang up around these centres, supplying vegetables, fruit, flowers and live plants for the local population (Hale, 1955).

Even so, local production was insufficient to satisfy this demand. Australia became the source of much imported plant material. In 1841, an advertisement

in the New Zealand Gazette offered fruit trees for sale, imported from "Van Dieman's land" (ie Australia) (Hale, 1955).

Exports of native and ornamental plants made as the importation of food plants continued. In 1842 the New Zealand Land Company paid John Armstrong £10 for collecting a case of native plants and 12s. 6d. for the carriage of them from the bush to the wharf (Hale, 1955). Hale also writes of exports of plants in the early 1900's to South America, England, Germany, France, Italy and Ireland, some of which were native plants.

This period was one in which international trade flourished. Unhindered by quarantine restrictions, growers and collectors sent plants around the world without encountering trade barriers (Cameron, 1993). The size of orders was large, with tens of thousands being bundled and sent by boat (Hale, 1955). Large volumes of plant material circled freely around the globe, much to the delight of growers, who had unrestricted access to imported plant material.

In 1880, gold and wool supported the colony (Hale, 1955). Growers were dependent on the "wool kings" and pastoral farmers to purchase most of their shelter and fruit trees. Success of the farmers was critical to the success of the nursery industry. The fortunes of growers followed the demand and price for wool. When the wool price dropped in London, a frequent occurrence, there were only two options to dispose of products, auction sales or bonfires (Hale, 1955). Bonfires were sometimes the less costly.

The people who endured this, and continued with their chosen profession, were true pioneers, resolute and self-reliant (Hale, 1955). He claimed many of these businesses only had short lives (15-20 years). Like many modern nursery businesses, they did not survive their founders (Cameron, 1993).

In spite of these hardships, or maybe because of them, growers formed the New Zealand Association of Nurserymen (NZAN) in 1904. This was the first

documented instance of cooperation between New Zealand growers (Hale, 1955). Founded by Mr Horton, a Hawke's Bay nurseryman, the purpose of this organisation was to obtain the cooperation of growers to promote the interests of individuals within the nursery industry. The membership of the NZAN had grown to 125 businesses by 1916 (New Zealand Association of Nurserymen, 1916).

2.2 ECONOMIC PROBLEMS: 1914-1944

While the future of international trade seemed promising, two simultaneous factors triggered the worst period in the history of the nursery industry. World War I closed the usual trade routes. They were abandoned due to the threat of enemy warships. Young men answered the call to serve King and Country, and financial institutions restricted their lending (Hale, 1955).

In 1916, the Government first enacted legislation requiring most types of nursery growers to register with the Department of Agriculture, Industry and Commerce (Department of Agriculture, Industry and Commerce, 1917). The reason was purportedly to control the spread of plant diseases, a move helped by quarantine regulations prohibiting the importation of plants into New Zealand. This also served to protect local producers from foreign competition.

New Zealand was not alone in acting to restrict imports. In 1912 and 1919, legislation was passed in the United States of America that severely limited imports of plant material (Davidson, Mecklenburg & Peterson, 1981). Although the Government of the United States of America claimed this move slowed the spread of disease, it had a more dramatic effect on slowing imports. This created a favourable marketing situation for growers in that country. The same occurred in many countries (Davidson et al., 1981).

International trade in live plants almost ceased during this period. With the loss of export earnings, and due to unfavourable conditions in the domestic market, the nursery industry entered a period of decline. By 1923, owners were walking off their land because of high debts and large amounts of unsold stock (New Zealand Association of Nurserymen, 1924). Growers were again forced to burn their surplus product (Hale, 1955).

In the period between the two World Wars, the nursery industry remained relatively unsophisticated (Richards, 1977). Work in the field was often done by hand, despite the availability of more technologically advanced methods (Hale, 1955). Most of the produce was sold either from the farm gate or by mail order, with the nursery owner accepting whatever price could be fetched (Richards, 1977). This market situation implies there was a surplus of material in these years, although maybe only in certain regions and varieties (Cameron, 1993).

While new technology allowed many New Zealand industries to make advances after World War II, this did not occur in the nursery sector. The introduction of plant growth regulators and herbicides should have enabled growers to produce large numbers of plants more profitably (Richards, 1977). However, the premises and equipment of many growers were old and not easily modified to incorporate the new technologies. There was insufficient capital available for the replacement of aging facilities, and this hindered the adoption of new methods (Cameron, 1993).

Richards (1977) also suggested another reason that prevented the industry from advancing rapidly. He said the "deeply entrenched conservatism among the people involved mitigated against the development of new technology" (p. 27). When new methods cut across old habits, there were problems with the uptake of the technology.

Hale (1955) supports this view of the founders of New Zealand's nursery industry. This author's description provides insight into the life of these early pioneers,

where long hours of hard physical work were not well rewarded in monetary terms. For many growers it was only their love for plants that sustained them. However, it appears that the qualities that allowed them to carry such heavy burdens may have led to the problems that Richards described. Recent research suggested that these problems continue today (Cameron, 1993).

2.3 YEARS OF EXPANSION: 1945-1983

Growth in the nursery industry over the last 50 years has been driven by two main factors: growth in the population, and the expansion of related industries. Between 1945 and 1991 the population, of New Zealand doubled, from 1.7 million persons to 3.4 million (Statistics New Zealand, 1994). The population also became more urban. By 1991, only 15% of New Zealanders lived in rural areas (Table 2.1). Therefore, 85% of the population lived in urban areas, covering only 2.7% of the land area.

Table 2.1. Percentage of the population living in the rural and urban areas of New Zealand between 1936 and 1991.

Years	Population in rural areas (%)	Population in urban areas (%)
1936	32.1	67.9
1966	20.7	79.3
1991	15.0	85.0

Source: Statistics New Zealand, 1993.

During the 1950's and 1960's this expanding urban population, intent on owning a home and developing a garden, led to an expansion of the plant market. Nurseries were established and developed specifically to meet consumer demand for plant material. These nursery businesses tended to concentrate around the major New Zealand cities to be closer to their markets (Cameron, 1993), repeating a pattern of the 1840's and 1850's.

It has been claimed that New Zealanders are very "garden conscious" (P. Huddleston, personal communication, 1994). The annual household spending on gardening products as a percentage of total household spending is among the highest in the world. This attitude has surely contributed to the expansion of the nursery sector.

The development of the fruit, timber and flower export industries was the second factor causing an expansion in this period. Horticulture went through a boom in the 1970's, with pipfruit and kiwifruit leading the way. This stimulated an interest in other horticultural crops suitable for export, such as nashi, persimmon, pepino, avocado and berry fruits. Simultaneously, the returns for pastoral farming were low. Changes to tax laws allowed investors to write off development expenditure against other business activities, so horticulture and forestry became more worthwhile propositions. Capital surged into these sectors as entrepreneurs advertised "get-rich-quick" schemes. As the fortunes of the nursery industry once mirrored those of the wool merchants in London, in more recent times they have been dependent on the performance of these associated industries.

While the growth of associated industries led to a boost of nursery sales, it also generated optimism for the export of live plants. Rainey (1974) claimed that New Zealand could develop a big European export market for live plants. Following a visit to Europe, Rainey became convinced that New Zealand had some market advantages in supplying the opposing hemisphere with plant material.

Richards (1977) claimed there was no technological reason New Zealand should not become a major exporter of plant materials. The Minister of Agriculture was so impressed by the opportunities for growth in horticulture he said the potential was limitless (MacIntyre, 1978).

An act of parliament established the New Zealand Export-Import Corporation (NZEIC) in 1974. This was a statutory body formed to promote New Zealand's overseas trade (Stansworth, 1978). The NZEIC commissioned several reports

in the early 1980's. These provided information on crops and markets so informed investment, production and marketing plans could be prepared. For instance, Kitson (1980) wrote positively of the Japanese market, but warned potential exporters to take note of the cultural nuances of foreign countries. In another study, Hayward (1981) claimed there were market opportunities for live plants in the Middle East, but said geographic distance to the market may pose a barrier to profitable export.

Glowing reports mixed with caution were common. Growers were encouraged to cooperate and develop the excellent opportunities for selling live plants to Northern Europe (Export Opportunity Team, 1978). England was thought to offer the best opportunity for the sale of plants, particularly of cuttings and small plants (Ministry of Agriculture and Fisheries, 1980).

Japan offered a large potential market for New Zealand horticultural produce, although liaison between growers was considered essential (Horticultural Export Development Committee, 1981). Hunt (1983) found that export trade would allow nurseries to produce larger volumes, by that becoming more cost efficient. A report on the plant export opportunities to Southern California concluded that a professional, long-term approach to the market should produce good results (New Zealand Trade Commission, 1985).

In summary, these reports were generally very positive towards live plant exports. Many opportunities were identified in the world market, and everyone knew New Zealand could produce plants well. However, the industry has failed to achieve the expected growth. Although the reports were probably too optimistic, it appears the conservatism of growers hindered the capitalising on the opportunities that were there.

Still, the industry did manage to evolve during this time. Driven by growth in both the export and domestic markets, and following overseas trends, some businesses became more specialised (Richards, 1977). This happened either

with respect to place in the industry chain (eg propagation, production or retail), or to the crops grown (eg forestry, fruit trees or ornamental). However, many businesses maintained a broad range of crops, claiming this helps customer satisfaction (Cameron, 1993).

Although not mentioned by Richards, containerisation was reported as the most important technological change in the American nursery industry in the late 1950's (Davidson et al., 1981). The use of pots instead of open ground growing has allowed the sale of plants all year, rather than businesses being limited to delivery in the dormant period when wrenching and lifting could occur. There is no reason to assume that the changes were any less significant to the industry in New Zealand. Other developments included the use of slow release fertilisers, improved pesticides, and hydraulic power for root pruning and lifting plants (Davidson et al., 1981).

In retrospect, changes in the industry led to changes in the industry organisations. In 1927, the name of NZAN was changed to the New Zealand Horticultural Trades Association (NZHTA) (New Zealand Association of Nurserymen, 1927). It was felt that the previous name failed to represent the full range of trades catered for. These included nursery owners, seed producers, florists and landscape gardeners.

By 1969, the NZHTA was comprised mainly of nursery owners, with various trade groups having developed their own associations. That year the Association s changed their name to the New Zealand Nurserymen's Association (NZNA) (New Zealand Horticultural Trades Association, 1969). This is evidence that the Association has become more narrowly focused over the years. The old name was out of line with similar organisations in other countries. By the time of the next meeting there was enthusiasm for the new name. It was hoped the modern insignia would gain acceptance and be understood by the public (New Zealand Nurserymen's Association, 1970).

2.4 RECENT DAYS: 1984-1994

New Zealanders elected a Labour government to office in 1984. This move introduced a comprehensive programme of change, unprecedented in the history of this country (Hawke, 1987). Now known as "Rogernomics"¹, the first moves involved the reduction or removal of agricultural subsidies (Johnson, 1987). Intended to allow market signals to guide primary sector production, initially the incomes of primary producers fell and capital flowed out of these industries (Easton, 1987).

The changes taking place in the nursery industry in this period have been poorly documented. Researchers have concentrated on the main export-oriented industries linked with fruit growing and pastoral farming. Since 1981, growers of prescribed plants have not had to register their businesses, therefore the numbers are unknown. Only businesses earning more than \$30,000 annually had to register for the payment of Goods and Services Tax (GST). Many nursery businesses had a gross income of lower and therefore did not have to register. Furthermore, business surveys by the Department of Statistics excluded businesses if the participants earned less than half their income from those activities (Department of Statistics, 1989). Again, this excluded many nursery businesses.

Even the NZNA does not know industry details beyond those of their own members. With 435 member businesses in 1992, it was not certain what proportion of the industry this represented (New Zealand Nurserymen's Association, 1993). The Association claimed their members made up 40-60% of New Zealand's nurseries, and produced 70-80% of the volume of plants traded (New Zealand Nursery Research Centre, 1991).

¹"Rogernomics" was a name given to the economic reforms initiated by the then Minister of Finance, Roger Douglas.

Cameron (1993) found that 75 of the 187 respondents (about 40%) to his survey of woody plant growing businesses were members of the NZNA. Other organisations had smaller followings, and 25% of growers were without any cooperative organisation to represent their views (Table 2.2).

Table 2.2. Primary organisation membership of woody plant growers.

Organisation	Membership	Percentage
New Zealand Nurserymen's Association	75	40
None	47	25
International Plant Propagators Society	18	10
New Zealand Tree Crops Association	10	5
Farm Foresters Association	8	4
New Zealand Rhododendron Association	5	3

Source: Cameron, 1993.

Recently, there has been some information on the New Zealand nursery industry coming either from the New Zealand Nursery Research Centre (NZNRC²) or from individuals associated with ornamental research at Massey University. In 1991, an industry workshop concluded both the export and domestic markets were strong, yet there were many internal problems in the industry (see Table 2.3).

In 1993, a staff member of Massey University wrote up the results from an industry census of woody plant growers (Cameron, 1993). The following description of the nursery businesses was derived from this work:

- Although nursery businesses were distributed throughout New Zealand, higher numbers of nurseries were located in the north and east of the North Island. Official statistics fail to report on many of these businesses, either because they occupy too small an area or their owners earn less than 50% of their income from the business.

²The New Zealand Nursery Research Centre was established by the NZNA and Massey University in 1975 as a jointly funded research facility, but closed in 1994.

- Businesses surveyed were diverse in terms of the land area used, staff numbers, crops grown, volume produced and technology employed. In addition, there was no relationship between these factors, and therefore no suitable measures could be found for comparison between businesses.

Table 2.3. Strategic analysis of the New Zealand nursery industry.

Strengths	Sympathetic domestic market due to environmental concerns. Enthusiastic and committed growers. Export market with good potential. Climate.
Weaknesses (internal)	Industry organisation is fragmented & lacks strategic planning, industry standards and long-term R & D investment. Growers are not profit oriented and lack business skills. Products are perishable and have a long development time. Domestic market is small.
Opportunities	Lifestyle changes of New Zealanders. Promotion of the industry and products through the media. Coordinated marketing. Exports. Environmental opportunities for promotions. Better industry cooperation and organisation.
Threats (external)	Political (economic) climate. Slow population growth. Potential loss of green image through chemical use. Internal/external competition.

Source: New Zealand Nursery Research Centre, 1991.

- The people involved were well-educated when compared to the members of other primary industries, having often entered the industry with previous experience in other industries. Yet there was a surprisingly high level of suspicion and even antagonism towards other growers, expressed on a personal level.

- Very few businesses were involved in live plant export. Only 10% of the respondents had exported plants directly. Of these, only three growers declared earning more than \$100,000 per year from export activities, with many reporting modest earnings.

This claim regarding export is supported by the External Trade Data³. With sales on the domestic market of around \$170 million in 1991-92 (New Zealand Nursery Research Centre, 1991), export income represented only 5% of the local sales revenue. This compares with around 50% for cut flowers (New Zealand Nursery Research Centre, 1991) and 90% for fresh apples (New Zealand Apple and Pear Marketing Board, 1993). The nursery industry was therefore predominantly focused on the domestic market. Only a little of the industry revenue earned offshore.

Despite the reported "unlimited possibilities", live plants remain a small export earner. In 1991-92 the value of horticultural exports was \$17,873 million, or 7.2% of the total value of the country's exports (The Orchardist, 1992). During the same period the nursery industry earned about \$8.5 million from exports (New Zealand Nursery Research Centre, 1991), less than 0.05% of the total value of horticultural exports. In the same year the export earnings from cut flowers and foliage were about \$42 million (Table 2.4), five times the nursery earnings.

Table 2.4. Value of bulb, live plant, cut flower and foliage exports; 1988 to 1994 (year ending June 31, \$ million, fob).

Product Groups	1988	1989	1990	1991	1992	1993	1994
Bulbs ³	1.3	2.4	1.7	3.3	5.0	5.7	6.1
Live plants	2.1	2.9	2.5	3.4	3.5	3.9	3.2
Cut Flowers	5.1	16.1	19.0	24.7	27.8	35.3	42.2
Foliage ⁴	5.1	9.5	11.0	17.0	13.9	18.9	18.7
Total	13.6	30.9	34.2	48.4	50.2	63.8	70.2

Source: Statistics New Zealand, 1994a.

³ This includes bulbs, tubers, tuberous, roots, corms, crowns and rhizomes.

⁴ This includes mosses, lichens, grasses, branches and other parts without flowers or flower buds.

³This is a record of the official, declared value of all products entering or leaving New Zealand.

Export sales of live plants have been growing. From 1988 until 1994 the value of live plants leaving New Zealand grew from \$2.1 million to \$3.2 million⁴. Although this represents a 52% growth over 6 years, this was easily the lowest growth rate of the categories listed (Table 2.5). In some years the value of live plants exported actually fell.

Table 2.5. Growth in export earnings for bulb, live plant, cut flower and foliage exports for the period 1988 to 1994.

Product Group	Percentage Growth
Bulbs	369
Live plants	52
Cut Flowers	727
Foliage	267
Total	416

Source: Statistics New Zealand, 1994a.

Interpreting data on live plant exports from New Zealand requires an international perspective. The United Kingdom's garden product market was worth around NZ\$6 billion⁵ in 1992, compared to NZ\$1 billion in Australia. It was NZ\$170 million in New Zealand, for the same period (Skegg, 1993). The United Kingdom imported live plants worth over NZ\$33 million in 1977, 80% coming from EEC countries (Export Opportunity Team, 1978). Japan imported NZ\$13 million of live plants in 1979 (Kitson, 1980).

The International Floriculture Quarterly Report claimed that the total international trade in floriculture was worth NZ\$8.47 billion (World trade in cut flowers., 1993). World trade in ornamental plants was valued at NZ\$3.68 billion in 1989. This was up from NZ\$1.86 billion in 1985, an increase of about 100% over the four-year period (New Zealand Trade Development Board, 1992).

⁴There is a difference between the figures presented in Table 2.5 and those in the preceding paragraphs, due to a reclassification of the export records.

⁵Where conversion to New Zealand dollars (NZ\$) was necessary, exchange rates on 8 March 1995 were used.

Cameron (1993) listed the methods by which businesses with live plant export experience became involved in that activity (Table 2.6). Almost half the 19 respondents involved in export activities listed some sort of personal contact as the reason. Similar results were obtained by Seiler (1994) through interviews with woody plant exporters.

Table 2.6. Methods by which respondents involved with export developed that activity.

Grower description of the method of export development	Percent
Requests from personal contacts	21
Contacts made while travelling overseas	15
Advertisements in foreign magazines	11
Because I am an international expert	11
Gradual growth	5
Bought a business already exporting	5
Overseas buyers approached me	11
No comment	21
Total	100

Source: Cameron, 1993.

2.5 SUMMARY

For 140 years after the arrival of European explorers in 1769, the New Zealand nursery growers struggled to establish themselves. The work of these pioneers has ensured that an enormous range of plant material is available for propagation, both native and collected from around the globe.

Post-war prosperity ensured the period from 1945 till 1983 was financially favourable for nursery businesses. Initially, population growth fuelled demand and later capital became more freely available. Since deregulation, starting in 1984, the industry has matured to become efficient and responsive to market' needs.

Due to lack of funding, scarcity of information sources and the relatively unimportant export component, there has always been a shortage of research on the nursery industry. While technical research has occurred, socioeconomic research has been largely ignored.

Over recent times the nursery industry has grown steadily, but has not become export focused. Despite the encouraging reports of possibilities for New Zealand to export live plants overseas, the industry has remained oriented towards the domestic market.

The sparse socioeconomic research conducted on the nursery industry and its participants provided a starting point for this study. The aim was to extend the understanding of the industry into the area of export behaviour. An introduction to this field is provided by the next chapter.

Chapter Three

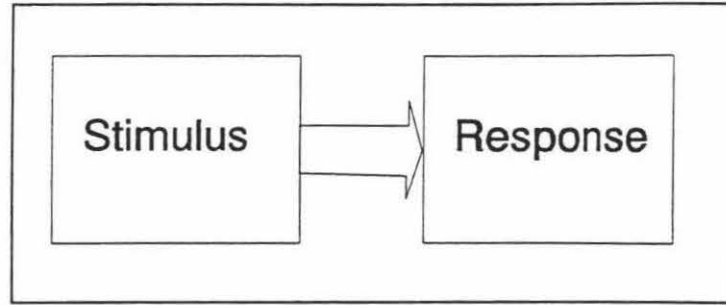
Attitude and Behaviour

A selective review of the social psychology literature was undertaken in this study. It identified the importance of attitude research in the study of human behaviour (Section 3.1). A review of the components of attitude (Section 3.2) and the methods of attitude measurement (Section 3.3) occurred. Relating attitude to behaviour (Section 3.4) allows readers to gain an understanding of the important predictive abilities of attitudinal data. The Fishbein-Ajzen Theory of Reasoned Action is examined carefully and explained in detail (Section 3.5). Selected occurrences of attitude research in the New Zealand primary sector were briefly reviewed (Section 3.6). The value of this model for changing behaviour was covered (Section 3.7), with the implicit assumptions clearly stated. Some non-experimental methods of investigation available to social psychologists are described (Section 3.8).

3.1 SOCIAL PSYCHOLOGY AND ATTITUDE RESEARCH

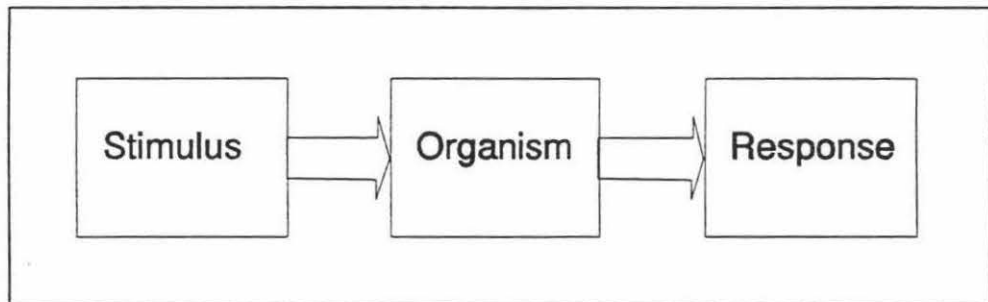
According to an early definition, social psychology is "the science which studies the behavior of the individual in so far as his behavior stimulates other individuals, or is itself a reaction to this behavior" (Allport, 1924, p. 12). The traditional stimulus-response theory says that a certain stimulus will elicit a particular response (Figure 3.1).

Figure 3.1. The stimulus - response model.



As cognitivists examined this claim, they decided that relationship only held for certain types of behaviour, and then only in certain animals. The relationship between stimulus and response acted through an intermediary that needed further study, the organism (Figure 3.2).

Figure 3.2. A modified stimulus - response model.



Focusing on the organism, social psychologists have often claimed attitudes are the major force intervening between the stimulus and response (Fishbein, 1967). Attitude can be most simply defined as "orientations of mind, where internal states exert influence on overt behaviour" (O'Keefe, 1990, p. 17). Another definition is, a "learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object" (Fishbein & Ajzen, 1975, p. 23).

In the 1920's, attitude was regarded as a concept so central that people equated social psychology with the study of attitudes (McGuire, 1968). The concept of attitude is "probably the most distinctive and indispensable ... in contemporary

American social psychology the primary building stone in the edifice of social psychology" (Allport, 1954, pp. 43-45). Claims like these have support in the huge volumes of literature published on attitudes. The importance of attitude was explained by Kelvin (1969, p. 34):

Man can only cope with his environment if that environment is reasonably orderly and predictable, so that the individual, and the group or society, may know where they stand and what to do Attitudes are, in fact, the fundamental processes or systems whereby the individual orders his environment and behaviour on the basis of values.

Many other researchers have identified attitude as a concept very important to the study and understanding of humans and their actions (Allport, 1961; Rokeach & Mezei, 1966; Rokeach, 1973; Fishbein & Ajzen, 1975). To ignore attitude while seeking to understand human behaviour would be foolhardy at least, if not disastrous.

As scientists, social psychologists operate on two levels; theory and observation (Kerlinger, 1986). While theory is formed to explain general trends of understandings, specific methods of collecting accurate observations are needed to test theory. This process is known as measurement. Variables are used for comparing different individuals' measurements of like characteristics (Kerlinger, 1985). For example, if the size of people is of interest, individuals may be measured from their head to their toes, and the variable could be called height. Variables may include sex, age, height, weight, attitudes, beliefs, opinions, etc. Therefore any investigation into the phenomena of social psychology will require measurement of the related variables.

It is often useful to distinguish between two types of variables. Psychological variables are individual characteristics relating to the nature, function or phenomena of the human mind (Kerlinger, 1986). These include beliefs, opinions, attitudes, motivations, values, cognitions and behavioural intentions

(Elms, 1976). They cannot be directly observed by another individual, but must be inferred from the individual's introspective reports or from observations of his/her behaviour. Sociological variables are qualities of individuals that arise due to membership of social groups (Blanchard, 1993). Examples such as age, gender, income and occupation, can be measured directly.

3.2 COMPONENTS OF ATTITUDE

Heider (1946) and Rosenberg (1960) argued that people come to hold positive attitudes towards anything that helps them attain their goals, and negative attitudes towards whatever prevents them from attaining their goals. Therefore attitudes are a blend of beliefs and values: a feeling about a particular object in terms of its assumed relationship to one's values (Elms, 1976). Furthermore, Elms says that, in Plato's terminology, attitudes combine cognitive (belief) and affective (value) components.

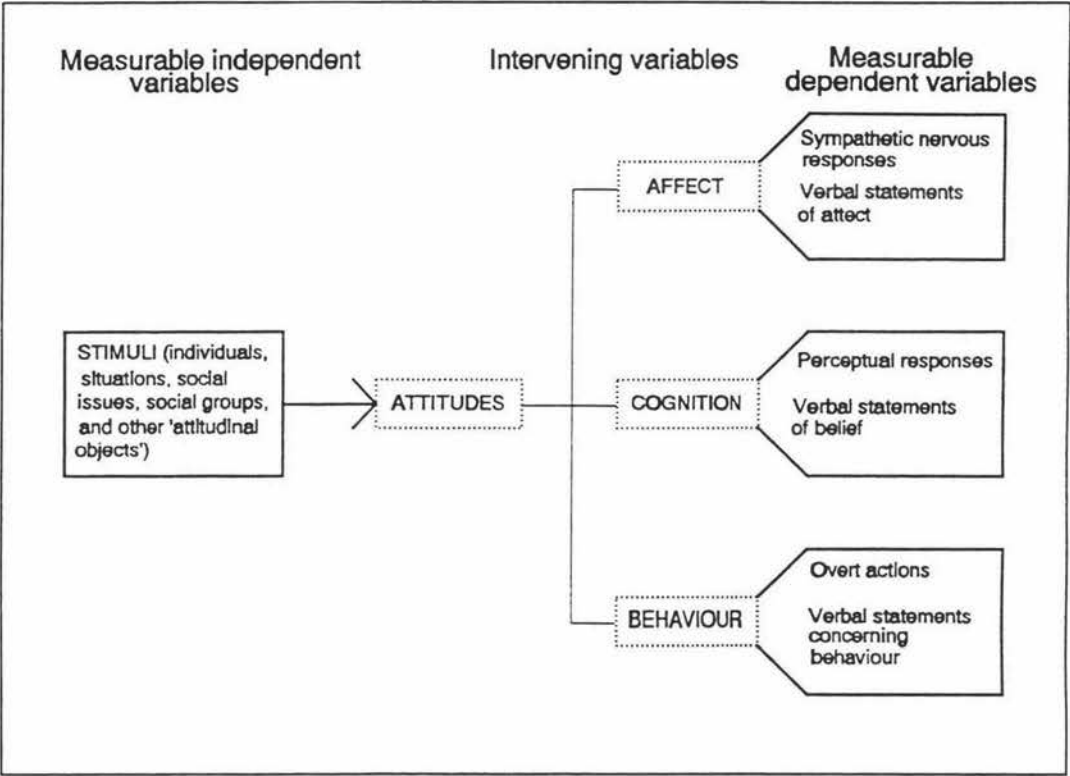
Attitudes were defined by Rosenberg and Hovland (1960, p. 3) as "predispositions to respond to some class of stimuli with certain classes of response" These classes of responses are specified as:

- a). A cognitive component - the idea, belief or opinion towards the object.
- b). An affective component - concerns the emotions, feelings of like or dislike, good or bad.
- c). A behavioural component - a predisposition to act, a behavioural intention or an action tendency.

The three-component model of Rosenberg and Hovland (Figure 3.3) is much more than a definition of attitudes. It identifies the components by viewing attitudes as hypothetical constructs that intervene between the stimuli and

subsequent behaviour. The stimuli are grouped into a category that represents the attitude object. The attitude has three aspects, and each aspect is measured by a variety of subject responses.

Figure 3.3. The three-component models of attitudes.



Source: Rosenberg and Hovland, 1960.

3.3 MEASUREMENT OF ATTITUDE

To use attitude as a variable in the testing of behaviour theory, a method of measurement must be established. This problem was, and continues to be, a basic methodological problems of social psychology (Eiser, 1980). Thurstone (1928, p. 530) illustrates this: "It will be conceded at the outset that an attitude is a complex affair which cannot be wholly described by any single numerical index". Attitude can only be ever measured in part.

In the following paragraphs some methods of attitude measurement will be described. The sources used for writing these summaries are: Zimbardo and Ebbesen (1970); Tittle and Hill (1975); Reich and Adcock (1975); Elms (1976); and Stahlberg and Frey (1988).

Thurstone's Method of Equal-Appearing Intervals.

In 1928, Thurston conducted one of the first studies concerned with attitude measurement. He developed an approach for defining attitudinal scales. Below are a few statements from a list compiled by Thurstone (1930, p. 89):

- 1 Films are to blame for the prevalence of sex offenses.
- 2 Films are just a harmless pastime.
- 3 Films bore me.
- 4 I think films are fairly interesting.

Respondents had to judge the degree to which each item in a list of statements expressed a positive or negative attitude towards the object. This process introduced order into the list. In this ordering method, he assumed the interval between statements was approximately equal, with each statement being an equal distance from the one above and below. Thurstone's feeling of success can be gauged by the title of his first publication on the topic, "Attitudes can be measured." (Thurstone, 1928). Previously, attitude measurement had been elusive. However, following Thurstone's approach, many alternative methods were soon developed. He is remembered for first measuring attitudes, and introducing metric measurement to a new area of research.

Likert Method of Summated Ratings.

The first of the deluge of new methods was the Likert Method of Summated Ratings in 1932. The use of a series of opinion statements about an issue overcame the laborious and time-consuming task of producing an ordered scale.

Respondents rated the strength of their agreement or disagreement with each statement on a five-point scale. A person's attitude was the sum of the scores

over all statements. Assumed in the theory of summation was that each statement was a function or component of the attitude in question. Because there was no assumption of equal interval, it was quite possible to order respondents' attitudes on a continuum, but impossible to say how close or far apart different attitude scores were.

Osgood Semantic Differential Method.

The two scaling techniques described above attempt to measure attitudes by measuring the extent of agreement with various opinion statements. In contrast, this next method evolved out of research in the 1950's by Charles Osgood and others, concerned with the "measurement of meaning" that people attach to words. The Osgood Semantic Differential Method uses a set of semantic scales based on bipolar adjectives to allow respondents to show their attitude towards various words. Analysis of results obtained from this method revealed three dimensions people use in judging concepts. These are the evaluative factors (eg good-bad), the potency factor (eg strong-weak) and the activity factor (eg active-passive). It was claimed that by understanding how these three components of attitude differed, one could predict the behaviour of respondents when dealing with the concept concerned.

3.4 ATTITUDE AND BEHAVIOUR

The emphasis on attitude to explain behaviour has not enjoyed a harmonious following. Inspired by LaPiere's (1934) study on racism⁶, many researchers rejected measures of attitude that involved asking people directly or indirectly to describe their actions (Elms, 1976).

⁶LaPiere toured America with a Chinese couple, noting the response of hoteliers and restaurateurs. The observed behaviour differed markedly from earlier surveys asking whether a Chinese person would be served in the establishment.

Triandis (1971) claimed that attitudes are neither a necessary nor sufficient cause of behaviour, but merely a facilitative factor. While the study of attitudes contributes to the understanding of behaviour, it is not sufficient for a full understanding. Even after 75 years of research on attitudes, there is little evidence to support the claim that knowledge of an individual's attitude towards some object will allow one to predict the way that person will behave towards the object (Fishbein, 1967). He lists several studies all supporting the claim that people bring attitudes into line with behaviour, rather than altering behaviour to match attitudes (eg Landy, 1966; Gerald, 1965; Cohen, 1960).

Yet it would be naive to conclude that there is no relationship between attitude and behaviour. Eiser (1980, p. 45) said:

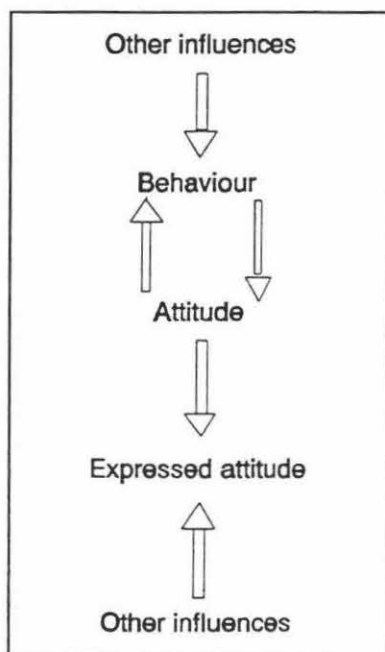
A situation in which there was no correspondence between people's expressed attitudes and their behaviour, therefore, would not simply be a situation in which people did not act out their beliefs, it would be a situation in which they could not even communicate their preferences through language at all.

"Are attitudes necessary?" wrote Abelson (1972). He was not asking an absurd question, but rather an affirmative response sought to counteract the earlier attacks on the attitude-behaviour relationship. Instead of rejecting attitudes as unimportant, Abelson recommended an examination of the basic theory and underlying assumptions to improve the predictive ability of attitudes.

Myers (1990) presents a diagram showing two possible reasons why the relationship between attitude and behaviour may not be strong (Figure 3.4). He claims the attitude we express and our actual behaviour is subject to other influences. First, the process of expression sometimes distorts people's real attitudes. Rather than expressing their true attitude, people may lie, exaggerate or play down their real attitude to hide how they really feel. Secondly, a person's typical or average behaviour that should be observed to see the true effects of

attitude on behaviour. During a "one-off" look at behaviour, the observer may see an extreme or non representative form of behaviour. It may be influenced by the presence of others, or some temporary physical or emotional state.

Figure 3.4. Why our attitudes are not perfect predictors of our behaviour.



Source: Myers, 1990.

Freedman, Carlsmith and Sears (1970) also recognised the effect of these factors:

.... attitudes always produce pressure to behave consistently with them, but external pressures and extraneous considerations can cause people to behave inconsistently with their attitudes. Any attitude or change in attitude tends to produce behaviour that corresponds with it. However, this correspondence often does not appear because of other factors that are involved in the situation (pp. 385-386).

Cohen (1964) raised concern over this assumption of a causal link between attitudes and behaviour, i.e. an attitude changing would result in a behavioural

change. "Until a good deal more experimental investigation demonstrates that attitude change has implications for subsequent behaviour, we cannot be certain that the attitude concept has any critical significance whatever for psychology" (Cohen, 1964, p. 17). Cushman and McPhee (1980) also believed this assumption had hindered the development of attitudinal research.

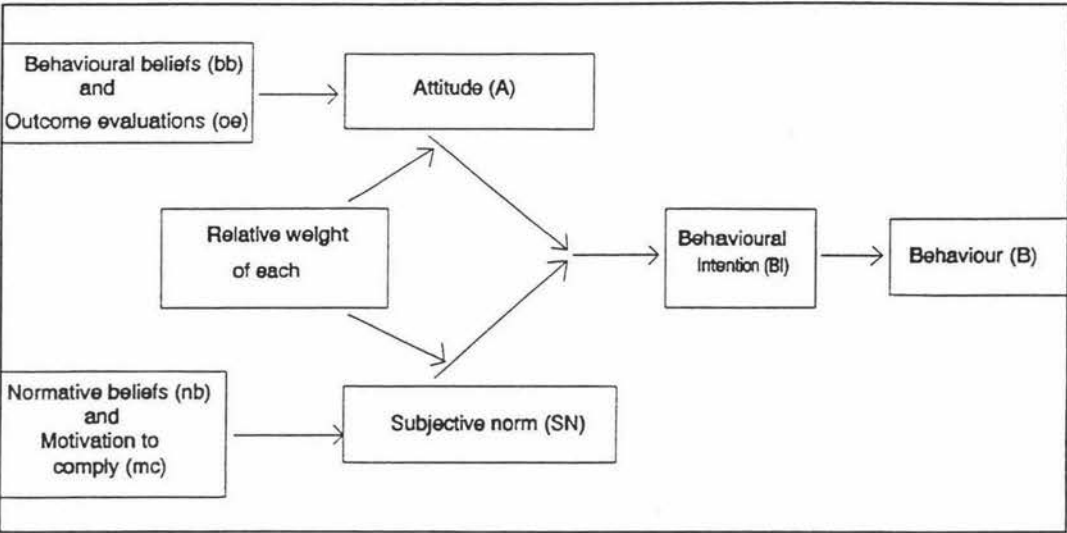
Some new conditions emerged from an investigation of the basic theory and assumptions. Ajzen and Fishbein (1977) wrote that when the measured attitude is general and the behaviour is specific, one should not expect a high correspondence between words and actions. This was the case in 51 out of 52 studies they reviewed. Yet, when the behaviour and the attitude were specific, one could expect high correspondence. Their work eventually led to the development of a theory, one that has become popular and influential.

3.5 FISHBEIN-AJZEN THEORY OF REASONED ACTION

Fishbein and Ajzen (1975) define attitude as a learned predisposition to respond consistently, either in a favourable or unfavourable way, to a given object. This implies that determining a person's attitude towards an object will allow the prediction of object-related behaviour for that individual. The empirical findings of Fishbein and Ajzen did not merely restore confidence in the predictive ability of attitudes. They formed a model to understand the causal links between attitudes and behaviour (Eiser, 1986). Thus emerged the Theory of Reasoned Action.

The Theory of Reasoned Action is based on the assumption that human beings are rational and will make systematic use of the information available to them. It must also be possible to distinguish between beliefs, attitudes, behavioural intentions and behaviour. This Theory of Reasoned Action is presented in the following diagram (Figure 3.5).

Figure 3.5. The Theory of Reasoned Action.



Source: Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980.

Before examining the theory, it is important that the terms used are clearly understood. Starting at the right of the figure, the important terms are:

Behaviour (B): is the action under investigation, or the behaviour related to the study. It must be specific and clearly understood.

Behavioural intention (BI): is a measure of the individual's intention to perform the behaviour in question. BI is the weighted sum of two components; the overall attitude towards the behaviour(A), and the subjective norm (SN).

Attitude (A): is the predisposition the individual has towards the act.

Subjective norm (SN): is a measure of the individual's perception of the social pressure they feel themselves under to perform or not perform the act.

Behavioural beliefs (bb): individuals associate several attributes with the act, these may be any trait, property, outcome or characteristic. A behavioural belief is the likelihood that the given attribute is associated with the act, indicated on a scale ranging from "extremely likely" through to "extremely unlikely".

Outcome evaluations (oe): each outcome evaluation is the individual's evaluation of the attribute in question, marked on a scale ranging from "extremely good through" to "extremely bad".

Normative beliefs (nb): is the individual's set of perceived beliefs of how a specific person or group thinks the individual should act; should he/she perform the behaviour or not?

Motivation to comply (mc): is the importance placed by the individual on complying with what that specific person or group thinks about performing the act.

The theory claims that an individual's behaviour (B) is largely determined by his/her behavioural intention (BI), reflected by a high positive correlation between B and BI. BI is a weighted sum of the attitude (A) towards the behaviour (often termed the attitudinal component) and the subjective norm (SN) (often termed the normative component). The behavioural belief (bb) and the outcome evaluation (oe) for each attribute is multiplied, and then summed across all attributes to calculate the overall attitude towards the behaviour. The normative belief (nb) and the motivation to comply (mc) for each individual or group in question is multiplied, and then summed across all individuals or groups to calculate the subjective norm.

The Fishbein-Ajzen Model of Reasoned Actions can be written mathematically:

$$BI = \beta_A A + \beta_{SN} SN$$

where:

BI = behavioural intention,

A = overall attitude,

SN = subjective norm,

β_A and β_{SN} = weights given to A and SN.

The components are;

$$A = \sum_{i=1}^n bb_i oe_i$$

where there are n attributes associated with the act;

bb_i = probability that the i-th attribute is associated with the act,

oe_i = outcome evaluation the individual has towards the i-th attribute.

and

$$SN = \sum_{i=1}^n nb_i mc_i$$

where there are n people or groups whose opinion is important;

nb_i = the normative belief of the i-th important person or group regarding whether the individual should perform the behaviour or not,

mc_i = the motivation to comply with what the i-th important person or group think.

The following example attempts to find an individual's overall attitude towards the behaviour "travelling on a supersonic transport plane" (TSSTP). Suppose the following attributes were thought to be important:

- (1) TSSTP is fast;
- (2) TSSTP is noisy;
- (3) TSSTP is expensive;
- (4) TSSTP is environmentally friendly.

The individual is asked to estimate the probability that each attribute be true (bb). This is often marked on a scale ranging from one (extremely likely) to seven (extremely unlikely). Next, they are asked to say how good or bad that attribute is (oe), despite whether it was true. This often uses a scale from negative three (extremely bad) to positive three (extremely good). Table 3.1 shows the individual's responses.

Table 3.1. Hypothetical beliefs and evaluative outcomes for attributes associated with TSSTP.

Attribute	Belief (bb)	Outcome evaluation (oe)	be x oe
Fast	7	+2	+14
Expensive	6	-3	-18
Noisy	3	-1	-3
Environmentally friendly	2	+3	+6
Attitude ($A = \sum bb.oe$)			-1

In this example, the individual strongly associated the attribute "fast" with TSSTP, and had a favourable disposition towards "fast". He/she has a slightly weaker belief that the attribute "expensive" is associated with TSSTP, and a negative disposition towards "expensive". The belief that the attribute "noisy" is associated with TSSTP was weak, and has a slightly negative disposition towards "noisy". He/she has a weak belief that "environmentally friendly" is associated with TSSTP, and has a positive disposition towards "environmentally friendly". The overall attitude towards TSSTP is negative (A is negative one). A change in the respondent's attitude to become more positive (or less negative) towards TSSTP requires changes to either the belief or the evaluations of one or more attributes.

Whether presented in a figure, in words, or in an equation, the end is the same: by making accurate measures of the appropriate variables, it is possible to make an accurate forecast of an individual's intention to perform a specific action.

This model uses two indexes to measure the relationships between some variables. The first index is the correlation coefficient (represented by the letter r). The Pearson correlation coefficient is a measure of association between two variables (Ehrenberg, 1982). If there is no linear relationship, r equals zero ($r=0.0$). When there is a perfect positive linear relationship, then r equals positive one ($r=1.0$). When there is a perfect negative linear relationship, then r equals negative one ($r=-1.0$).

Ajzen and Fishbein (1980) say that in the social sciences, correlations of around 0.30 are satisfactory for inference, whereas correlations below this level are of little practical value. Correlations of between 0.30 and 0.50 have a moderate importance and greater than 0.50 suggests a relatively strong relationship between the two variables.

The other index represents the degree to which one variable can be predicted from the simultaneous consideration of two other variables. This is the multiple correlation coefficient (R) in the literature (Ajzen & Fishbein, 1980), though more commonly known as regression. The value of R ranges from zero ($R=0.0$) (no predictability) to one ($R=1.0$) (perfect predictability). Ajzen and Fishbein (1980, p. 99) say:

The multiple correlation shows the amount of correlation between two or more predictor variables and one criterion measure. In computing this index we also obtain a weight for each of the predictor variables that represents the independent contribution of that variable in the prediction of the criterion. When testing our theory, then, weights are obtained for the attitude towards the behaviour and the subjective norm. These weights (w) are indicators of the relative importance of each component in the prediction of intention.

There has been much debate on the necessity and form of the normative component, in particular the "motivation to comply" variable. Eiser (1986)

examines various claims regarding the use of unipolar or bipolar scales for measurement of this variable, saying there are alternatives to the original that are equally effective. Schegel, Crawford and Sanborn (1977) found that the inclusion of "motivation to comply", actually worsened the prediction of behavioural intention. As Ajzen and Fishbein (1980) claim, the normative component is often weakly correlated with the behavioural intention. An accurate measure of intention can be made by using the attitudinal component, it would appear that the motivation to comply is the least indispensable component.

O'Keefe (1990) agrees with this, claiming that while attitude and subjective norm have proved to be good predictors of behavioural intentions, in most applications the attitudinal component is more strongly correlated with the intention than is the normative component. However, when one is unsure of the relative importance of each component, it would be wise to investigate both. Often research will use a measurement of only the subjective norm to represent the normative component. O'Keefe (1990) goes on to say that while there is much controversy over the adequacy of this model, there has yet to emerge another model with the same broad base of support.

3.6 ATTITUDE RESEARCH IN THE PRIMARY SECTOR OF NEW ZEALAND

Attitude research has often seen use in agriculture and horticulture. The following New Zealand examples mostly involve management decisions. Blanchard (1993) used the Fishbein-Ajzen Theory of Reasoned Action to gain a better understanding of farmers' attitudes towards bull beef supply contracts. She sought to identify the key aspects of individual farmer's belief structures that influenced his/her decision not to renew the contracts. Bulla (1995) used the same model to interpret dairy farmers' attitudes towards conducting Somatic Cell Counts, which would give them more control over milk quality. He identified some attributes that were important to explain farmers' attitudes towards Total Quality Management.

Howard and MacMillian (1991) researched the attitude of farm managers towards risk, returns, and longer term planning. Paine (1991) sought to understand the needs of kiwifruit growers' when they employed a consultant for advice on orchard management. This was done by asking about the attitudes and underlying beliefs. Spelman (1990) examined the attitudes of farmers towards a "once-bred heifer" beef production system. The methodology used by Fairweather and Keating (1990) included attitudinal statements to determine the goals of farmers in the Canterbury area, and how they viewed success. This allowed a more thorough understanding of the management styles of those farmers. Kampanellas (1981) investigated the relationships between North Canterbury farmers' attitudes towards extension and their rate of adoption of new technology.

3.7 ATTITUDE AND BEHAVIOUR CHANGE

The Theory of Reasoned Action was chosen as a sound method to explain how attitudes relate to relevant behaviour (O'Keefe, 1990). The relationships in the model, which decide how the components of attitude interrelate, also reveal how attempts can be made to alter behaviour. According to Ajzen and Fishbein (1980) a change in behaviour is a chain reaction, and ultimately the result of a change in beliefs. People must be exposed to information that will cause changes in their beliefs. This will change the attitude, which will alter the intention, and in turn cause a change in behaviour.

However, as Ajzen and Fishbein (1980) point out, this is not always the case. Due to several intervening relationships between beliefs and behaviour within the model, changes in beliefs do not always cause a change in behaviour. Linked to each of these relationships is an assumption that must hold true to gain accurate indications of what will induce a change in behaviour.

While the authors discuss only how a change in beliefs will change behaviour, an alternative would be to change the outcome evaluation related to the behavioural belief or the motivation to comply related to a normative belief. Ajzen and Fishbein (1980) have not followed this through. However, it is clear from their writing changing behavioural intention requires changes to several components of this intention. Behavioural beliefs, outcome evaluations, normative beliefs and motivations to comply are all components of behavioural intention. Any combination of components will suffice, if the cumulative effect is great enough.

The first pair of relationships is between beliefs and attitude, and beliefs and subjective norm. The assumption is that a change in beliefs will produce a change in attitude or subjective norm. However, attitudes are based on the total set of salient beliefs, and a change in one or more beliefs may not be sufficient to change the overall attitude. Similarly, by changing one or more normative beliefs, a change in subjective norm may not occur. Therefore, enough beliefs must be changed so either the attitude or subjective norm is changed. Unless there is a change in the attitude or subjective norm, there will not be a change in behaviour.

The second pair of relationships is between attitude and behavioural intention, and subjective norm and behavioural intention. The assumption is that a change in the attitude or subjective norm will actually result in a change in behavioural intention. However, a change in attitude may fail to alter intention if the attitude component carries little weight in figuring out behavioural intention. Similarly, a change in the subjective norm will not affect the behavioural intention if the normative component carries little or little weight. To change behavioural intention, either both the attitude and subjective norm must be changed, or the weight of the one changed must be large enough to ensure behavioural intention changes. Again, unless there is a change in the intention, we cannot expect a change in the behaviour.

The final relationship is between behavioural intention and behaviour. The assumption is that a change in behavioural intention will produce a change in behaviour. However, this is not certain. Only if there is a strong relationship between the intention and the behaviour, can we expect a change in intention to produce a change in behaviour.

In attempting to change the behaviour of a person or group, it is essential that all these assumptions are considered. Is there a high relationship between intention and behaviour? If so, what is the relative importance of the attitudinal and normative components? Effort can then be focused on the set of beliefs underlying whichever is strongest, or both if necessary. These efforts must change enough important beliefs to cause a change.

The authors of the Theory of Reasoned Action illustrate the use of information to change behaviour (Ajzen & Fishbein, 1980). This method is very similar to that of persuasion, as reported by O'Keefe (1990), Miller (1987), Petty and Cacioppo (1986) and Baron (1986). Other methods by which behaviour can be altered through influencing attitudes have also been suggested, such as; coopting (Luthans, 1989), repeated exposure (Zimbardo & Leippe, 1991), forced compliance (Eiser, 1986), or fear (Leventhal, Singer, & Jones, 1965).

The use of persuasive information as a suitable means of inducing attitude change is supported by the above literature. When control over the subjects is not possible or desirable, and long-lasting change is required, persuasion is effective. In these cases attitude change must occur freely within the individual. Over 2000 years ago, Aristotle claimed persuasion was the most effective in changing behaviour when the source had good character, the message was supported by strong evidence and the audience was in a receptive frame of mind.

3.8 NON-EXPERIMENTAL RESEARCH METHODS

Experimental research is where the researcher can manipulate the independent variable to test his/her hypothesis (Kerlinger, 1986). He contrasts this with non-experimental research, where systematic empirical enquiry is made without control over the independent variable. A question can be asked, "Do I (want to) have control the independent variable?" Due to ethical requirements in research⁷ and a desire to study people in their natural environment, it is often unsuitable to research the behaviour of people in an experimental way. In such cases, non-experimental research methods are used.

Having excluded experimental methods of research, the selection of a method must be made from the non-experimental methods. It is now useful to ask a second question; "Can the data of interest be collected from directly observable behaviour?" If the phenomena the researcher wishes to investigate are not directly observable, then non-direct methods of data collection must be used (Nachmias & Nachmias, 1981). Attitudes are like this. They are not directly observable and therefore need non-direct methods of data collection. The survey method is commonly used to collect data on attitudes and opinions (Wrightsmann, 1977).

Yin (1989) suggests that the strategy (or method) chosen for research depends on three conditions: the form of the research question; the extent of control the researcher has over behavioural events; and the degree of focus on contemporary as opposed to historical events. His view supports the use of survey research when one wishes to ask "how many" or "how much" type questions, one does not require any control of behavioural events, and one has a contemporary focus. This was the case in this study.

⁷For a full discussion on ethics in research see Miles and Huberman (1994), Sedlack and Stanley (1992), or Dominoski (1980).

A survey refers to the collection of information from populations by selecting a sample to discover the relative incidence and relationships between sociological and psychological variables (Kerlinger, 1986). A census, a survey of the entire population, differs from a survey only in the proportion of the population questioned. It is therefore possible to view a census as a survey where the sample size equals the population size.

Surveys can be classified according to methods of obtaining information: personal interview; mail questionnaire; and telephone survey (Kerlinger, 1986). Cameron (1993) collated the advantages and disadvantages of these various methods from a number of texts. A modified copy of his findings can be seen in Table 3.2.

Table 3.2. A summary of the advantages and disadvantages of three survey techniques: mail questionnaires, telephone surveys and personal interviews.

Mail Questionnaires	
Advantages Successfully gain answers to personal or embarrassing questions. Cost effective. Easier to contact respondents. Can get results quickly. Centralised control.	Disadvantages Can only be used with easily understood questions. Lower response rate. If long response rate falls. No opportunity to discuss questions. Must not involve too much work.
Telephone Surveys	
Advantages Very fast response obtained. Relatively cheap to administer. Easy to make repeat calls.	Disadvantages Questions must be simple. List of question must be short. Unconsidered answers may be given. Only telephone owners selected. Hard to establish rapport.
Personal Interviews	
Advantages Can produce high response rates. Can ask complex questions. Questions can be discussed.	Disadvantages Expensive on money and time. Requires a highly skilled interviewer to obtain accurate results.

Source: Cameron, 1993.

Personal interviews are a qualitative method of research with verbal descriptions as the data (Krathwohl, 1993). They are considered the best method to identify attributes that growers associate with behaviour (Hoinville & Jowell, 1982). This qualitative data often has far more meaning than pages of surmised numbers (Miles & Huberman, 1994). The personal interview provides opportunity for discussion around the topic (Parker & Hughes, 1989). Questions may be altered, added or omitted as appropriate and responses can be recorded verbatim (Krathwohl, 1993). However, the cost per interview may be prohibitive (Esslemont & Lewis, 1993).

A mail survey requires the development of a set of questions. These are compiled into a questionnaire and posted to every person or business on a mailing list. There is a low cost per interview as it does not require the time of trained interviewers, and postage is relatively cheap. Mail questionnaires offer a high level of anonymity to the respondent. However, it is only feasible to ask simple questions as there is no opportunity to clarify issues that are misunderstood. A high response rate is possible if care is paid to all aspects of the process (Erdos, 1983; Babbie, 1990; Sedlack & Stanley, 1992).

A telephone survey provides a way to collect information quickly, an important advantage near the end of the data collection stage. As the costs for face-to-face surveys have increased and the proportion of households with telephones have increased to over 95%, the popularity of telephone interviews has also increased (Esslemont & Lewis, 1993). However, although telephone ownership is high, it must be remembered that it is probably those with lower incomes who do not have a telephone. If the phenomena under consideration vary by income, a telephone survey may bias the results (Ott & Mendenhall, 1990).

Chapter Four

Method

A mailing list for the mail surveys was prepared (Section 4.1) and the behaviour to be investigated defined (Section 4.2). Attributes were selected (Section 4.3) and the survey questionnaire was constructed (Section 4.4). The mail survey was carried out (Section 4.5) and the responses recorded (Section 4.6). Telephone surveys of some non-respondents from the mail survey occurred (Section 4.7) and the response rate was calculated (Section 4.8). Analysis of data from both surveys followed (Section 4.9).

4.1 CONSTRUCTION OF THE MAILING LIST

A mail survey was chosen as the most appropriate method to collect the necessary information. This required the posting of a questionnaire to every person, household or business selected. A list was made of all known woody plant growers in New Zealand, constructed from the following sources:

- a). The New Zealand Nursery Register 1994/1995 (1994).
- b). Advertisements from nursery trade magazines (Commercial Horticulture, Horticulture News and Growing Today) and other related journals (The Orchardist and The New Zealand Gardener).
- c). Businesses with probable involvement in woody plants found listed in the advertising section of telephone directories for all areas of New Zealand.

This resulted in a list of 524 probable woody plant growers. Cameron (1993) found there was enormous variation between the members of the woody plant

industry. This justified the use of a census technique, (i.e. a survey of all members of a population). A census was made in this study this case.

4.2 DEFINITION OF THE BEHAVIOUR

The Theory of Reasoned Action offered a proven framework for understanding attitudes (see Section 3.5). The procedure detailed by Ajzen and Fishbein (1980) was followed. First, the behaviour to be investigated was defined. Purchasing managers of five large retail chains each listed the aspects of a "formal growing arrangement" they considered important. The most common aspects were worded into a definition of the desired behaviour:

"Growing a significant proportion of your woody plants under negotiated agreements that specify plant and product characteristics, quantity, price and delivery date, with sufficient lead time to grow the plants."

Retailers claimed that their preferred suppliers, those given preferential treatment when it came to ordering plants, were growers who met the above conditions. If a grower could produce woody plants according to the specified "plant and product characteristics, quantities, prices and delivery dates", they were considered desirable partners the retailer concerned.

This behavioural definition was shortened to "growing a significant proportion of your woody plants under negotiated agreements" when written in questions.

4.3 SELECTION OF THE ATTRIBUTES

Research in the nursery industry during 1993 had developed relationships with a number of nursery growers (Seiler, 1994). These same people were contacted and asked to help find the attributes growers associated with the behaviour. Seven growers responded positively and were interviewed. The interviews were taped to ensure that an accurate record was made of the answers and to allow the researcher's full attention to be given to the respondent. Growers listed the advantages, disadvantages and any other characteristics they associated with the behaviour:

"Growing a significant proportion of your woody plants under negotiated agreements that specify plant and product characteristics, quantity, price and delivery date, with sufficient lead time to grow the plants."

A list of 42 attribute statements was extracted through an analysis of the recorded interviews. If an area or characteristic was covered by more than one attribute, one attribute was selected to represent that area and the others were dropped. This was a consultative process with Massey University staff experienced in the use of this model. The elimination of attributes reduced the number down to 23 attributes. A complete list of the attributes can be found in Appendix I.

The literature documented a dispute over the nature of the bipolar scales (O'Keefe, 1980; Eiser, 1986). There was disagreement over whether a response of "extremely unlikely" on a behavioural belief question meant the opposite was actually likely. The questioning of two attributes, financial reward and financial risk, was altered to allow insight into the way respondents used the scale. Questions asked whether "growing a significant proportion of your woody plants under negotiated agreements" led to an increase or a decrease in financial risk and financial reward.

For example, a respondent would give one score on how likely increased financial reward was to result from "growing a significant proportion of your woody plants under negotiated agreements". He/she would give another on how likely reduced financial reward was because of "growing a significant proportion of your woody plants under negotiated agreements". A comparison of the results would show how respondents viewed the scale. Therefore, Appendix I lists 25 attributes.

4.4 CONSTRUCTION OF THE SURVEY QUESTIONNAIRE

A draft survey form was printed to incorporate the selected attribute statements. A process of improvements and rewriting followed. Staff members with a variety of backgrounds participated. These included Professor D. Font (an agricultural extension scientist from Ohio State University), and from Massey University: Dr J. Clemens (Department of Plant Science), Mr E. Cameron and Mr D. Kuiper (Department of Agricultural and Horticultural Systems Management) and Dr M. Tolich (Department of Sociology).

The final survey draft was considered too long (18 pages) to achieve a high response rate. The reason was the large number of attributes that had been included. Each attribute required two questions, one to find the behavioural belief score and another to find the outcome evaluation score (explained in Section 3.5).

The literature claims there are between five and nine important attributes for any specific behaviour (Ajzen & Fishbein, 1980). However, in this study it was not possible to reduce the number of attributes further without possibly excluding the important ones. It was preferable to include more attributes in the questionnaire and select the important ones through the analysis of results, rather than select less attributes for the questionnaire and maybe exclude the important ones.

After the final survey draft was completed, a pretest was conducted. Three growers completed the survey with the interviewer present to observe areas of difficulty. These were local growers who had been cooperative in previous contacts and were prepared to pretest the survey. Any problems were noted and minor alterations made, mainly to vocabulary and instructions.

The final survey form (Appendix II) contained two sections. Section One covered behavioural intention, attitude, subjective norm, belief and evaluation questions based on the chosen attributes. Section Two included personal and business questions. These would allow the meaningful interpretation of data from Section One and provide descriptive information on the participants and the industry. The effective targeting of extension activities also requires personal and business knowledge.

4.5 IMPLEMENTATION OF THE MAIL SURVEY

An article released to the media explained the purpose and value of the study. It appeared twice (Growers to be quizzed., 1994; Woody Plant Growers., 1994) (Appendix III). By timing the release carefully, growers read the article just before receiving the questionnaire form. A recent viewing of a related article often increases the response rate (Babbie, 1990).

The first posting, of 524 surveys packs, occurred on 19 October 1994. A sense of quality, relevance and importance of the survey form is necessary to obtain high a response rate (Brennan, 1992). The great effort expended to achieve this is reflected in the contents of the packs:

- a). A high quality, white envelope (C4, 229x324mm), with the Massey University logo and return address printed in colour, easily distinguished from other unsolicited mail. These were addressed to the manager of each business, who was named wherever possible.

- b). A survey form. Each survey form had an identification number stamped on the back cover. This allowed the identification of respondents for the sole purpose of deleting them from the mailing list once a reply was received.
- c). A covering letter (Appendix IV), laser printed on embossed, letterhead paper. This explained the purpose of the study, how the grower had been chosen, what was required of him/her, and an expression of appreciation from the researcher. The covering letter also assured growers that nobody other than the researcher would know their identity. If growers were unhappy with that arrangement, they were encouraged to remove the identification number and reply with anonymity. The disadvantage of this was that they would receive an additional survey form and possibly a telephone call as if they had not responded.
- d). A printed return envelope, stamped and addressed.

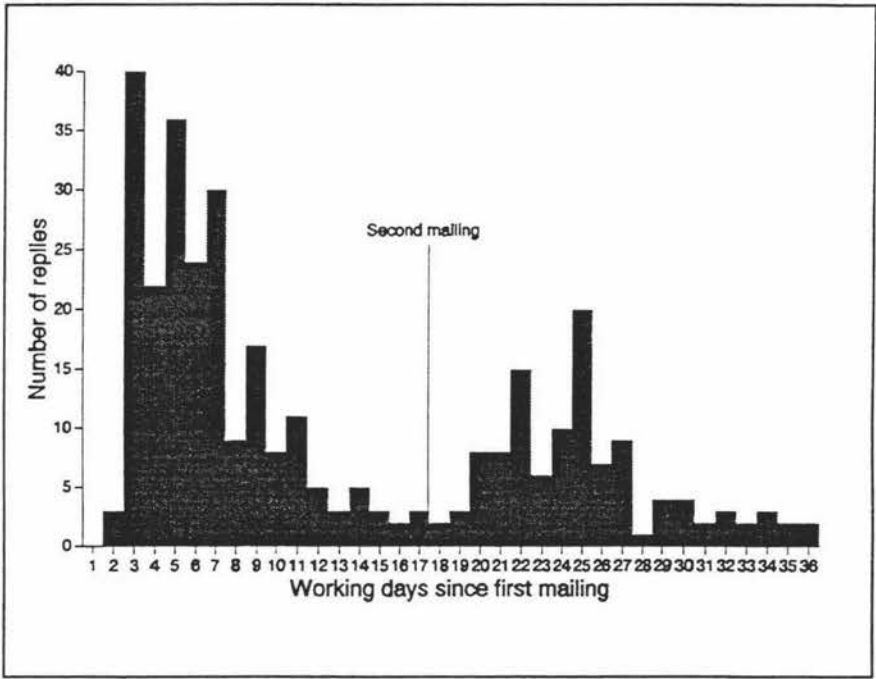
Within three days of posting, envelopes were being returned by New Zealand Post. Some envelopes were returned because the address was unknown, the redirection order had expired, or the potential respondent had failed to leave a forwarding address. After reasonable attempts to find a new address, the form was posted again, if possible.

The covers were removed as survey forms were returned. These were stored separate from the forms. Where the identification number was intact, respondents were deleted from the mailing list to ensure another form was not posted to them. The assignment of new numbers occurred as the survey forms returned. These precautions made it impossible for anyone to identify the respondents.

After the first mailing, the forms began arriving quickly, with 189 responses having been received after only 10 days. The second mailing occurred on 14

November 1994, another form being posted to 289 people or businesses who had not yet responded. Following a report by Vigderhous (1978), this occurred when the rate of returns had declined to a level such that the probability of future returns from the first mailing was small. The return pattern of survey forms is visible in Figure 4.1. Clearly identified are the two peaks, each starting around three days after a mailing date.

Figure 4.1. The return pattern for mail survey replies.



4.6 RESPONSE TO THE MAIL SURVEY

Five hundred and twenty-four businesses were identified as possibly being woody plant growers. At least one survey pack was sent to each, two to all those who did not reply to the first mailing. By 20 December 1994, the cutoff date for responses, 21 returned survey packs remained undelivered. This suggested these businesses has ceased to exist. Five hundred and three growers were assumed to have received packs.

A response rate of 62% was achieved for the mail survey (Table 4.1). Of the 503 businesses thought to have received a survey pack, 311 returned their forms completed. Sixty-three respondents claimed they were not involved in the production or growing on of woody plants, leaving 248 woody plant growers (people who said they were involved in the production or growing-on of woody plants). Of the 248 woody plant respondents, 3 removed their identification number, an option offered to increase the response rate by offering respondents anonymity. There were 192 non-respondents.

Table 4.1. Summary of the response categories of the mail survey.

Description	Number	Percentage
Number of businesses approached.	524	
Less; those returned undelivered	<u>21</u>	
Total businesses thought to have received the survey pack.	503	100.0
Responses from non-woody plant growers.	63	
Plus; responses from woody plant growers.	<u>248</u>	
Total number of responses	<u>311</u>	61.8
Total number of non-respondents	192	38.2

4.7 TELEPHONE SURVEY OF NON-RESPONDENTS FROM THE MAIL SURVEY

As 40% of businesses contacted in the mail survey did not reply, it was decided to conduct a telephone survey of the non-respondents. Surveys of non-respondents are often recommended (Stopher & Meyburg, 1979; Babbie, 1990). This method reveals if the respondents typified the whole population. If not, any differences would introduce bias into the results, and possibly invalidate any claims or conclusions resulting from the survey (Brownlee, 1957).

The second survey (Appendix V) in January 1995. Forty-eight businesses (25% of the non-respondents) were chosen at random from the list of non-respondents

(to the mail survey). Nine questions were chosen from the survey form on the following criteria:

i). The question was thought to provide useful descriptive data to compare this sample with the respondents from the mail survey.

or

ii) The mail survey's results suggested that the answer on this question would be a good predictor of behavioural intention. This was decided by correlation analysis between mail survey question data and the behavioural intention.

The number and type of questions were limited by the necessary brevity of telephone contact, and the reality that all information had to be communicated verbally. It was felt that questions involving any scaled response, such as in Section One of the mail survey, would be too complicated to ask over the telephone.

4.8 RESPONSE TO THE TELEPHONE SURVEY

All businesses were telephoned up to three times, in an attempt to include businesses where the call went unanswered initially. Table 4.2 shows a breakdown of the response categories.

Ten percent of the businesses telephoned were presumed to be no longer in existence. The numbers were disconnected and a search could not locate a new number. In eight cases (17%) the owner or manager could not be contacted within the period allocated, often they were said to be on holiday. The owners or managers refused to answer the questions in six cases (13%). This left 29 cases where a survey was completed or a response rate of 60%. Of these, six

businesses did not propagate or grow-on woody plants. Twenty three-woody plant growers completed the survey.

Table 4.2. Summary of the response categories of the second survey.

Description	Number	Percentage
Number of businesses in the sample.	48	100
Businesses unable to be contacted (phone non-operational) and assumed to have gone out of business (no new number found).	5	10.4
Businesses where owner or manager could not be contacted.	8	16.7
Businesses where owner or manager refused to participate in the survey.	6	12.5
Total number of businesses contacted	29	60.4
Not woody plant growers there.	6	12.5
Woody plant growers.	23	47.9

4.9 DATA ANALYSIS

The questions in the mail survey were encoded as completed forms arrived back from the growers. Data were entered to ASCII text files using a text editor. Analysis was performed using Statistical Package for the Social Sciences for Personal Computers, Version Four (SPSS-PC+ 4.0). SPSS-PC+ 4.0 could do all the procedures necessary for this research.

The data were screened using frequency tables, descriptive statistics, and specially designed search routines to locate values that were outside realistic boundaries. The form numbers for any suspicious looking answers were noted and the original survey forms were then consulted to check for data entry errors.

Tests for normality were conducted. The skewedness of the distribution (skewness coefficient = g_1) and how peaked this was (coefficient of kurtosis = g_2) were important to decide the normality. Variables with a normal distribution were treated with parametric procedures (eg t-tests). Data whose distribution varied substantially from normal were analysed using appropriate non-parametric tests (eg Mann-Whitney tests).

Telephone survey data was also handled in the same way. Tests, following the method of Reid as reported in Armstrong and Overton (1977), searched for significant differences between respondents to the mail survey and respondents to the telephone survey. This involved the selection of seven variables that were common to both the mail and the telephone survey. Both the Mann-Whitney test and the t-test were applied to identify if any inter-group differences existed across the variables measured (Steel & Torre, 1980).

Graphical and frequency methods were used to process descriptive information, found in Section Two of the mail survey. Where possible, this study followed the categories in frequency tables from Cameron (1993). This helped to identify differences between the results of each study. However, if displaying the results would endanger the anonymity of the larger businesses responding to this survey, categories were constructed to protect the identity of these growers.

It was expected that attributes would need removing, due to the high number of attributes included in the survey. Any attribute with a low correlation to the behavioural intention was removed. An inter-attribute correlation identified attributes which measured the same characteristic or area as another. Discussion with researchers who were familiar with the nursery industry ensured that each characteristic was represented by only one attribute. Eight attributes were selected for further analysis.

Correlation and regression techniques established the strength of the relationships between variables in the Fishbein-Ajzen model.

Two procedures allowed the identification of components of attitude suitable for future extension programmes. The first procedure was logistic regression. This uses independent variables to predict a dichotomous dependent variable. The components of attitude were the independent variables. The dependent variable was the "yes" or "no" to the question "Do you still grow plants under a negotiated agreement?" Logistic regression calculates the odds of performing the behaviour (dependent variable) given certain variable scores (independent variables). It also calculates the change in the odds of performing the behaviour caused by a one unit change in a specified independent variable score.

The second procedure was the grouping of respondents to identify attributes where the average score for each group was different. The grouping procedure finally chosen utilised the same criteria as the logistic regression. One group consisted of all the respondents that were growing plants under a negotiated agreement ("contract growers"). The remaining respondents were not growing plants under a negotiated agreement ("not contract growers").

The application of the methods described in this chapter produced the results in the next chapter.

Chapter Five

Results

A description of the respondents to the mail survey and their businesses is presented first (Section 5.1). When survey attributes were being selected, an intentional error of admission was considered preferable to an unintentional error of omission. The presentation and selection of attributes are described (Section 5.2).

The Theory of Reasoned Action was chosen as the model for use in this study. It proposes that there are measurable links between cognitive variables and behaviour. This theory is applied to survey responses. The results presented are for the relationships between behavioural beliefs, outcome evaluations, behavioural intention, subjective norm and attitude (Section 5.3).

Logistic regression analysis quantified the expected impact that a given change in any component score would have on the decision whether to grow woody plants under negotiated agreements (Section 5.4). Results of the comparison between the "contract growers" and the "not contract growers" are presented (Section 5.5). Differences in the average behavioural belief and outcome evaluation scores are highlighted. Lastly, the relevance of the survey findings for the whole population of woody plant growers is tested (Section 5.6).

5.1 DESCRIPTION OF THE RESPONDENTS AND THEIR BUSINESSES

Most of the responding growers were male. Only 35 out of the 248 respondents were female, about 14%. These men and women were middle aged (mean of 45 years). Sixty-five percent were between 25 and 54 years old (Appendix VI, Table A6.1). Only 15% were under the age of 35 years.

The respondents were well educated and well trained in horticulture, though some had other backgrounds. Half had obtained some level of tertiary education, with one third studying at this level for more than two years (Appendix VI, Table A6.2). Only 15% left school before receiving School Certificate. Almost half those growers with some tertiary education (121) reported that horticulture was the field of their highest qualification (Appendix VI, Table A6.3). The fields of science, arts/social sciences and agriculture were also popular. Approximately half the respondents claimed to have received formal training in horticulture, and the other half said they had none (Appendix VI, Table A6.4).

Predominantly, respondents had a long history of experience in the nursery industry. On average, they had spent 17 years working in the nursery industry. About 80% had worked between 10 and 30 years in the nursery industry (Appendix VI, Table A6.5). Approximately 90% of respondents (218) reported that they had a financial investment in the business. Only 29 claimed no financial investment.

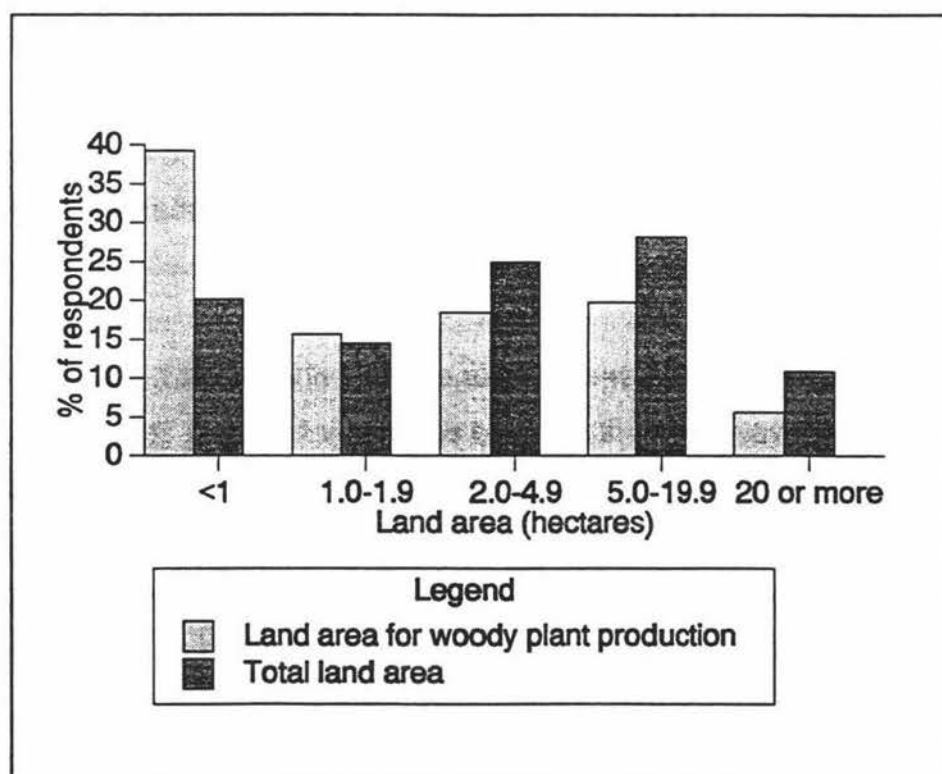
Half the respondents said the business was owned by a partnership (Appendix VI, Table A6.6). Companies and sole traders were the next most popular forms of ownership, scoring approximately 30% and 20%, respectively.

The nursery businesses of respondents were young. Fourteen percent were established in the last five years, 52% in the last 15 and 80% in the last 25 years (Appendix VI, Table A6.7). However, there were some older businesses, 14 established before 1945 (at least 50 years old). The mean age of businesses

was 18 years. The median business age was 14 years, although the tail of the distribution was skewed towards the old businesses (skewness coefficient $g_1=2.25$) and peaked over the young businesses (coefficient of kurtosis $g_2=5.83$).

Although the range in respondents' land area was very large (0.1-100 hectares), the mean size was small. Twenty percent of responding businesses operated on less than one hectare of total land area, 35% less than two and 60% less than five (Figure 5.1). Only 10% had more than 20 hectares. With a mean area of 9.4 hectares and a median area was 3.0 hectares, the distribution appeared non-normal. The distribution was both positively skewed (skewness coefficient $g_1=3.7$), and quite peaked (coefficient of kurtosis $g_2=14.8$).

Figure 5.1. The total land area and the area used for woody plant production of responding businesses (supporting data in Appendix VI, Table A6.8).



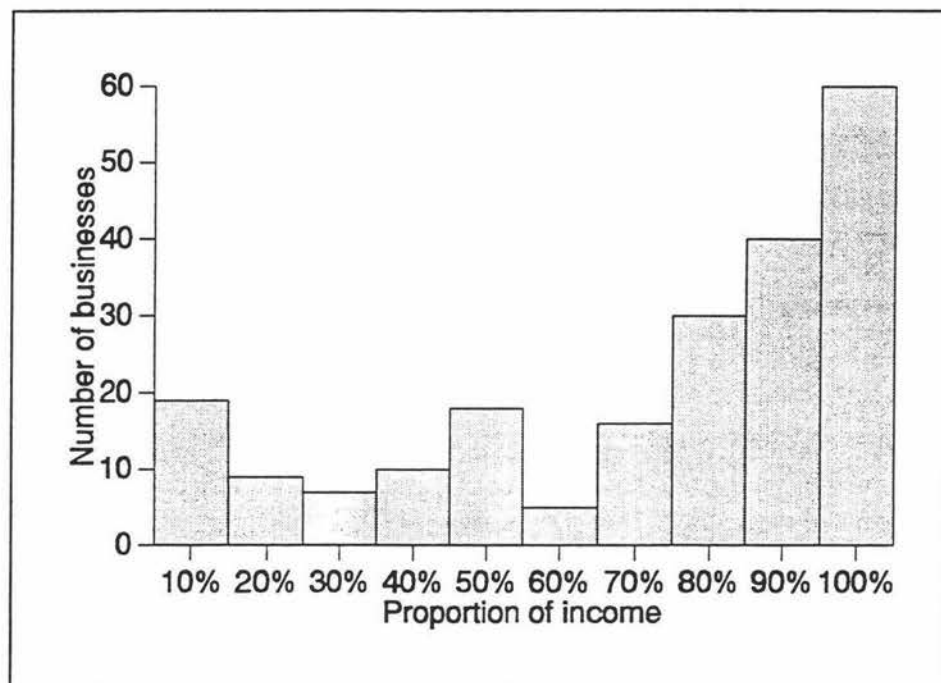
The range of land area used for woody plant production was just as large, though the mean size was smaller, at 5.2 hectares. Forty percent of responding businesses used less than one hectare of land for woody plant production, 55% less than two and 75% less than five (Figure 5.1). However, 5% of businesses still used more than 20 hectares for woody plant production, and 7 used more than 100 hectares. With a median of 1.4 hectares, the distribution was highly influenced by the extremely large growers (skewness coefficient $g_1=5.0$ and coefficient of kurtosis $g_2=30.6$).

One quarter of the businesses earned less than \$50,000 from selling woody plants in the 1993-1994 financial year, and over half earned less than \$150,000 (Appendix VI, Table A6.9). Although the median income was about \$120,000, the few businesses earning much more (17 over \$1,000,000 and 8 over \$2,000,000) drew the mean up to over \$340,000 (skewness coefficient $g_1=5.3$ and coefficient of kurtosis $g_2=40.0$).

Respondents earned most of their income from growing woody plants. While all the respondents were woody plant growers, over 60% said woody plants made up 80% or more of the income for their business last financial year (Figure 5.2). In contrast, only about 30% of businesses earned less than half their income from woody plant sales.

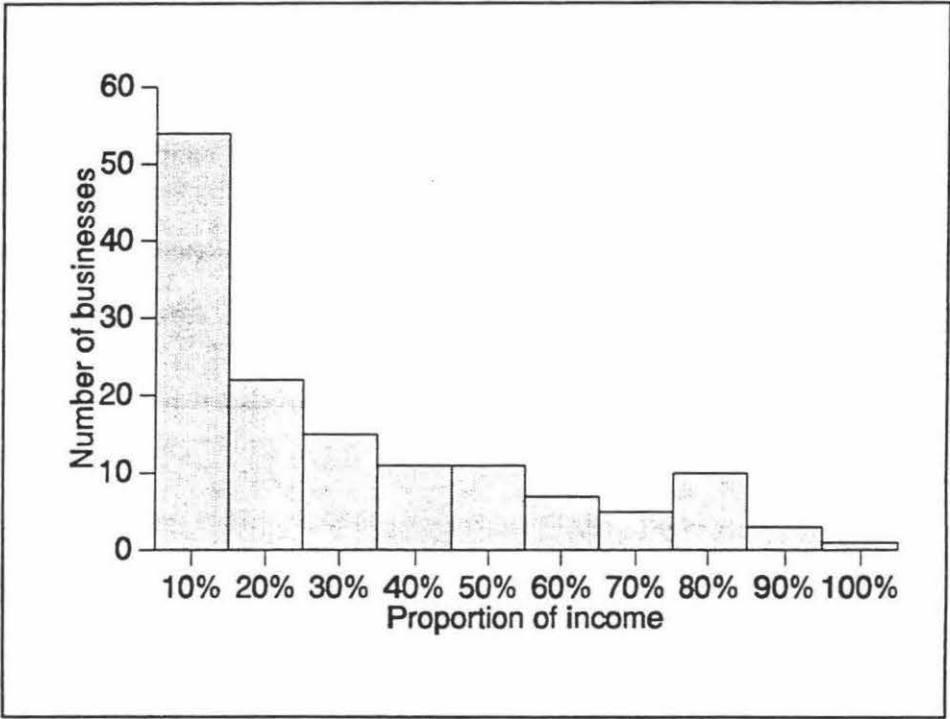
Not surprisingly, respondents had the total income higher than the income from the sale of woody plants. Evidence is found in the higher average of \$460,000 for total income, compared with \$340,000 for income earned through woody plant sales. The total income earned ranged from less than \$10,000 to well over \$2,000,000 for the 1993-1994 financial year. Only 15% of responding businesses had a total income of less than \$50,000 last year (Appendix VI, Table A6.11).

Figure 5.2. The proportion of respondents' income for the 1993-1994 financial year earned by woody plant growing activities (supporting data in Appendix VI, Table A6.10).



Sixty-one growers (25%) claimed they had no previous experience of growing plants under a negotiated agreement (Appendix VI, Table A6.12). Of the remaining 185 growers with experience of negotiated agreements for growing plants, 140 (57%) were currently growing plants under negotiated agreements. However, this behaviour only earned some of the business income. Sixty-five percent of all businesses currently producing woody plants under negotiated agreements earned less than 30% of their income from doing so (Figure 5.3). About 65% of the 45 growers who once grew woody plants under negotiated agreements had stopped in the last five years (Appendix VI, Table A6.14).

Figure 5.3. The proportion of respondents income for the 1993-1994 financial year earned by growing woody plants under negotiated agreements (supporting data in Appendix VI, Table A6.13).



Respondents ranked "customers / retailers" as the people most important to consider when deciding whether to grow plants under a negotiated agreement. "Customers /retailers" scored over 24%, while "accountants / bank manager" and "other nursery businesses" each scored over 10% (Table 5.1).

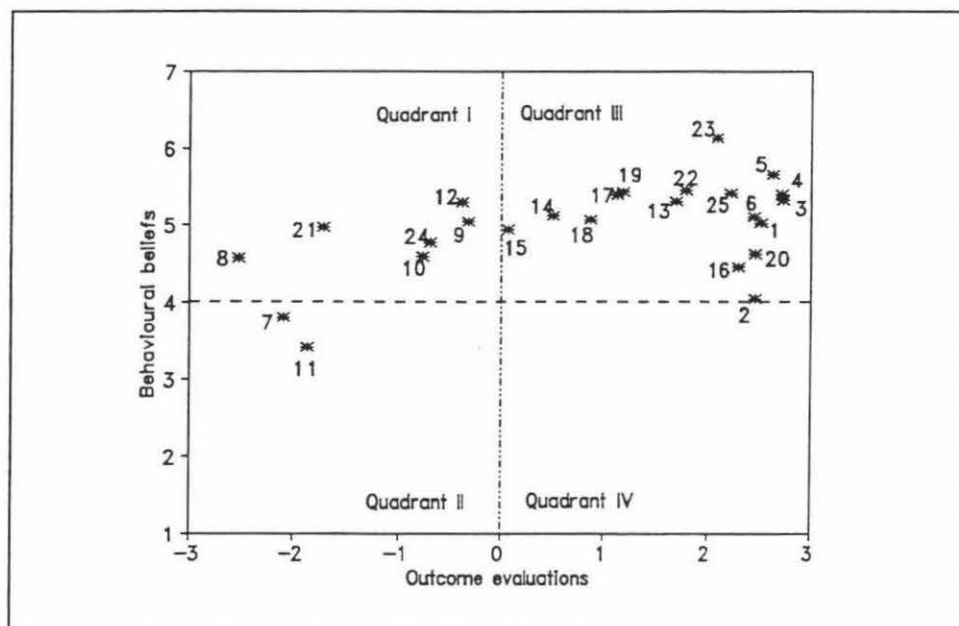
Table 5.1. The people or groups whose opinions were most likely to be considered by respondents when making a decision whether to grow woody plants under a negotiated agreement.

Person or Group	Number	Percentage
Customer / retailers	99	24.6
Accountant / bank manager	72	17.9
Other nursery businesses	44	10.9
Staff / management	32	7.9
Lawyer / solicitor	29	7.2
Industry organisations	28	6.9
Own / none	24	6.0
Spouse / family	20	5.0
Owners / other owners	19	4.7
Consultant / advisor	15	3.7
Associated businesses	12	3.0
Suppliers	9	2.2
Total	-	100.0

5.2 PRESENTATION AND CORRELATION OF ATTRIBUTES

The attributes can be located in one of three quadrants by mean behavioural belief and outcome evaluation scores, is shown (Table A7.1). Quadrant I ("likely and bad") in Figure 5.4 contained six attributes with high behavioural belief scores (between four and seven) and low outcome evaluation scores (between -3 and 0). Attributes "customers refusing to buy the plants" (attribute eight) and "breaking my side of deal due to factors over which I have no control" (attribute twenty-one) were in this quadrant. Respondents felt these attributes were quite bad (outcome evaluation component scores of -2.53 and -1.72, respectively) and slightly likely (behavioural belief component scores of 4.56 and 4.96, respectively). The product for attitude eight was -11.54 and -8.53 for attribute twenty one. Other attributes in this quadrant made less contribution to attitude, with only small products.

Figure 5.4. The relative position of attributes: average behavioural belief and outcome evaluation scores for woody plant respondents.



Quadrant II ("unlikely and bad") in Figure 5.4 contained attributes with low behavioural belief scores (between one and four) and low outcome evaluation scores (between -3 and 0). Only two attributes were in this quadrant, "less financial reward" (attribute seven) and "increased financial risk" (attribute eleven). Respondents felt these attributes were quite bad (outcome evaluation component scores of -2.09 and -1.87, respectively) but only slightly unlikely (behavioural belief component scores of 3.79 and 3.41, respectively). The product for attitude seven was -7.92 and -6.37 for attribute eleven.

Quadrant III ("likely and good") in Figure 5.4 contained the remaining seventeen attributes. They all had high behavioural belief scores (between four and seven) and high outcome evaluation scores (between 0 and -3). Although respondents felt these attributes were at least slightly likely, there was a range of evaluations (from 0.07 to 2.73).

Quadrant IV ("unlikely and good") in Figure 5.4 contained no attributes. This meant respondents did not think any of the attributes were both unlikely and good.

Respondents gave opposite scores to attributes with opposite wordings. The attributes "less financial reward" (attribute seven) and "increased financial risk" (attribute eleven) were the paired opposites of "more financial reward" (attribute twenty) and "reduced financial risk" (attribute one). The average score for attribute seven was an opposite and almost equal distance from the origin (where the behavioural belief component score was 0 and the outcome evaluation component score was 4) compared with the average score for attribute twenty. Attributes eleven and one followed this pattern also.

Therefore, when a respondent's score showed a characteristic was unlikely to be the result of growing a significant proportion of woody plants under a negotiated agreement, this revealed he/she thought the opposite was likely. Attributes seven and attribute eleven, having served their purpose as stated in Section 4.3, were excluded from further data analysis.

Additional attributes were also excluded from the remaining analysis. "Risk of a better price elsewhere" (attribute nine), "beneficial to retailers" (attribute 13), "high level of managerial skill" (attribute 17), "making changes to my business" (attribute 18) and "plan business activities ahead of time" (attribute 23) were dropped. Each had a low and non-significant correlation with the behavioural intention ($r=0.003$ $p=0.96$, $r=-0.008$ $p=0.904$, $r=0.116$ $p=0.071$, $r=0.032$ $p=0.616$ and $r=0.105$ $p=.101$, respectively).

"Reduces my financial risk" (attribute one), "using my land and labour more efficiently" (attribute four), "more financial reward" (attribute 20) and "budget more accurately" (attribute 25) all had high correlations with "set goals I can work towards" (attribute five) ($r=0.518$, $r=0.731$, $r=0.502$ and $r=0.578$, respectively). Attribute five was retained, representing the group of planning oriented attributes.

"Customers refusing to buy the plants" (attribute eight) had a high correlation with "strengthens my bargaining position as a grower" (attribute two) ($r=0.432$). The retention of attribute eight represented attributes associated with the power of growers in negotiated agreements.

"Extensive negotiations with my customer" (attribute 12) was retained as an attribute representing communication between the grower and their customer. A high correlation ($r=0.306$) with "better understanding of my customers' needs" (attribute three) caused attribute three to be dropped.

"Concentrating on fewer customers" (attribute 15) was selected to represent specialisation. Correlation results revealed that "producing larger numbers of fewer types of plants" (attribute 14) also measured this characteristic ($r=0.648$). Attribute 15 was retained in favour of attribute 14.

"Commercial rather than a lifestyle approach to the business" (attribute 19) had a high correlation with three other attributes. They were "reducing the number of plants grown but not sold" (attribute six), "remaining ahead of my competitors" (attribute 16) and "breaking my side of deal due to factors over which I have no control" (attribute 21) ($r=0.573$, $r=0.397$ and $r=0.426$, respectively). The retention of attribute 19 allowed other business approach oriented attributes to be excluded.

"Reduces freedom to produce how, what and when I want" (attribute ten), "learning to meet the requirements of a negotiated agreement" (attribute 22) and "spending more time on administrative tasks" (attribute 24) were unrelated to other attributes. They were all included for the remaining analysis.

The attributes selected for further analysis were; "set goals I can work towards" (attribute five); "customers refusing to buy the plants" (attribute eight); "extensive negotiations with my customers" (attribute 12); "concentrating on fewer customers" (attribute 15); "commercial rather than a lifestyle approach to the

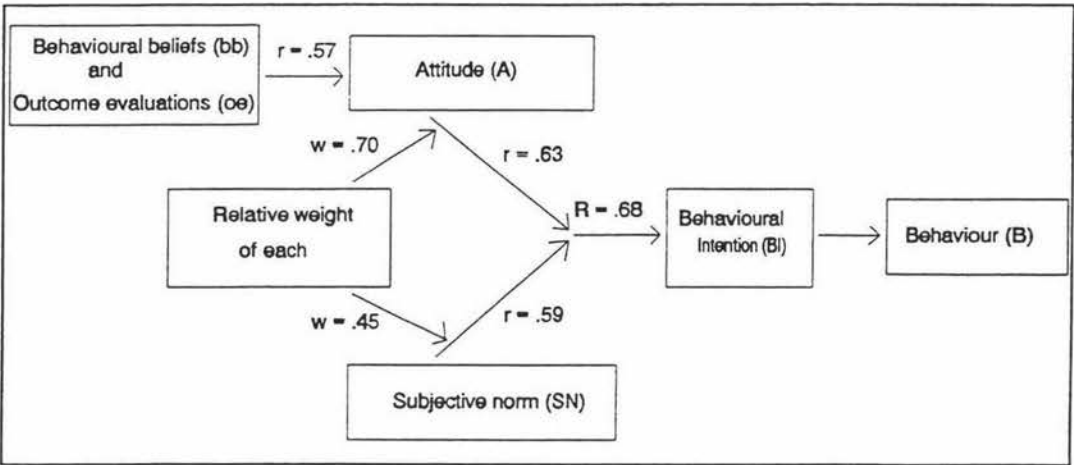
business" (attribute 19); "reduces freedom to produce how, what and when I want" (attribute ten); "learning to meet the requirements of a negotiated agreement" (attribute 22) and "spending more time on administrative tasks" (attribute 24).

5.3 FISHBEIN-AJZEN THEORY OF REASONED ACTION

When applying the Fishbein-Ajzen model to the data collected, the model appeared to explaining the behavioural intention very well. The correlations between the following pairs of variables were highly significant ($p < 0.0005$) and strong: summed product of behavioural beliefs (bb) and outcome evaluations (oe) and attitude (A) ($r = 0.57$); A and behavioural intention (BI) ($r = 0.63$); and subjective norm (SN) and BI ($r = 0.59$).

Attitude had a more significant role in predicting the behavioural intention than did subjective norm. The weights given were 0.7 and 0.45 respectively ($T < 0.00005$). Together they explained 68% of the variability in behavioural intention (multiple correlation coefficient $R = 0.68$ ($F < 0.00005$)). This is sufficient evidence that the attitudinal and normative data collected in this study had a close relationship with the behavioural intention of the respondents (Figure 5.5).

Figure 5.5. Correlation coefficients, multiple correlation coefficient and weights according to the Theory of Reasoned Action.



5.4 LOGISTIC REGRESSION

A logistic regression parameter was calculated for each behavioural belief and outcome evaluation component (Appendix VII, Table A7.2). All logistic parameters that altered the odds of performing the behaviour by less than 10% (i.e. where the parameter was greater than 0.900 and less than 1.1) were rejected for further analysis. The effect that they had on the odds of performing the behaviour was considered too small to be useful. The remainder, those that are useful, are presented in Appendix VII, Table A7.3. The logistic parameter was used to compute the change in odds of performing the behaviour. It is these results that are shown in Table 5.2. This process is illustrated by the following example:

Table 5.2. The ten components with the largest change in odds of performing the behaviour.

Components	Change in Odds (%)
o5	+34
o24	+33
o19	+33
b5	+27
o22	+26
b24	+21
b10	-14
b12	-14
b19	-17
o8	-30

Component o5 is the outcome evaluation component of "set goals I can work towards" (attribute five). This component had a logistic regression parameter of 1.3372 (Appendix VII, Table A7.3). If extension activities managed to increase a grower's score for this component by one unit, the odds of him/her growing plants under a negotiated agreement would increase by approximately 34% (Table 5.2). A one unit increase in this component corresponds to a change on the scale from "slightly good" to "quite good", or from "extremely bad" to "quite bad".

Component o8 is the outcome evaluation component of "more financial reward" (attribute eight). This component had a logistic regression parameter of 0.6986 (Appendix VII, Table A7.3). If extension activities managed to increase a grower's score for this component by one unit, the odds of him/her growing plants under a negotiated agreement would decrease by approximately 30% (Table 5.2).

However, increasing the odds of the grower growing plants under a negotiated agreement is the focus of this study. Therefore, extension activities would attempt to reduce the score of the respondent for this attribute. If extension activities managed to decrease a grower's score for this component by one unit, the odds of him/her growing plants under a negotiated agreement would increase by approximately 30% (Table 5.2). A one unit decrease in this score would be from "quite good" to "slightly good", or from "quite bad" to "extremely bad".

The same interpretation holds for any behavioural belief component. However, the scale of the independent variable would be different. A one unit increase in any behavioural belief component corresponds to a change on the scale from "slightly likely" to "quite likely", or from "extremely unlikely" to "quite unlikely". A one unit decrease would be the opposite direction, say from "quite likely" to "slightly likely", or from "quite unlikely" to "extremely unlikely".

The results for the remaining eight components can be interpreted as following the same logic. A one unit increase in the grower's score for component o24 or o19 would increase the odds of him/her growing plants under a negotiated agreement by approximately 33%. A one unit increase in the grower's score for component b5 or o22 would increase the odds of him/her growing plants under a negotiated agreement by approximately 27% and 26%, respectively. A one unit increase in the grower's score for component b24 would increase the odds of him/her growing plants under a negotiated agreement by approximately 21%.

Conversely, a one unit decrease in the grower's score for component b10 or b12 would increase the odds of him/her growing plants under a negotiated agreement by approximately 14%. A one unit decrease in the grower's score for component b19 would increase the odds of him/her growing plants under a negotiated agreement by approximately 17%.

5.5 QUANTIFICATION OF DIFFERENCES BETWEEN "CONTRACT GROWERS" AND "NOT CONTRACT GROWERS"

Differences were found between the "contract growers" and the "not contract growers" (Table 5.3). These differences in the mean behavioural belief and outcome evaluation scores were between growers who were growing woody plants under a negotiated agreement at the time of the survey (the "contract growers") and those who were not (the "not contract growers"). The differences

in Table 5.3 show the disparity between the "contract growers" and the "not contract growers", in terms of behavioural beliefs or outcome evaluations.

Except component o8, differences existed for every component. However, some differences were very small, 0.1 units for components o5 and -0.1 for component o15. The negative differences show that the "not contract growers" scored higher, on average, than the "contract growers". The fact that differences did occur for most components meant the "contract growers" growers had different opinions from those of the "not contract growers"

Table 5.3. The difference in mean behavioural beliefs and outcome evaluations scores between "contract growers" and "not contract growers".

Attributes	Behavioural Beliefs			Outcome Evaluations		
	Contract growers	Not contract growers	Difference	Contract growers	Not contract growers	Difference
5 Set goals I can work towards	6.0	5.3	0.7	2.7	2.6	0.1
8 Customers refusing to buy the plants	4.3	5.0	-0.7	-2.6	-2.6	0.0
10 Reduces freedom to produce how, what and when I want	4.3	5.0	-0.7	-0.6	-1.0	0.4
12 Extensive negotiations with my customers	5.1	5.6	-0.5	-0.3	-0.6	0.3
15 Concentrating on fewer customers	4.7	5.3	-0.6	-0.3	-0.2	-0.1
19 Commercial rather than lifestyle approach to the business	5.4	5.5	-0.1	1.4	0.9	0.5
22 Learn to meet requirements of negotiated agreement	5.6	4.3	0.3	1.9	1.6	0.3
24 Spend more time on administrative tasks	4.9	4.6	0.3	-0.5	-1.0	0.5

5.6 DIFFERENCES BETWEEN MAIL AND TELEPHONE SURVEY RESPONSES

The mail survey respondents would be considered representative of all woody plant growers. Results from Mann-Whitney tests supported the null hypothesis (i.e. there was no statistical difference between the respondents of the mail and telephone surveys) in four of the five cases investigated. Although differences occurred in all the variables (Table 5.5), only for "land area in woody plants" was the difference statistically significant ($P=0.05$). Respondents to the mail survey had a larger mean land area under woody plant production than the respondents of the telephone survey. However, as the other measures of business size (total land area and income earned from woody plant sales) were not statistically different, it is unlikely that the businesses of the mail survey respondents were larger in general.

Table 5.4. Means and ranges of variables used to compare woody plant growers' responses from the mail and telephone surveys.

Variables used for comparison	Mail survey (n=248)		Telephone survey (n=23)	
	Mean	Range	Mean	Range
Age of the business (years)	18.1	1-99	21.7	2-99
Total land area (ha)	9.4	0.1-99.9	7.5	0.4-99.9
Land area in woody plants (ha)	5.2	0.1-99.9	1.2	0.1-3.5
Income earned from woody plant sales (\$)	340,000	0-2,000,000	206,900	0-600,000
Above as percentage of turnover	43	10-100	48	10-90

Chapter Six

Discussion

Social and behavioural psychologists have utilised models to understand human behaviour for decades, but in the last 10-20 years, other disciplines have adopted them. The Fishbein-Ajzen Theory of Reasoned Action is only one of many models that tries to explain the relationships between beliefs, the associated evaluations and behaviour. There were several reasons why the Theory of Reasoned Action was chosen as the model for this study. Previous research had displayed that its relevance to a wide spectrum of human behaviours (O'Keefe, 1990). This model offered a full explanation of the intervening links between the cognitive variables and the observable behaviour. There was also an accessible researcher who was familiar with the model and its use.

Research using the Fishbein-Ajzen model in the New Zealand primary sector is not extensive. Of the attitude research previously discussed (Section 3.6), most did not utilise the Fishbein-Ajzen model (Kampanellas, 1981; Spelman, 1990; Fairweather & Keating, 1990; Paine 1991; Howard & MacMillian, 1991). They tended to investigate attitude only partially, rather than utilising a comprehensive model that, while requiring extensive measuring, attempts to explain the interrelationships between all components fully.

Only Bulla (1995) and Blanchard (1993) used the Theory of Reasoned Action. However, each study had peculiarities that hampered the comparison of results. A common problem was the small sample sizes ($n=15$ and $n=22$, respectively). While suitable for understanding each individual, it is dangerous to make claims regarding human behaviour from such small sample sizes.

The most recent found a close relationship between attitude and behavioural intention (Bulla, 1995). However, the results of this work are misleading and not

comparable with those of the present study. For example, all the growers interviewed were already carrying out the behaviour concerned. It was expected that the respondents' behavioural intention scores would be high and similar. If they had similar behavioural intention scores, the attitude score was probably similar. These similarities were precisely what was reported. However, this was of little use to understand the behaviour. Only if differences in behaviour are found will a search for the cause of the differences be started.

Blanchard (1993) decided to ignore the normative component of behavioural intention, claiming that this makes behavioural intention synonymous with the overall attitude. Although she found support in the literature for this, there is then no way of knowing how important the attitudinal component of behavioural intention is compared with the normative component. A safer method would have been to study the subjective norm in a few questions. This would have revealed if the normative component was significant in the formation of behavioural intention.

Previous research conducted with the Fishbein-Ajzen model has usually found the attitudinal component to be more important in explaining behavioural intention than the normative component (O'Keefe, 1990). This was expected to be the case in this study. Therefore, the attitudinal component was researched fully, with only the subjective norm of the normative component being measured. The resulting weights were $r=0.70$ for the attitudinal component and $r=0.45$ for the normative component, given by the multiple correlation (regression) procedure. These results supported the initial expectation that the contribution of the attitudinal component to the formation of behavioural intentions was higher than the normative aspect.

Computing the multiple correlation coefficient introduced a problem. The regression procedure in SPSS-PC+ 4.0 generated a constant (the value was 0.51, $T=0.2489$), or a y-intercept figure as is normal for most regression procedures. Yet the Theory of Reasoned Action does not appear to allow for

this, claiming that behavioural intention is solely determined by attitude and subjective norm. Furthermore, nowhere in the literature by Ajzen and Fishbein is any mention made of a constant.

Force the regression equation through the origin would remove the y-intercept, and therefore the resulting equation would have no constant. However, one problematic consequence of this action is that it inflates the R value artificially (Varela-Alvarez, personal communication, 14 February 1995). In this study the value rose from 0.68 to 0.92 when the regression equation was forced through the origin. It is extremely unusual for a behavioural model to explain 92% of the variation in the dependent variable. The weights for attitude and subjective norm also changed, from 0.70 and 0.45 to 0.65 and 0.58 respectively. With at least two options for calculating the multiple correlation, each of which produced quite different answers here, this must certainly be a major oversight on behalf of the authors.

The lack of instructions or description on how the multiple correlation coefficient and the weights were calculated was surprising. Given the centrality of this calculation to the model, one would have expected the literature to have explained the procedure fully. Statistical advice sought in the preparation of this thesis recommended not to force the regression line through the origin. Instead, the constant should be allowed, yet ignored, as it was insignificant ($T=0.2489$).

Two other areas of concern became apparent during the analysis. First, is attitude the sum of the product of all behavioural beliefs and the corresponding outcome evaluations? This claim is often written as:

$$A = \sum_{i=1}^n b_i o_i$$

If so, the relationship between b_i and o_i is purely multiplicative, and a score for attitude is attained by summing these products for all attributes. However, other theories, that use very similar components, claim a more complicated expression

is needed (O'Keefe, 1990). While an examination of these is beyond the scope of this discussion, it should suffice to remember that the Theory of Reasoned Action is but one model to simplify the understanding of human behaviour. While the formation of new models may be in the domain of social psychologists, future research could apply the collected data to more than one existing model, and compare the explanatory ability of each.

The second area was the selection of attributes. Were the correct attributes chosen? Each attribute is chosen to represent an important aspect of the behaviour under investigation. Each attribute also makes a contribution to the computation of attitude. Therefore, if too many attributes are selected representing one aspect of the behaviour, then that aspect will also receive too high a weight in the computation of the attitude. The ideal situation would be, first, to question only those attributes that are significant to the decision; and then, question each attribute in proportion to its significance. If one attribute is twice as important as a second, then twice as many questions on the should first be asked. An acceptable practice would be to ensure that each attribute questions a unique area, and there is no overlap.

In this research, care was taken in the questionnaire construction to include only one attribute on each area. However, the results of inter-attribute correlation revealed that there was significant overlap. The final selection of attributes for analysis involved two criteria. The correlation between attributes was used to identify attributes that may be measuring similar areas. Attributes were removed if an overlap occurred, leaving eight attributes with little correlation between them ($r < 0.300$). Secondly, researchers with considerable nursery experience oversaw this procedure, ensuring that distinct areas were identified with only one attribute included for each area.

This process would have been unnecessary if information it was known which attributes were important. However, this was not known, so the survey

questioned many attributes, the most important of which were sorted for a final selection.

The model required the behaviour to be defined specifically. Even the initial naming the behaviour proved difficult. Contract growing was considered and rejected. It was thought that if contract growing was mentioned, growers would think of a previous contract they had worked with or heard about. This contract may not have contained the desired traits that were in the defined behaviour. The term "negotiated agreement" was used to avoid this trap. This term also suggested that the agreement was not forced upon growers, but rather, each party participated.

With hindsight, this insistence on the phrase "growing under a negotiated agreement" was probably unnecessary. In most enquiries made or comments received, the above phrase had been replaced by "contract growing" (not to be confused with the group of respondents who were growing plants under a negotiated agreement, "contract growers"). This second phrase appeared more commonly used, and therefore probably better understood. It is recommended that any future work in this area use "contract growing" in the behavioural definition and the questions.

In this research the response rate was 62% for the mail survey. Despite the length of the survey and the time required to complete it, the level of response may be considered excellent (Varela-Alvarez, personal communication, 31 January, 1995; Townsley, personal communication, 7 February 1995; Tolich, personal communication, 15 February 1995). This was a reflection on the effort spent designing, writing and carrying out the survey.

The whole idea of response rate is extremely important in survey research. The inferential statistics used concerning survey analysis assumes that all members of the initial sample complete and return their questionnaires (Stopher & Meyburg, 1979). If this is not so, the theory behind the statistical procedures is

invalidated and errors are introduced. A higher response rate is therefore important to give greater accuracy to any claims that result from the study.

The literature contains various opinions regarding the acceptability of different response rates. One is that a 50% response rate is adequate, 60% is good and 70% is very good (Babbie, 1990). Another, 50% was an acceptable minimum, unless it was shown that the non-respondents are similar to those that did respond (Erdos, 1983).

The response rates for the telephone survey (60%) was almost identical to that of the mail survey. However, January was not a good time to telephone nursery businesses. Many owners were away on holiday. Future survey work should consider not only suitable timing for the mail survey, but also a better time to contact non-respondents should this be necessary. The proportion of businesses responding that were involved with woody plant growing was almost identical for each survey, 79% for telephone respondents and 80% for mail survey respondents.

The results obtained in this research say, according to the Theory of Reasoned Action, the specific behaviour of growers can be changed. The intervening relationships between the cognitive variables and the behavioural intention were found to be strong. The attributes selected were related to the behaviour in question. According to the Theory, if enough component scores are changed, this will eventually lead to a change in the behaviour.

However, the selection of a sufficient number and the correct attributes (or components) for future extension work was difficult. Extension involves providing information to people that will allow them to make decisions that improve their wellbeing (Farquhar, 1962; Vane, 1970). In particular, this information may be chosen to refute incorrect views held by people or to supplement areas where knowledge and experience are missing, which is an "improvement" or "betterment" aspect. By doing so, the extension agent can present a picture of

a "better" place. Extension, therefore, involves inducing voluntary change towards a "better" state of being.

The intention of this research was to identify gaps in the knowledge and experience concerning the production of woody plants under a negotiated agreement. This would allow future work to design a programme to present this information to the growers. If successful, the gaps would become less prominent. Growers would have new attitudes and be in a stronger position to decide what is "better" for their situation.

An examination of criteria other than "contract growers" and "not contract growers" occurred. These included various measures of business size, age, ownership structure and growing experience. While differences existed found for all criteria, the differences were had no use for selecting attributes for extension. For example, why would the scores of large growers be any "better" than those of small growers? Is it feasible to persuade small nursery owners to adopt the views of the larger ones? The only differences of interest were where one group was "better" informed or more knowledgeable than the other group. "Contract growers" had more information to base decisions on than did "not contract growers". The rest served no useful purpose for this study.

The plotting of attributes (Figure 5.4) provided some understanding of the 25 attributes (50 components). First, while the attribute scores covered most of the possible range on the outcome evaluation scale, scores on the behavioural belief scale are much more condensed. The primary reason for this stems from the procedure used to elicit these attributes in the initial interview phase. Growers were asked to express the advantages, disadvantages and attributes they associated with performing the behaviour. Questions were formed around what these few growers considered likely, and the result suggest that most other growers also considered these statements likely.

Only three attributes were exceptions to this. It appears that "strengthens my bargaining position as a grower" (attribute two) was genuinely not considered a likely or an unlikely consequence of performing the behaviour. Then, the view of those growers interviewed in selecting attributes was different from the view of the respondents. Attributes seven and eleven were of course removed from the analysis, as they were the opposites in wording and scores from attributes twenty and one.

This reflects the inherent conservatism that Richards (1977) identified. Growers were reluctant to offer extreme opinions on attributes. Respondents scored attribute related to risk cautiously. "Risk of a better price outside the agreement" (attribute nine), "producing a larger number of fewer types of plants" (attribute 14) and "concentrating on fewer customers" (attribute 15) were all scored near the origin.

Secondly, the further an attribute was plotted from the zero score on the x-axis, the greater the contribution that attribute made to overall attitude. This can be in either the positive or negative direction; each is as significant as the other, only the direction of the direction of the impact alters. Also, the greater the sum of the behavioural belief and outcome evaluation scores, the greater the contribution that attribute has on overall attitude.

Components to target with future extension activities were identified. The logistic regression procedure identified components most likely to influence the stated behaviour. The quantification of the differences between "contract growers" and "not contract growers" revealed whether expecting a change in these components in the indicated direction was feasible.

There were six components in group one, for which an increase in the score would cause an increase in the odds of performing the behaviour. These covered attributes "set goals I can work towards" (attribute five), "commercial rather than a lifestyle approach to the business" (attribute 19), "learning to meet

the requirements of negotiated agreement" (attribute 22) and "spending more time on administrative tasks" (attribute 24). The inter-group differences suggest that changes in the "not contract growers" scores are feasible.

The second group included attributes "customers refusing to buy the plants" (attribute eight), "reduces freedom to produce how, what and when I want" (attribute ten), "extensive negotiations with my customers" (attribute 12) and "commercial rather than a lifestyle approach to the business" (attribute 19). The aim in working with these attributes would be to persuade "non-growing" growers to lower their scores for these attributes. There was no difference between the "contract growers" and the "not contract growers" average scores for the outcome evaluation of attribute eight. With this exception, the inter-group differences suggest that changes in the "not contract growers" scores, in the desired direction are feasible.

The above attributes and the associated components could be used in future extension activities in which the aim was to persuade growers of woody plants who have never grown under a negotiated agreement to change their behaviour. This will be made clearer in the conclusions.

The demographic data provide a link between the behavioural results of this study and the previous knowledge on the industry in Chapter Two. The largest discovery was that 75% of growers had some experience at growing woody plants under a negotiated agreement. The work of Seiler (1994) and Cameron (1993) indicated grower aversion to formalised growing arrangements. Casual conversations with industry player had provided support for this view. Interviews with retail chains (Section 4.2) concluded that most growers acted poorly in these arrangements.

All this may be true, however, most growers had grown plants under a negotiated agreement at some stage. Therefore, it may be more relevant for extension activities to persuade those growers who have grown woody plants under a

negotiated agreement to grow more this way, to increase the proportion. Forty percent of those who do grow woody plants under a negotiated agreement earn only about 10% of their income this way. Only 20% of growers earn more than half their income this way.

Despite the claimed conservatism of nursery growers, there was a high standard of education, on average, better educated than their pastoral farming contemporaries. Cameron (1993) found about 40% of woody plant growers had tertiary education, while for farmers, Parker (1993) reported just over 20%. This survey found almost 50% of respondents had received tertiary education. There is an implication here for extension activities. When the education standard is low, all information must be simple (Arnon, 1989). One can present a higher calibre of information to well educated people.

In education, Massey University has provided an important service to the industry. Commenting on formal horticultural qualifications, 22 respondents reported having a Diploma in Horticulture, 10 a Bachelors degree in either Horticulture (3 years) or Horticultural Science (4 years) and one a Masters in Horticultural Science, all from Massey University. Many other said that they had studied a few courses or papers at Massey University.

Owning or managing nursery businesses is obviously a male-dominated domain, according to the survey results. However, the industry may not be quite so lacking in females. Almost half the businesses reported they were owned through a partnership structure. It is likely that many of these are male/female arrangements, although this survey cannot confirm this. A search of The New Zealand Nursery Register revealed many businesses to be either managed by a woman, or a husband/wife team.

The average age of the nursery managers and owners was 45, similar to the average for farmers of 45 years (Parker, 1993) and 42 for Canterbury farmers (Moore, 1990). However, it appears very few young people own or manage

woody plant businesses, with only 15% under the age of 35 years. This contrasts with 32% of Moore's farmers. Both the age and age distribution of respondents were similar to those found by Cameron (1993).

As woody plant respondents are older yet have spent less time in their industry than their farming counterparts, 17 year average compared to 23 for farmers (Parker, 1993), it would appear they entered the industry later. This suggests that they have had previous experience in other industries. Cameron (1993) found this to be so, with respondents to his survey reporting a wide range of previous experience, both within and outside horticultural industries. This helps explain why 46% of these well-educated growers do not have any formal training in horticulture.

With two-thirds of businesses being either sole traders or partnerships, very few respondents were without a financial investment in the business (only 14%). This means that the results obtained were mainly from those who stand to lose or gain money personally from any decisions that they make. In terms of answers to the behavioural belief and outcome evaluation questions, this is very important.

The 35% of nursery businesses with land areas of under two hectares (86 in all) would have been excluded from most agricultural surveys in New Zealand. Two questions on income were included as an alternative measure of business size. There was a risk that some respondents would refuse to return their forms because of these questions. However, only 15% refused to answer them. Both questions were placed at the end of the survey to minimise the questions not answered if people stopped after seeing these questions.

Conclusions

The following conclusions were derived from the research and analysis presented earlier in this document. They are supported by the data that was collected in the mail survey, and assumed to be relevant to the whole woody plant industry.

1. The following definition of the formal growing of woody plants was derived from the conditions required by New Zealand retail chains of their suppliers:

"Growing a significant proportion of your woody plants under negotiated agreements that specify plant and product characteristics, quantity, price and delivery date, with sufficient lead time to grow the plants."

This behaviour, often shortened to "growing a significant proportion of your woody plants under a negotiated agreement", was used throughout this study.

2. The respondents were predominantly well-educated, middle-aged men, with a financial investment in the business and many years experience in the industry. The businesses they managed or owned were generally recently established partnerships, covering a small land area.

This insight has been useful to understand the attitudinal data, and will be of value to future extension work. Knowing the characteristics of the growers and their businesses will allow the extension programme to be effectively planned for the target group.

3. The understanding of the attitude of woody plant growers when "growing a significant proportion of your woody plants under a negotiated agreement" has been detailed. Knowledge was gained as to the strength of various components of attitude and the differences between how various groups perceive each attribute
4. The important components of attitude were identified. Listed below are those that could be used in future extension programmes within the nursery industry where the aim is to increase the number of businesses producing plants under formal growing arrangements. Each of these is influential in the decision of whether to grow woody plants under a negotiated agreement:

"Contract growers" thought setting goals to work towards was better than "not contract growers" (component o5).

"Contract growers" did not think that having to spend more time on administrative tasks was as bad, compared to the "not contract growers" (component o24).

"Contract growers" thought to have a commercial rather than lifestyle approach to the business was better than "not contract growers" (component o19).

"Contract growers" thought it was more likely that growing under a negotiated agreement allowed the setting of goals to work towards than the "not contract growers" (component b5).

"Contract growers" thought learning to meet the requirements of a negotiated agreement was better than "not contract growers" (component o22).

"Contract growers" thought it was more likely that growing under a negotiated agreement would involve spending more time on administrative tasks than did "not contract growers" (component b24).

"Contract growers" thought that a reduction in freedom to produce how, what and when they wanted was an outcome less likely to occur than did the "not contract growers" (component b10).

"Contract growers" thought that extensive negotiations with the customers was an outcome less likely than did the "not contract growers" (component b12).

"Contract growers" thought to have a commercial rather than lifestyle approach to the business" was better than "not contract growers" (component o19).

There were also two serendipitous conclusions originating from the research:

6. A surprisingly high proportion of woody plant growers claimed to be growing woody plants under a negotiated agreement. However, the proportion of income that was earned through this activity was low. Efforts to increase this proportion may be more rewarding than efforts to persuade "not contract growers" to enter negotiated agreements.
7. The wording of the behaviour statement should be changed. Although the above definition performed adequately, one refinement for future research would be to change the wording to:

"Growing a significant proportion of your woody plants under contractual agreements that specify plant and product characteristics, quantity, price and delivery date, with sufficient lead time to grow the plants."

The shortened version would become "growing a significant proportion of your woody plants under a contractual agreement."

References

- Abelson, R.P. (1972). Are attitudes necessary? In B.T. King, & E. McGinnies (Eds.) Attitudes, conflict and social change. New York: Academic.
- Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour. New Jersey: Prentice-Hall.
- Ajzen, I., & Fishbein, M. (1977). Attitude-behaviour relations: A theoretical analysis and review of empirical research. Psychological Bulletin, 84, 888-918.
- Allport, F.H. (1924). Social psychology. Boston: Houghton Mifflin.
- Allport, G.W. (1954). The nature of prejudice. Reading, Massachusetts: Addison-Wesley.
- Allport, G.W. (1961). Pattern and Growth in Personality. New York: Holt, Rinehart, and Winston.
- Armstrong, J.S., & Overton, T.S. (1977). Estimating non-response bias in mail surveys. Journal of Marketing Research, 14, 396-402.
- Amon, I. (1989). Agricultural research and technology transfer. New York: Elsevier Science.
- Babbie, E.R. (1990). Survey research methods (2nd ed.). Belmont, California: Wadsworth.
- Baron, R.A. (1986). Behaviour in organisations: Understanding and managing the human side of work. Boston: Allyn & Bacon.

- Beaglehole, J.C. (1968). The journals of Captain Cook on his voyages of discovery. London: The Cambridge University Press.
- Blanchard, V.J. (1993). Farmer attitudes and beliefs towards a bull beef supply contract. Unpublished MAgSc thesis, Massey University, Palmerston North.
- Brennan, M. (1992) Techniques for improving mail survey response rates. Marketing Bulletin, 3, May 1992, 24-37. Department of Marketing, Massey University, Palmerston North.
- Brownlee, K.A. (1957). A note on the effects of non-response on surveys. Journal of the American Statistical Association, 52 (277), 29-32.
- Bulla-Agudelo, G.A. (1995). Milk quality and dairy farmers' intentions to perform somatic cell counts. Unpublished DipAgSc dissertation, Massey University.
- Cameron, E. A. (1993). Research and extension needs of woody plant growers: A history and survey to describe the woody plant industry. Unpublished MHortSc thesis, Massey University.
- Cohen, A.R. (1964). Attitude change and social influence. New York: Basic Books.
- Cushman, P.D., & McPhee, R.D. (1980). Attitudes, behaviours and messages: An introductory overview. In P.D. Cushman (Ed.) Communications, attitudes and behaviour. New York: Academic.
- Davidson, H., Mecklenburg, R., & Peterson, C. (1981). Nursery management, administration and culture. (2nd ed.). Englewood Cliffs: Regents/Prentice Hall.

- Delpar, H. (Ed.). (1980). The Discoverers: An encyclopedia of explorers and exploration. New York: McGraw-Hill.
- Department of Agriculture, Industry and Commerce. (1917). Annual report of the Department of Agriculture, Industry and Commerce 1916/1917. Appendix to the journals of the House of Representatives, 1917. Wellington: Government printer.
- Department of Statistics. (1989). Economic survey of plant nurseries for the financial year 1987-1988. Wellington: Author.
- Easton, B. (1987). Agriculture in New Zealand's economy. In L.T. Wallace, & R. Lattimore (Ed.) Rural New Zealand ~ what next? (pp.2.1-2.14). Christchurch: Agribusiness and Economic Research Unit.
- Ehrenberg, A.S.C. (1982). An introductory statistics textbook. New York: Wiley.
- Eiser, J.R. (1980). Cognitive social psychology: A guidebook to theory and research. London: McGraw-Hill.
- Eiser, J.R. (1986). Social psychology: Attitudes, cognition and social behaviour. Cambridge: University.
- Elms, A.C. (1976). Attitudes. Milton Keynes: Open University.
- Erdos, L.M. (1983). Professional mail surveys. Malabar, Florida: Krieger.
- Esslemont, D.B., & Lewis A.C. (1992). Study guide for 56.203 marketing information management. Palmerston North: Massey University.

- Export Opportunity Team. (1978). The market for New Zealand cut flowers, live plants, fresh berryfruit and processed horticultural products in northern europe. Wellington: Department of Trade and Industry.
- Fairweather, J.R., & Keating, N.C. (1990). Management styles of Canterbury farmers: A study of goals and success from the farmers' point of view. Agribusiness and Economics Research Unit: Lincoln University.
- Farquhar, R. (1962). Agricultural Extension. In J.D. Squire, & A.H. Hughes (1973) Evaluation of agricultural extension work, occasional paper No. 6, Department of Agricultural Economics and Farm Management, Massey University.
- Fishbein, M. (1967). Attitude and the prediction of behaviour. In M. Fishbein (Ed.) Readings on attitude theory and measurement, pp. 477-492. New York: Wiley.
- Fishbein, M. & Ajzen, I. (1975). Belief, attitude, intention, and behaviour. Reading, Massachusetts: Addison-Wesley.
- Freedman, J.L., Carlsmith, J.M., & Sears, D.O. (1970). Social psychology. Englewood Cliffs, New Jersey: Prentice-Hall.
- Glenn, R. (1950). Botanical explorers of New Zealand. Wellington: A.H. & A.W. Reed.
- Growers to be quizzed on contract growing. (1994, October). Commercial Horticulture, 4.
- Hale, A.M. (1955). Pioneer nurserymen of New Zealand. Wellington, A.H. & A.W. Reed.

- Hammett, K. (1993, March). New Zealand - the Holland of the South Pacific? Commercial Horticulture, 21-23.
- Hawke, G. (1987). Agriculture in New Zealand's economy. In L.T. Wallace, & R. Lattimore (Ed.) Rural New Zealand ~ what next? (pp.1.1-1.11). Christchurch: Agribusiness and Economic Research Unit.
- Hayward, R.M. (1981). The Middle East as a market for New Zealand's horticultural products. Wellington: Horticultural Research Unit.
- Heider, F. (1946). Attitudes and cognitive organisations. Journal of psychology, 21, 107-112.
- Hoinville, G. & Jowell, R. (1982). Survey research practice. New York: Heinemann.
- Horticultural Export Development Committee. (1981). Report of the horticultural mission to Japan. Wellington: Author.
- Howard, W.H., & MacMillian, R. (1991). In search of excellence on the farm: An example of case research. Agribusiness 7(1): 1-10.
- Hunt, D. (1983). A review of horticultural exports; product profiles. Wellington: Horticultural Export Development Committee.
- Johnson, G. (1987). Agriculture in New Zealand's economy. In L.T. Wallace, & R. Lattimore (Ed.) Rural New Zealand ~ what next? (pp.19.1-19.14). Christchurch: Agribusiness and Economic Research Unit.
- Kampanellas, P.G. (1981). Farmers' attitudes towards the farm advisory service: A study in Cheviot County, North Canterbury, New Zealand. Unpublished MAgSc thesis, Lincoln College.

- Kelvin, P. (1969). The base of social behaviour. New York: Holt, Rinehart, & Winston.
- Kerlinger, F.N. (1986). Foundations of behavioural research (3rd ed.). New York: Holt, Rinehart, and Winston.
- Kitson, G.W. (1980) A survey of the Japanese market for horticultural produce. Wellington: Horticultural Research Unit.
- Krathwohl, D.R. (1993). Methods of educational and social science research: An integrated approach. New York: Longman.
- LaPiere, R.T. (1934). Attitudes v. actions. Social Forces, 13, 230-237.
- Leventhal, H., Singer, R., & Jones, S. (1965). Effects of fear and specificity of recommendation upon attitudes and behaviour. In K. Thomas (Ed.) Attitudes and behaviour (1971), pp 202-220. Harmondsworth, Middlesex: Penguin.
- Luthans, F. (1989). Organizational behavior. New York: McGraw-Hill.
- MacIntyre, D. (1978). In The proceedings of the Horticultural Export Symposium, 1978. Wellington: Parliament.
- McGuire, W.J. (1968). Personality and susceptibility to social influence. In E. Borgatta, & W.W. Lambert (Eds.), Handbook of personality theory and research, (Vol. 3). Chicago: Rand McNally.
- Miles, M.B., & Huberman, A.M. (1994). Qualitative data analysis (2nd ed.). London: Sage.

- Miller, G.R. (1987). Persuasion. In C.R. Berger, & S.H. Chaffee (Eds.), Handbook of communication science (pp. 446-483). Newbury Park, California: Sage.
- Ministry of Agriculture and Fisheries. (1980). Prospects for New Zealand horticultural exports in the 1980's. Wellington: Author.
- Myers, D.G. (1990). Social psychology. New York: McGraw-Hill.
- Nachmias, D. & Nachmias, C. (1981). Research methods in the social sciences. New York: St. Martin's.
- New Zealand Apple and Pear Marketing Board. (1993). NZAPMB annual report. Wellington: Author.
- New Zealand Association of Nurserymen. (1924). Official report of the 17th annual meeting and conference of the NZAN. Wellington: Author.
- New Zealand Association of Nurserymen. (1927). Official report of the 20th annual meeting and conference of the NZAN. Wellington: Author.
- New Zealand Association of Nurserymen. (1916). Official report of the 9th annual meeting and conference of the NZAN. Wellington: Author.
- New Zealand Horticultural Trades Association. (1969). Official report of the 62nd annual meeting and conference of the NZHTA. Wellington: Author.
- New Zealand Nursery Research Centre. (1991). Positioning the New Zealand nursery industry for 21st century success. A nursery industry outlook workshop. Palmerston North: Massey University.

- New Zealand Nurserymen's Association. (1970). Official report of the 63rd annual meeting and conference of the NZNA. Wellington: Author.
- New Zealand Nurserymen's Association. (1993). Official report on the proceedings of the 86th annual meetings and conference of the NZNA. Wellington: Author.
- New Zealand Trade Development Board. (1992). Future directions for the New Zealand floriculture export industry. A joint discussion paper prepared in May 1992.
- New Zealand Trade Commission. (1985). Product profile: Southern California nursery market. Wellington: Author.
- O'Keefe, D.J. (1990). Persuasion: Theory and Research. Newbury Park, California: Sage.
- Olssen, E. (1984). A history of Otago. Dunedin: McIndoe.
- Olssen, E. & Stenson, M. (1989). A Century of Change: New Zealand 1800-1900. Auckland: Longman Paul.
- Ott, I., & Mendenhall, W. (1990). Understanding Statistics (5th ed.). Boston: PWS-Kent.
- Paine, M.S. (1991). Towards more effective farm management consultancy: A frame work for managing behavioural change. Unpublished MHortSc thesis, Massey University.
- Parker, W.J. (1993). Report to Nufarm (NZ) Ltd on a telephone survey of 1992 users of the "Extender 100" drench capsule for ewes. Department of Agricultural and Horticultural Systems Management, Massey University.

- Parker, W.J., & Hughes, A.H. (1989). An introduction to agricultural surveys. Department of Agricultural and Horticultural Systems Management. Massey University.
- Petty, R.E., & Cacioppo, J.T. (1986). The elaboration likelihood model of persuasion. Advances in Experimental Social Psychology, Vol. 19.
- Rainey, G. (1974). Research in the nursery industry. Official report on the 67th annual meeting and conference of the NZNA held between the 25th and 28th February 1974.
- Reed, A.H., & Reed, A.W. (Ed.) (1951). Captain Cook in New Zealand: Journals of Captain James Cook. Wellington: A.H. & A.W. Reed.
- Reich, B., & Adcock, C. (1975). Values, attitudes and behaviour change. London: Methuen.
- Richards, M. (1977, May). In: The proceedings of nursery management symposium. Massey University, Palmerston North.
- Rokeach, M. (1973). The nature of human values. New York: Free Press.
- Rokeach, M., & Mezei, L. (1966). Race and shared beliefs as factors in social choice. Science, 151, 167-172.
- Rosenberg, M.J. (1960). An analysis of affective-cognitive consistency. In M.J. Rosenberg, C.I. Hovland, W.J. McGuire, R.P. Abelson, & J.W. Brehm (Eds.) Attitude Organization and Change: An analysis of consistency among attitude components. New Haven: Yale University.
- Rosenberg, M.J., Hovland, C. (1960). Cognitive, affective and behavioural components of attitudes. In M.J. Rosenberg, C.I. Hovland, W.J. McGuire,

- R.P. Abelson, & J.W. Brehm (Eds.) Attitude Organization and Change: An analysis of consistency among attitude components. New Haven: Yale University.
- Schegel, R.P., Crawford, C.A., & Sanborn, M.D. (1977). Correspondence and mediational properties of the Fishbein model: An application to adolescent alcohol use. Journal of Experimental Social Psychology, 13, 421-430.
- Sdorow, L. (1995). Psychology (3rd ed.). Madison, Wisconsin: W.C. Brown Communications.
- Sedlack, R.G., & Stanley, J. (1992). Social research: Theory and methods. Needham Heights: Allyn & Bacon.
- Seiler, P.E. (1994). Constraints to live plant exporting from New Zealand: Grower's perceptions. Unpublished DipHortSc research report, Massey University.
- Skegg, M. (1993). In Trends all in the right direction for trade. Commercial Horticulture. April 1993.
- Spelman, R.J. (1990). Case studies of sheep and beef farmer attitudes to the adoption of a "once-bred heifer" beef production system. Unpublished BAgrSc Honours Dissertation, Massey University.
- Stahlberg, D., & Frey, D. (1988). Attitudes I: Structure, measurement and function. In M. Hewstone, W. Stroebe, J. Codol, & G.M. Stephenson (Eds.), Introduction to social psychology: A European perspective, 142-166. Oxford: Basil Blackwell.
- Stansworth. (1978). In The proceedings of the Horticultural Export Symposium, 1978. Wellington: Parliament.

- Statistics New Zealand. (1994). Population issues for New Zealand: New Zealand national report on population. Wellington: Author.
- Statistics New Zealand. (1994a). External trade data for the period July 1991 to June 1994. Wellington: Author.
- Statistics New Zealand. (1993). Measuring Up: New Zealanders and the environment. Wellington: Author.
- Steel, G.D., & Torre, J.H. (1980). Principles and procedures of statistics: A biometrical approach. (2nd. ed.). New York: McGraw-Hill.
- Stopher, P.R., & Meyburg, A.H. (1979). Survey sampling and multivariate analysis for social scientists and engineers. Letington: Heath.
- Sykes, W.R. (1974). Introduced trees. In New Zealand's Nature Heritage. 1, (7). Wellington: Hamlyn's Limited.
- The New Zealand Nursery Register 1994/95. (1994). Auckland: Reference.
- The Orchardist. (1992, November). Export Increase - the details. The Orchardist.
- Thurston, L.L. (1928). Attitudes can be measured. American Journal of Sociology, 33, 529-554.
- Thurstone, L.L. (1930). A scale measuring attitudes towards the movies. Journal of Educational Research. Vol 22 pp89-94.
- Tittle, C.R., & Hill, R.J. (1975). Attitude measurement and prediction of behaviour: An evaluation of conditions and measurement techniques. In

A.E. Liska The consistency controversy: Readings on the impact of attitudes on behaviour. New York: Wiley.

Triandis, H.C. (1971). Attitude and attitude change. New York: Wiley.

Van den Ban, A.W., & Hawkins, H.S. (1988). Agricultural Extension. Essex: Longman Scientific and Technical.

Vane, N. (1970). Agricultural extension development overseas. In: Proceedings of the agricultural extension seminar, Massey University.

Vigderhous, G. (1978). Analysis of patterns of response to mailed questionnaires. In D.F. Alwin (Ed.), Survey design and analysis: Current issues. London: Sage.

Woody plant growers: Have your say. (1994, August/September). New Zealand Association of Nurserymen Newsletter.

World trade in cut flowers, cut foliage and ornamental plants 1991. (1993). International Floriculture Quarterly Report, 4 (2), 19-24.

Wrightsman, L.S. (1977). Social Psychology. (2nd. ed.). Monterey, California: Cole.

Yin, R.K. (1989). Case study research: Design and methods (Rev. ed.). Newbury Park, California: Sage.

Zimbardo, P. & Ebbesen, E.B. (1970). Influencing attitudes and changing behaviour: A basic introduction to relevant methodology, theory and application. Reading, Massachusetts: Addison-Wesley.

Zimbardo, P.G. & Leippe, M.R. (1991). The psychology of attitude change and social influence. New York: McGraw-Hill.

*Appendix I***Attribute Statements**

Attribute Number	Attribute
1	Reduces my financial risk.
2	Strengthens my bargaining position as a grower.
3	Better understanding of my customers' needs.
4	Using my land and labour more efficiently.
5	Set goals I can work towards.
6	Reducing the number of plants grown but not sold.
7	Less financial reward.
8	Customers refusing to buy the plants.
9	Risking a better price outside the agreement.
10	Reduces freedom to produce how, what and when I want.
11	Increased financial risk.
12	Extensive negotiations with my customers.
13	Beneficial to retailers.
14	Producing larger number of fewer types of plants.
15	Concentrating on fewer customers.
16	Remaining ahead of my competitors.
17	High level of managerial skill.
18	Make changes to my business.
19	Commercial rather than a lifestyle approach to the business.
20	More financial reward.
21	Breaking my side of deal due to factors over which I have no control.
22	Learning to meet the requirements of a negotiated agreement.
23	Planing business activities ahead of time.
24	Spending more time on administrative tasks.
25	Budget more accurately.

*Appendix II***Mail Survey of Woody Plant Growers****SURVEY OF WOODY PLANT
GROWERS****MASSEY
UNIVERSITY****SPRING 1994**

Could the person most responsible for the physical and financial management of this business please answer the questions.

MASSEY
USE ONLY

1. Are you or your business involved in the propagation and/or growing-on of woody plants?

This includes: Roses.
 Fruit trees.
 Forest trees.
 Ornamental trees and shrubs.

Yes ☐

No ☐

1 ☐

If "Yes": Please continue with the questionnaire. Answer all questions from your own situation, as one involved in the growing of woody plants. There are no right or wrong answers.

If "No": The remainder of this survey is not relevant to you. Please return the questionnaire in the enclosed stamped envelope. Thank you for your help.

INSTRUCTIONS (Please read carefully).

I am interested in what you as a grower think about:

Growing a significant proportion of your woody plants under negotiated agreements that specify plant and product characteristics, quantity, price and delivery date, with sufficient lead time to grow the plants.

My questions often include the words "Growing a significant proportion of my woody plants under negotiated agreements". Please remember that this phrase refers to the complete activity described in the indented paragraph above.

Many questions require you to mark your answer on a scale like that in the example below.

EXAMPLE:

If you were asked to rate "the weather in New Zealand", and you thought that it was *quite bad*, you would place your tick as follows:

The weather in New Zealand is

extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad
					✓	

Or alternatively, if you thought that the weather in New Zealand was *neither good nor bad*, you would place your tick like this:

The weather in New Zealand is

extremely good	quite good	slightly good	neither	slightly bad	quite bad	extremely bad
			✓			

Tick the box below the words which best describe your opinion.

Only tick one box for each question.

While some questions may appear the same or repetitive, I assure you that they are not. The answer to each question is like a piece from a jigsaw puzzle: although some pieces may appear the same, they are all different and each one, when joined to the others, is essential to complete the picture.

SECTION ONE: YOUR OPINIONS.

Please tick the box below the words which best represent your opinion.

2. I intend to grow a significant proportion of my woody plants under negotiated agreements within the next 12 months.

Extremely likely.	Quite likely.	Slightly likely.	Neither likely or unlikely.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2 ☐

3. For me, growing a significant proportion of my woody plants under negotiated agreements is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐

4. For me, growing a significant proportion of my woody plants under negotiated agreements is:

extremely beneficial.	quite beneficial.	slightly beneficial.	neither.	slightly harmful.	quite harmful.	extremely harmful.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐

5. For me, growing a significant proportion of my woody plants under negotiated agreements is:

extremely desirable	quite desirable	slightly desirable	neither	slightly undesirable	quite undesirable	extremely undesirable
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐

6. Most people who are important to me think

I definitely should	I probably should	Maybe I should	It is not significant if I	Maybe I should not	I probably should not	I definitely should not
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐

grow a significant proportion of my woody plants under negotiated agreements.

MASSEY
USE ONLY

7. Growing a significant proportion of my woody plants under negotiated agreements reduces my financial risk.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

7 ☐

8. Growing a significant proportion of my woody plants under negotiated agreements strengthens my bargaining position as a grower.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

9. Growing a significant proportion of my woody plants under negotiated agreements gives me a better understanding of my customers' needs.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

10. Growing a significant proportion of my woody plants under negotiated agreements means I can use my land and labour more efficiently.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

11. Growing a significant proportion of my woody plants under negotiated agreements allows me to set goals I can work towards.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

MASSEY
USE ONLY

12. Growing a significant proportion of my woody plants under negotiated agreements reduces the number of plants that are grown but not sold.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

12 ☐

13. Growing a significant proportion of my woody plants under negotiated agreements will give me less financial reward.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

14. Even when growing woody plants under negotiated agreements my customers could refuse to buy them.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

15. Growing a significant proportion of my woody plants under negotiated agreements involves taking the risk that I could get a better price elsewhere than I would receive under the agreement.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

16. Growing a significant proportion of my woody plants under negotiated agreements reduces my freedom to produce how, what and when I want.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

MASSEY
USE ONLY

17. Growing a significant proportion of my woody plants under negotiated agreements increases my financial risk.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

17 ☐

18. Growing a significant proportion of my woody plants under negotiated agreements requires extensive negotiations with my customers.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

19. Growing a significant proportion of my woody plants under negotiated agreements is beneficial to retailers.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

20. Growing a significant proportion of my woody plants under negotiated agreements means that I must produce a larger number of fewer types of plants.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

21. Growing a significant proportion of my woody plants under negotiated agreements means concentrating on fewer customers.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

22. Growing a significant proportion of my woody plants under negotiated agreements is a way to remain ahead of my competitors.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

22 ☐

23. Growing a significant proportion of my woody plants under negotiated agreements requires a high level of managerial skill.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

24. Growing a significant proportion of my woody plants under negotiated agreements requires me to make changes to my business.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

25. Growing a significant proportion of my woody plants under negotiated agreements requires me to have a commercial rather than a lifestyle approach towards my business activities.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

26. Growing a significant proportion of my woody plants under negotiated agreements will give me more financial reward.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

MASSEY
USE ONLY

27. When growing a significant proportion of my woody plants under negotiated agreements I may have to break my side of the deal due to factors over which I have no control (e.g. weather).

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

27 ☐

28. Growing a significant proportion of my woody plants under negotiated agreements creates an environment in which I can learn to meet the requirements of these agreements.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

29. Growing a significant proportion of my woody plants under negotiated agreements means I must plan my business activities ahead of time.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

30. Growing a significant proportion of my woody plants under negotiated agreements means I must spend more time on administrative tasks.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

31. Growing a significant proportion of my woody plants under negotiated agreements means I can budget more accurately.

Extremely likely.	Quite likely.	Slightly likely.	Neither.	Slightly unlikely.	Quite unlikely.	Extremely unlikely.

☐

Please tick the box below the words which best represent your opinion.

32. Something that reduces my financial risk is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

32 ☐

33. Something that strengthens my bargaining position as a grower is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

34. Having a better understanding of my customers' needs is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

35. Using my land and labour more efficiently is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

36. Being able to set goals I can work towards is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

MASSEY
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37. Reducing the number of plants that are grown but not sold is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

37 ☐

38. Something that gives me less financial reward is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

39. My customers refusing to buy the plants is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

40. Taking the risk that I could get a better price elsewhere than I would receive under the agreement is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

41. Something that reduces my freedom to produce how, what and when I want is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

MASSEY
USE ONLY

42. Something that increases my financial risk is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

42 ☐

43. Something that requires extensive negotiations my customers is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

44. Something which is beneficial to retailers is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

45. Producing a larger number of fewer types of plants is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

46. Concentrating on fewer customers is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

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47. Remaining ahead of my competitors is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

47 ☐

48. Something that requires a high level of managerial skill is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

49. Having to make changes to my business is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

50. Having a commercial rather than a lifestyle approach towards my business activities is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

51. Something that gives me more financial reward is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

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52. Breaking my side of the deal due to factors over which I have no control (e.g. weather) is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

52 ☐

53. Creating an environment in which I can learn to meet the requirements of a negotiated agreement is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

54. Having to plan my business activities ahead of time is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

55. Having to spend more time on administrative tasks is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

56. Being able to budget more accurately is:

extremely good.	quite good.	slightly good.	neither.	slightly bad.	quite bad.	extremely bad.

☐

SECTION TWO: BUSINESS AND PERSONAL INFORMATION.

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57. In what year was this business established? 57 ☐ ☐

58. How much land does the total business cover?
(Include leased and owned land). hectares or acres ☐ ☐ ☐

59. How much land of the total land area is used for woody plant production?
..... hectares or acres ☐ ☐ ☐

60. How long have you been working in the nursery industry? years ☐ ☐

61. How would you classify the ownership of this business?

Sole proprietor	<input type="checkbox"/>
Partnership	<input type="checkbox"/>
Company	<input type="checkbox"/>
Trust	<input type="checkbox"/>
Other, please specify	

☐

62. Do you have a financial investment in this business?

Yes ☐

No ☐

☐

63. When considering growing a significant proportion of your woody plants under negotiated agreements, there might be people or groups whose opinion you take into account. Who are they?

1)

☐ ☐

2)

☐ ☐

3)

☐ ☐

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64. Have you ever grown plants under a negotiated agreement?

No ☐ Yes ☐

75 ☐

If "no", go to question 68.

65. Do you still grow plants under a negotiated agreement?

No ☐ Yes ☐

☐

If "no", go to question 67.

66. Roughly what percentage of this business's current income is earned from the sale of woody plants grown under a negotiated agreement?

10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐

67. How long is it since you grew woody plants under negotiated agreements, and why did you stop?

..... years ago

☐

I stopped because

☐

68. How old are you?

..... years

☐

69. How far did you go in school?

I left school before getting School Certificate.	<input type="checkbox"/>
I left school after getting School Certificate.	<input type="checkbox"/>
I have up to two years tertiary education.	<input type="checkbox"/>
I have more than two years tertiary education.	<input type="checkbox"/>

☐

70. If you have any tertiary education, in what field is your highest qualification?

.....

☐

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71. What formal training or qualifications do you have in horticulture?

.....

85 ☐

72. Please indicate your gender:

Male ☐

Female ☐

☐

73. What was the total income (excluding GST) from the sale of woody plants products for this business in the last financial year? Please indicate to the nearest \$10,000.

\$.....

☐☐☐

74. This previous figure represented

10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐

of the business's total annual turnover (excluding GST).

Thank you for taking the time to complete this questionnaire. The information you have provided is extremely important to this study and the results will be used to improve extension services to your industry.

75. Would you like to be sent a copy of the results?

Yes ☐ No ☐

If "Yes", please enter the following details (this page will be removed when I receive your questionnaire to preserve your confidentiality):

BUSINESS NAME

ADDRESS

.....

.....

PHONE NUMBER

NAME

YOUR POSITION

76. Would you be prepared to participate in a related survey at a later date?

Yes ☐ No ☐

Please place the completed questionnaire in the stamped, self-addressed envelope provided and mail as soon as possible. Thank you for your participation.



The box on this page contains an identification number printed for mailing purposes only. When I receive your completed form, I will cross off this number on my mailing list. I will then remove this page before using your responses. This will make it impossible for anyone to match your name with your responses.

If this number will prevent you from completing the questionnaire then please cut it off and reply anonymously. If you do this I will not be able to distinguish you from those who have not replied and you may receive an additional copy of the questionnaire. I apologise in advance for this, and ask that you would ignore it.

Appendix III

Articles on the Mail Survey

Growers to be quizzed on contract growing

NEW ZEALAND woody plant growers will this month receive a mail questionnaire seeking their attitude to growing plants under negotiated agreement.

The survey being carried out by Paul Seiler (Department of Plant Science, Massey University) will identify those factors of contract growing that are of most concern to growers. Research supervisors Dr John Clemens and senior lecturer Ewen Cameron are supervising Paul's masters thesis as part of on-going research into the New Zealand ornamental plant industry.

A list of 527 individuals and businesses who grow woody plants has been generated from newspapers, magazines and other industry publications. Each will receive the questionnaire this month and all are encouraged to respond.

Recent nursery industry trends point to growing dominance of

garden centre chains and groups in the retail sector. These chains require a predictable and reliable source of product in order to plan promotions and advertising and to budget for the coming season.

The two most common supply arrangements for these chains are contract growing or preferred supplier status, each a challenge to the time-honoured 'growing-on-spec' method.

In the future growers will, in the opinion of industry leaders and the research team, have to enter contractual arrangements or lose business. The attitude of growers towards such supply agreements is therefore crucial.

Anyone interested in the survey or who has further questions



Paul Seiler of Massey University's Department of Plant Science

can contact Paul Seiler at Massey University phone (06) 356-9099 extension 8066 or by fax (06) 350-5680.



**NEW ZEALAND
NURSERYMENS ASSOCIATION
NEWSLETTER**

3rd Floor (Rear Annex) Hope Gibbons Building
52-70 Taranaki Street P O Box 3443 Wellington

Tel: 04 385 3511

Fax: 04 385 3598

AUGUST - SEPTEMBER

**WOODY PLANT GROWERS :
HAVE YOUR SAY!**

Woody plant growers will soon be receiving a questionnaire asking about their attitude towards growing plants under a negotiated agreement. The results will be used to improve the extension and technology transfer services that are provided for you as growers. This is your chance to have your say.

The survey, being carried out by Paul Seiler from the Department of Plant Science at Massey University, will identify the factors of contractual growing that are most significant to growers. Dr John Clemens and Senior Lecturer Ewen Cameron are supervising Paul's masterate thesis as part of on-going research into the New Zealand ornamental industry.

Recent nursery industry trends show the growing dominance of garden centre chains and groups in the retail sector. These chains require a predictable and reliable source of product in order to plan promotions and to budget for the coming seasons. The two most common supply arrangements are contract growing or preferred supplier status, each a challenge to the time-honoured method of "growing on spec".

The opinion of industry leaders confirms that of the research team : in the future growers will have to participate in contractual arrangements or lose

Appendix IV

Covering Letters

14 October 1994

Peter Smith
Smith's Nursery
PO Box 238
Henderson
Auckland

Dear Peter Smith,

Enclosed is a survey that has been sent to all woody plant growers in New Zealand. I am interested in your opinions towards growing woody plants under a negotiated agreement. This survey, which will require around 20 minutes to complete, provides you with the opportunity to have your say.

My work is part of research being conducted by Massey University for the benefit of the ornamental industries of New Zealand. I need your response to make this study worthwhile. The results will be published in industry magazines and allow extension services to your industry to become more relevant. You can also receive a copy of the results by completing a form inside the back cover.

Your name and address has been obtained from the New Zealand Nursery Register or from other industry publications. I assure you that your response will remain confidential, meaning nobody else will be able to match your name with your response. But it is necessary that I know which growers have not responded and for this purpose each questionnaire is identified by a code number on the back cover. Once I receive your questionnaire I will cross your name off the mailing list and remove the back cover to protect your identity. If this number would prevent you from replying, then please cut it from your questionnaire form. When you do this, I have no way of distinguishing between you and those who have not responded, so you may receive an additional mailing.

Should you have any problems or questions regarding this research please do not hesitate to contact me. If I have not received your reply by late October you will be contacted again. Thank you for your time and cooperation. It is greatly appreciated.

Yours sincerely

Paul Seiler.

14 November 1994

Peter Smith
Smith's Nursery
PO Box 238
Henderson
Auckland

35% RESPONDED TO DATE!!!

Dear Peter Smith,

According to my records you have not yet responded to my survey of woody plant growers which was posted three weeks ago. It may be that the questionnaire form was misplaced, or put aside to fill in later, or just forgotten about all together. Whatever the reason, here is another chance to have your say.

Please would you complete the questionnaire and return it in the stamped envelope provided. All that is required is about 20 minutes of your time. In return, you are entitled to receive a copy of the results (which will be ready by February 1995) and will contribute to the future direction of your industry.

To date, 35% of those contacted in the first mailing have returned the questionnaire, a pleasing response. On many of those forms people expressed the view that this work was worthwhile and timely for the New Zealand nursery industry. Please contribute to the success of this work. Your responses will need to be posted by Wednesday 30th November 1994 to be included in this study.

Should you have any problems or questions regarding this research please do not hesitate to contact me at the above address or on extension 8066. Thank you for your time and cooperation. It is greatly appreciated.

Yours sincerely

Paul Seiler.

Appendix V

Telephone Survey of Non-Respondents

IDENTIFICATION NUMBER

DATE AND TIME 1st call

2nd call

3rd call

BUSINESS NAME

PHONE NUMBER

Hello, this is Paul Seiler calling from Massey University. May I please speak with the owner or manager of this business?

If not there **When would be most suitable to call back?**

.....

Thank you for your help. I will try again then. Goodbye.

If yes **Hello, this is Paul Seiler calling from Massey University. I am making a follow up to a survey on the New Zealand nursery industry which I have been doing as part of my thesis work. Would you mind answering nine quick questions?**

If no **That is alright. Thank you and goodbye.**

If yes

1. **Are you or your business involved in the propagation or growing-on of woody plants? This includes roses, ornamental trees and shrubs, fruit trees, and forest trees.**

Yes ☐

No ☐

If no **Well that is easy. Your business is outside the scope of my study. Thank you for your help. Goodbye.**

2. In what year was this business established?
3. How much land does the total business cover, including all leased and owned land?
..... hectares or acres
4. How much of the total land area is used for woody plant production?
..... hectares or acres
6. Have you ever grown plants under a negotiated agreement? This is an agreement made between you and your customers that specify plant and product characteristics, quantity, price and delivery date.

No ☐Yes ☐

If "no", go to question 8.

7. Do you still grow plants under a negotiated agreement?
No ☐ Yes ☐
8. To the nearest \$10,000, what was the total income (excluding GST) from the sale of woody plants products for this business in the last financial year?
\$.....
9. What percentage of the of the business's total annual turnover (excluding GST) was represented by this last figure?
.....

Thank you very much for your time. Is there anything you would like to ask me?

Your help has been appreciated. Have a good day. Goodbye.

*Appendix VI***Tables of Data From Section 5.1****Table A6.1. The age of respondents.**

Age of growers	Number of businesses	Percentage of businesses
less than 25	1	0.4
25 to 34	35	14.1
35-44	85	34.3
45-54	68	27.4
More than 54	47	19.0
Missing	12	4.8
Total	248	100.0

Table A6.2. The level of formal education of respondents.

Schooling	Number	Percentage
Before School Certificate	38	15.3
After School Certificate	85	34.3
Up to 2 years tertiary education	43	17.3
More than 2 years tertiary education	78	31.5
Missing	4	1.6
Total	248	100.0

Table A6.3. Fields of education for respondents progressing to tertiary education.

Field of tertiary education	Number	Percentage
Horticulture	54	44.6
Science	22	18.2
Arts/social sciences	18	14.9
Agriculture	13	10.7
Business	8	6.6
Missing	6	5.0
Total	121	100.0

Table A6.4. Occurrence of formal horticultural training among woody plant respondents.

Training	Number	Percentage
Yes	107	43.1
No	114	46.0
Missing	27	10.9
Total	248	100.0

Table A6.5. The length of time responding growers have worked in the nursery industry.

Years in industry	Number of businesses	Percentage of businesses
Less than 6	36	14.5
6-10	42	16.9
11-15	48	19.4
16-20	49	19.8
21-30	39	15.7
31-40	22	8.9
41-50	8	3.2
Missing	4	1.6
Total	248	100.0

Table A6.6. The ownership structure of businesses responding to the survey.

Ownership type	Number of responses	Percentage
Sole proprietor	50	20.2
Partnership	116	46.8
Company	70	28.2
Trust	2	0.8
Other ¹	9	3.6
Missing	1	0.4
Total	248	100.0

¹This includes research organisations, educational institutions and regional authorities.

Table A6.7. The age of businesses for which a response was received

Years since establishment	Number of responses	Percentage
Less than 5	34	13.7
5-14	95	38.4
15-24	67	27.0
25-50	34	13.7
More than 50	14	5.6
Missing	4	1.6
Total	248	100.0

Table A6.8. The total land area and the area used for woody plant production of responding businesses.

Land area (hectares)	Total land area		Land area of woody plant production	
	Number of responses	Percentage	Number of responses	Percentage
Less than 1	50	20.2	97	39.2
1.0-1.9	36	14.5	39	15.7
2-4.9	62	25.0	46	18.5
5-19	70	28.2	49	19.8
20 or more	27	10.9	14	5.6
Missing	3	1.2	3	1.2
Total	248	100.0	248	100.0

Table A6.9. Responding businesses' income from the sale of woody plants, 1993-1994 financial year (GST excluded).

Income from woody plants (\$)	Number of responses	Percentage	Valid percentage
Less than 25,000	35	14.1	16.5
25,000-49,999	24	9.7	11.4
50,000-99,999	27	10.9	12.8
100,000-149,999	33	13.3	15.6
150,000-249,999	20	8.1	9.5
250,000-499,999	27	10.9	12.8
500,000-999,999	28	11.3	13.3
1,000,000-1,999,999	9	3.6	4.3
More than 2,000,000	8	3.2	3.8
Missing	37	14.9	-
Total	248	100.0	100.0

¹A valid percentage is calculated by excluding missing responses from the denominator.

Table A6.10. Proportion of total income that respondents earned from the sale of woody plants, 1993-1994 financial year (GST excluded).

Proportion of income from woody plants (%)	Number of responses	Percentage	Valid percentage
10	19	7.7	8.9
20	9	3.6	4.2
30	7	2.8	3.3
40	10	4.0	4.7
50	18	7.3	8.4
60	5	2.0	2.3
70	16	6.5	7.5
80	30	12.1	14.0
90	40	16.1	18.7
100	60	24.2	28.0
Missing	34	13.7	-
Total	248	100.0	100.0

Table A6.11. Total income earned by respondent businesses during the last financial year (GST excluded).

Total annual income (\$)	Number of responses	Percentage of businesses	Valid percentage
Less than 25,000	13	5.2	6.3
25,000-49,999	20	8.1	9.7
50,000-99,999	25	10.1	12.1
100,000-149,999	34	13.7	16.6
150,000-249,999	21	8.5	10.2
250,000-499,999	33	13.3	16.0
500,000-999,999	32	12.9	15.5
1,000,000-1,999,999	16	6.5	7.8
More than 2,000,000	12	4.8	5.8
Missing	42	16.9	-
Total	248	100.0	100.0

Table A6.12. Growers previous and current experience of growing woody plants under negotiated agreements.

Growing experience	Number of responses	Percentage
No previous experience	61	24.0
Not currently growing	45	18.0
Currently growing	140	57.0
Missing	2	1.0
Total	248	100.0

Table A6.13. The proportion of income earned from woody plants grown under negotiated agreements.

Proportion of income (%)	Number of businesses	Percentage of businesses
10	54	38.6
20	22	15.7
30	15	10.7
40	11	7.9
50	11	7.9
60	7	5.0
70	5	3.6
80	10	7.1
90	3	2.1
100	1	0.7
Missing	1	0.7
Total	140	100.0

Table A6.14. The time since woody plants were last grown under a negotiated agreement.

Years	Number of responses	Percentage
1	9	20.0
2	7	15.6
3	4	8.9
4	3	6.7
5	6	13.2
6-10	7	15.6
More than 10	5	11.1
Missing	4	8.9
Total	45	100.0

Appendix VII

Tables of Data from Sections 5.2 and 5.4

Table A7.1. Average behavioural beliefs and outcome evaluations scores for attributes.

Attribute	Behavioural belief (bb)	Outcome evaluation (oe)
1 Reduces my financial risk	5.02	2.52
2 Strengthens my bargaining position as a grower	4.04	2.47
3 Better understanding of customers' needs	5.32	2.73
4 Using my land and labour more efficiently	5.39	2.72
5 Set goals I can work towards	5.66	2.64
6 Reducing number of plants grown but not sold	5.10	2.46
7 Less financial reward	3.79	-2.09
8 Customers refusing to buy the plants	4.56	-2.53
9 Risk of a better price outside the agreement	5.04	-0.33
10 Reduces freedom to produce how, what and when I want	4.58	-0.77
11 Increased financial risk	3.41	-1.87
12 Extensive negotiations with my customers	5.29	-0.39
13 Beneficial to retailers	5.30	1.69
14 Producing larger number of fewer types of plants	5.11	0.51
15 Concentrating on fewer customers	4.93	0.07
16 Remaining ahead of my competitors	4.45	2.31
17 High level of managerial skill	5.38	1.13
18 Make changes to my business	5.06	0.87
19 Commercial rather than lifestyle approach to the business	5.43	1.18
20 More financial reward	4.62	2.47
21 Breaking my side of deal due to factors over which I have no control	4.96	-1.72
22 Learn to meet requirements of negotiated agreement	5.45	1.78
23 Plan business activities ahead of time	6.13	2.09
24 Spend more time on administrative tasks	4.76	-0.69
25 Budget more accurately	5.41	2.23

Table A7.2. Logistic regression parameters for the behavioural belief and outcome evaluation components of the eight selected attributes.

Attributes	Behavioural beliefs	Outcome evaluations
5 Set goals I can work towards	1.2674	1.3372
8 Customers refusing to buy the plants	0.9748	0.6986
10 Reduces freedom to produce how, what and when I want	0.8602	1.0521
12 Extensive negotiations with my customers	0.8597	0.9512
15 Concentrating on fewer customers	0.9677	0.9255
19 Commercial rather than lifestyle approach to the business	0.8322	1.3316
22 Learn to meet requirements of negotiated agreement	1.0478	1.2579
24 Spend more time on administrative tasks	1.2055	1.3328

Table A7.3. The logistic regression parameters for the ten components with the largest associated change in odds of performing the behaviour, sorted in descending order to absolute magnitude.

Components	Logistic regression scores
o5	1.3372
o24	1.3328
o19	1.3316
b5	1.2674
o22	1.2579
b24	1.2055
b10	0.8602
b12	0.8597
b19	0.8322
o8	0.6986