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ABSTRACT

A project collected empirical data on the effectiveness of training in agriculture in Australia. Emphasis was on types of training and delivery modes most effective in enabling profitable changes to farm management or agricultural practice and on other catalysts that result in farmers making changes to increase profitability. Data were obtained from additional questions included in the Australian Bureau of Statistics/1993-94 Agricultural Financial Survey and an interview survey of 65 Tasmanian farmers. Findings indicated the following: specific adult agricultural education was related to higher profit; formal education improved profitability or productivity; and recent participation in training was clearly associated with higher profit. Farm businesses that trained and made changes to practice were more profitable than other farm businesses. Farm businesses that made changes to practice were more likely to participate in training. Small businesses were less likely to make changes in farming practices. Over a 3-year period, 38 percent of farm businesses made no changes to their practice. Larger and more profitable farms were more likely to participate in training events. Inability to get away, distance, or busy time of the year were barriers to training. Intimates, peers, and experts were sources of support. Most farm businesses that intended to train planned training in agricultural practices, although training needs identified by key stakeholders were in the areas of management, marketing, and communication skills. (Contains 43 references.) (YLB)

CHANGE, TRAINING AND FARM PROFITABILITY

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2

NATIONAL FARMERS FEDERATION DISCUSSION PAPER

NATIONAL FOCUS

A National Farmers' Federation research paper

Change, training and farm profitability

by
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Contents

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Foreword

The idea that education and training are significant determinants of earnings dates back to Adam Smith (1776) in his seminal work *The Wealth of Nations*, but it is only in the last twenty five years that this idea has been refined. What is more, only limited research into the benefits of training in the agricultural sector has been conducted.

Sue Kilpatrick's research has attempted to redress this deficiency. Her results make a significant contribution to analysis in this area.

Readers will be familiar with the concept of investment in physical capital. However, we can also apply exactly the same principles to investment in human capital or training. Although there are difficulties associated with measuring human capital, particularly in agriculture, Sue Kilpatrick should be commended for doing so in a rigorous and accessible manner.

NFF has been a long term advocate in promoting the need for improved training to allow farmers and their workforce to contribute to the dynamic and open economy we are gradually moving towards. Indeed, several studies have recommended the need for improved management skills if Australian industry is to meet the challenges ahead.

A crucial finding of this publication is that farm businesses which engage in training and implement change are more profitable than other farm businesses. It is therefore vital for farmers to invest in their human capital in the way they invest in capital equipment.

A greater investment in training will enable the rural sector to trap the benefits and better place farmers to maximise the opportunities arising from the changing environment in which they operate.

Change, Training and Farm Profitability provides a powerful argument for farmers to take up the challenge by providing a thorough examination of training in rural industry and assessing its effectiveness.

DONALD McGAUCHIE
President

Executive Summary

Education and training is a powerful influence on decision making on farms and hence is an important contributor to farm profitability and long term viability. Learning events, including accredited training courses and informal programs such as field days and crop monitoring groups, play an important role in making farmers aware of new management strategies and practices, and in influencing the adoption of new practices.

The National Farmers' Federation has recognised the need for more training in agriculture, and the development of "an ethic that values continued and broadened emphasis on training" (*New Horizons: A Strategy for Australia's Agrifood Industries*, 1993).

Australia's relatively poorly educated farm workforce, compared to our overseas competitors and to other Australian industry sectors, not only limits our productivity directly, but has a compounding effect by inhibiting further training, and so further limiting our capacity to be flexible, adaptable and responsive to change.

This project addresses the lack of empirical data on the effectiveness of training in agriculture, the consequent uncertainty about what sort of training and which delivery modes are most effective in facilitating profitable changes to farm management or agricultural practice, and the nature of other catalysts which result in farmers making changes which increase profitability. Analysis of quantitative data collected at a national level is verified by qualitative research at a state level.

Overview of this report

The first chapter discusses the background to the project, and briefly describes the methodology used. The next five chapters (Chapters 2 to 6) address each of the five focus questions of the study:

1. What impact has training had on farm profitability?
2. What 'triggers' farm managers to make major changes to their farming practices?
3. Why do farmers, and their workforce, participate in training?

4. What are the support mechanisms and who supports farmers as change is undertaken?
5. What are the future training needs in agriculture?

The first and major section of these five chapters (Chapters 2 to 6) is a description of the results from two parts of the project: additional questions on the Australian Bureau of Statistics' Agricultural Financial Survey 1993-94 (AFS) and an interview survey of Tasmanian farmers consisting of two sub-samples - a sample of course participants and a random sample of farmers. This is followed by a brief discussion of other relevant literature and finally the conclusions and recommendations arising which relate to that chapter. Some recommendations relate to findings presented in more than one chapter and are repeated in all relevant chapters.

The conclusions and recommendations from the project are brought together below. A list of the related conclusions follows each recommendation.

Conclusions (C) and Recommendations (R) arising from the report

Conclusions

C1. Farm businesses which have agricultural qualifications within the management team are more profitable than other farm businesses.

Australian farm businesses which have agricultural qualifications present in the management team have an average (mean) gross operating surplus in 1993-94 of $85 024 compared to $58 768 for other farm businesses. Those businesses with agricultural qualifications are more profitable when the value of assets is taken into account (AFS data).

C2. Field days are the most popular form of training. Training is defined broadly to include informal training at seminars, conferences, industry meetings and field days.

If the definition of training is limited to formal award courses run by universities, TAFE institutes and other accredited providers, then only 3 per cent of Australian farm businesses have someone participate in training in a twelve month period. 76 per cent of farm businesses participate in field days and 55 per cent participate in courses, seminars, workshops, conferences and/or industry meetings (AFS data).

C3. Farm businesses which engage in training are more profitable than other farm businesses.

Farm businesses which participate in at least one training 'event' in a twelve month period have a higher gross operating surplus than those which do not ($68 102 for

'training' farm businesses compared to $39 788 for 'non-training' businesses). Farm businesses which participate in training, excluding field days, have a higher average gross operating surplus of $80 993. Average gross operating surplus increases significantly with the number of training 'events' other than field days attended (AFS data).

C4. More profitable farm businesses participate in more training events than less profitable businesses.

More profitable farm businesses attend more courses, field days, seminars, workshops, conferences and industry meetings than other farm businesses with a similar value of assets.

C5. Farm businesses which engage in training are more likely to make changes to their practice which improve or are expected to improve long term profitability and viability.

68 per cent of farm businesses which participate in training make changes compared to 37 per cent of those which do not train. The more training events attended, the greater the likelihood of making a change to practice (AFS data).

64 per cent farm businesses which attend training courses make a change to their practice which is influenced by the course.

20 per cent of those who attend training courses subsequently make a change to practice which they first found out about at the course (Tasmanian data).

C6. Not all those who participate in training subsequently make a change to their practice which is influenced by that training.

Only two thirds of course participants have made, or have planned, changes to practices in their farm businesses which have been influenced by the course.

C7. Farm businesses which make changes to their practice which improve or are expected to improve long term profitability and viability are more profitable than those which make no change.

The average gross operating surplus of the 38 per cent of Australian farm businesses which made no change to their practice to improve long term profitability and viability in a three year period was $49 240, compared to $70 621 for those which made such a change (AFS data).

C8. Farm businesses most likely to make changes to their practice designed to improve profitability or viability are larger (measured by value of assets), more profitable, have some debt, have more educated managers and have more than one person in the management team.

Farm businesses with these characteristics are more likely to make changes to financial management, marketing and agricultural practices than are other farm businesses. They are also more likely to make changes to land management practices, although farm businesses which make a loss are also likely to make changes to land management practices.

Farm businesses in the sheep industry are less likely to make a change to practice than those in other sectors. The low prices experienced by the sheep industry and consequent lack of financial resources may partly explain the low percentage of 'changers'.

C9. Most changes to practice are influenced by interaction with, and information from, a number of sources.

The most frequent triggers, or critical factors which prompt a change are expert advisers (28 per cent of changes), other farmers (18 per cent), training events (17 per cent) and family or staff (13 per cent) (AFS data).

Financial and marketing changes are most likely to be prompted by consultants, field officers, bank personnel or other expert advisers. Agricultural and land management changes are most likely to be prompted by other farmers or family.

Other farmers are the most frequent source of initial information about a change to practice.

C10. Farm businesses most likely to participate in training are large (measured by value of assets), more profitable, have some debt, have more educated managers and have more than one person in the management team.

C11. A low level of education in the farm business management team inhibits participation in formal and non-formal training.

Farm businesses where all managers have less than year 10 education make up 42 per cent of all non training farm businesses, yet comprise only 19 per cent of all farm business (AFS data).

Farm businesses which take accredited or non-accredited courses of a number of sessions' duration participate in more training 'events' than other farm businesses.

C12. Seasonal and day-to-day on-farm commitments are the main reasons given for not participating in training.

Thirty-six per cent of all Australian farm businesses did not attend a training event identified as desirable for the farm businesses because of seasonal on-farm commitments (AFS data).

C13. Farmers prefer training which is relevant, non-threatening and directly applicable to their situation.

C14. There is no one best way of delivering education and training. A variety of delivery methods and training programs should be available.

Accredited training which leads to a qualification is important, especially for new entrants. There is a role for discussion groups, workshops and non-accredited courses in upskilling the existing workforce. Informal learning experiences are more attractive to the large group of farmers who feel intimidated by the formal training system of TAFE Institutes and universities. A small group of farmers would like training via distance education.

C15. Effective training is conducted in small groups with the opportunity for interaction with the facilitator/instructor and with fellow participants.

Training provides an opportunity for peer interaction, or networking, as well for the 'delivery' of new knowledge and skills. Training which recognises, and takes advantage of, the desire for such interaction is more likely to be successful.

Preferred training methods are short courses, seminars, workshops, industry meetings and conferences followed by field days.

C16. Family or staff provide the most support in making changes to practice, followed by expert advisers and other farmers.

Family or staff provide the most support for 41 per cent of farm business changes, expert advisers of various types provide the most support for 26 per cent of farm business changes, followed by other farmers (18 per cent of changes) (AFS data).

Large farm businesses and farm businesses with some debt are more likely to be supported in making a change by experts such as consultants or field officers than other farm businesses. Single manager farm businesses are more likely to make changes with no support than are other farm businesses.

C17. A large proportion of farm businesses intend to participate in some training, including field days, in the next three years. Most intend to participate in training about agricultural practices.

Only around one fifth of farm businesses intend to participate in financial management training and the same proportion intend to participate in marketing training.

C18. Past training participation is a good indicator of future training behaviour.

Recent training participation and past training participation are strongly correlated.

Past training participation is a good indicator of future training intentions. Ninety-three per cent of those farm businesses which have participated in training in the past twelve months plan more training in the next three years, compared to only 41 per cent of those who have not participated in training in the past twelve months.

Eleven per cent of farm businesses do not participate in training and have no plans to participate in the future (AFS data).

Those who undertake courses plan more training than those who do not take courses, and are more likely to plan to take further courses in the future.

Recommendations

R1. Farm business management units should be encouraged to obtain agricultural qualifications.

Agricultural qualifications are especially important for new entrants to farming and younger farmers who can expect to have to make many changes to their farming practice over their working lifetimes. Publication of information such as the financial returns to education found by this study should be used to encourage study for accredited agricultural qualifications.

R2. Farm business management units should be encouraged to undertake non-accredited training such as seminars, workshops and field days and to attend conference and industry meetings.

R3. Farm business management units be should encouraged to undertake training in management skills, including financial management and risk management; communication skills; marketing skills and to gain an understanding of the whole agricultural value chain relating to their farm products.

These skills should be included in accredited training programs and also available via non-accredited, informal training.

R4. A variety of delivery methods and training programs should be available.
R5. Training for the existing farm workforce should be delivered in ways consistent with adult learning principles.

This means respecting the learners' existing knowledge and skills and acknowledging that learners can contribute to the learning of others, including the learning of facilitators/instructors.

R6. The field day format should be considered as a model for attracting farmers to courses and other informal training.

Specific aspects of format that are attractive to farmers who have a low participation in formal education and training include the duration (one day or less), the opportunity to interact with experts, neighbours and 'progressive' farmers, and the opportunity to see new practices in place.

R7. Participatory group learning in local areas should be used to encourage the existing agricultural workforce into training.

Participation in courses is more likely once adult learners have had a successful experience with relevant, non-threatening training.

Local communities and groups of farmers with similar farm and/or socio-economic characteristics should be encouraged to come together to determine their own training needs. This will help ensure that training content is relevant; provide support for the adoption of new practices following training; and foster participation in further training.

R8. Training should be provided at times and in places that are accessible to farmers. Delivery by distance education of a variety of accredited and non-accredited training to existing farmers should be trialed.

There should be particular emphasis on scheduling into the program opportunities for interaction with fellow participants and facilitators/instructors. Such interaction could include electronic communication as well as face-to-face and telephone meetings.

R9. Further research be undertaken into why some training participants do not put into action the knowledge and skills presented during training.

Chapter 1
Background and methodology

1.1 Background

The National Farmers' Federation identifies establishment of a training culture and increased participation in management training as priorities in its strategy document *New Horizons: A Strategy for Australia's Agrifood Industries* (National Farmers' Federation, 1993). The National Farmers' Federation stresses the need for training and flexibility in order for the agricultural sector to remain internationally competitive.

> ... the skills required of farmers in the past in order to succeed in agriculture will in future need to be supplemented with additional skills in order to cope with the changes that have emerged over recent decades. Good technical skills in crop and livestock husbandry will need to be supported with skills in financial management.... and with skills in risk management. This is not to say that good technical skills are of any less importance than in the past, but in the future, additional skills will be pivotal to the survival of farm businesses.... (National Farmers Federation, 1993, 75-76).

The National Farmers' Federation is reflecting an economy-wide belief in links between training, change and economic competitiveness. One of the aims of the National Training Reform Agenda, outlined in the Australian National Training Authority's *Toward a Skilled Australia: A National Strategy for Vocational Education and Training*, is to:

> raise the skills profile of the labour force to better equip the nation to adjust to change and to increase our general level of international economic competitiveness (ANTA, 1994, 6).

Since most agricultural production is exported, farm businesses are directly exposed to global competitive pressures. The rural sector contributed 29 per cent of Australia's merchandise exports in 1994-95 (Martin, 1996). It is therefore essential

for both the agricultural sector and the Australian economy that Australia's farmers have a high level of skills and are adept at dealing with change.

This project addresses the lack of empirical data on the effectiveness of training in agriculture, the consequent uncertainty about what sort of training and which delivery modes are most effective in facilitating profitable changes to farm management or agricultural practice, and the nature of other catalysts which result in farmers making changes which increase profitability. Analysis of quantitative data collected at a national level is verified by qualitative research at a state level.

The project examines the following five focus questions:

1. What impact has training had on farm profitability?

The scope of 'training' investigated is broad, ranging from formal qualifications from agricultural colleges and other institutions to seminars and field days. It includes technical agricultural training (ranging from Agricultural Science degrees to field days), management training (university degrees to bookkeeping courses) and training in sustainable agriculture. The training that influences profitability can be undertaken by farm managers, their families (if applicable) or employees. The impact of 'advice' from agricultural extension officers and development authorities, fellow farmers and others is also relevant. In practice it is difficult to distinguish between 'training' and 'advice'; for example, is watching a video on using chemicals 'training' or 'advice'? To help clarify these and other issues both training and advice are considered in an interview survey.

2. What 'triggers' farm managers to make major changes to their farming practices?

The provision of training is widely regarded as increasing adaptability and so facilitating adjustment to changing conditions and opportunities. There are 'triggers' to change including training itself, advice from government authorities, agricultural companies, consultants, accountants, bank managers and informal exchanges with fellow farmers and employees. An interview survey addressed the questions: How do these operate? How is this information implemented?
Are some 'triggers' (including different types of training) more successful in precipitating change than others? Do some 'triggers' result in more profitable changes than others? Does the amount of education and/or training of those involved in the farm influence the likelihood of change? Are there other factors that influence the likelihood of change?

3. Why do farmers, and their workforce, participate in training?

Industry bodies have expressed concern about low training participation rates in agriculture. The National Farmers' Federation document *New Horizons; a Strategy for Australia's Agrifood Industries* (1993) arose out of discussions across Australia with farmers, farm organisations and government, and identifies increased participation in education and training as a priority.

Which delivery mode is most acceptable (and effective)? How important is the location of a training program? Are there personal or farm characteristics (for example, education, age, level of debt) which influence participation rates? How can training programs be evaluated for effectiveness?

4. What are the support mechanisms and who supports farmers as change is undertaken?

Farmers must be supported when making major changes as well as being persuaded to change. Support is essential to the success of a major change or innovation. The nature, type and duration of this support are key factors that are investigated.

5. What are the future training needs in agriculture?

The first four questions provide a data base to consider this final question, that is, how to implement a training strategy to improve farm profitability. Both effective delivery modes and content are relevant to planning. The opinions of all groups in the industry are required to assist in planning realistic and worthwhile training programs.

Further information relating to the fifth question, future training directions, is to be found in the Final Report on the project (Kilpatrick, 1996). That report includes the results of a survey of key stakeholders on the future directions of training in agriculture, as well as more detailed results relating to all five focus questions.

1.1.1 Training program evaluation proforma

Another outcome of the project is the development and trialing of a proforma for evaluating the effectiveness of agricultural training programs. Copies of the evaluation proforma are available from:

Tasmanian Farmers and Graziers Association
PO Box 193,
Launceston 7250
Phone (03) 6331 6377 Fax (03) 6331 4344

1.2 Methodology

The major data sources for this study are (i) an additional suite of questions included in the Australian Bureau of Statistics' 1993-94 Agricultural Financial Survey, and (ii) an interview survey of 65 Tasmanian farmers, 45 of whom were selected because they had completed one of three training courses. The methodology used for each of the components is described below.

1.2.1 The Agricultural Financial Survey (AFS)

The purpose of the Agricultural Financial Survey part of the larger project is twofold. First, it establishes baseline data about training patterns, reasons for not attending training 'events', future training intentions and changes to practice in Australian farm businesses. Second, it analyses links between these data and financial data including profit, value of assets and indebtedness.

The AFS is an annual survey of farm business units conducted by the ABS. The sample is a stratified one based on the value of operations by industry. The sample size in 1993/94 was approximately 2500 of an estimated farm business population of 107 538. Australian Bureau of Statistics (1995, 54) describes the sampling method.

An additional section of questions, entitled Changes to Farming Practice, was added to the 1993/94 survey. The section consisted of fourteen questions about changes to farming practice, educational qualifications held by the farm management team, formal and informal training attended and future training intentions. Responses are weighted according to the ABS's stratified sample weights to give information which represents the Australian farm business population as a whole.

Types of change to practice

Farm management units which had made a change to farming practice were asked which of the following categories described the change(s):

- financial management, which includes re-financing of loans or mortgages, changes to financial records or management system, use of computer for financial management or changes to software or hardware, changes to the use of financial information in farm management decisions and employment to staff/family to monitor finances;
- marketing, which includes changes to selling place or buyers of farm output, changes to the way farm output is sold and joining or leaving a marketing group or organisation;

- agricultural practices, which includes change in the way crops are grown or livestock managed, change of crops or livestock (not seasonal changes), changes to chemical use, changes to farm safety practices, change to employment numbers or skills mix (not by training existing employees) and purchase of capital equipment;
- land management, which includes changes to land management practices, changes to soil management, planting trees for land management and whole farm planning; or
- other.

Farm businesses which had made changes fitting more than one category were asked to identify the change that they regarded as most important.

Training and change to farming practice

Because training behaviour has been surveyed for the preceding twelve months while changes to practice relate to the past three years, it is not likely that the reported training has influenced the reported changes. The exception is those few changes which have been made in the last twelve months, following training. However, it is possible to establish whether or not those farm businesses which make changes to practice are also likely to train. If training behaviour in the past twelve months is typical of the pattern of training behaviour over a longer period, then it is possible that changes to practice have been influenced by training.

In order to explore this issue further it is necessary to either examine case study data such as that from the interview survey of Tasmanian farmers, or to follow training and change behaviour for a longer period.

Identifying suitable training

Two questions on the Agricultural Financial Survey ask: "In the last 12 months, were there any of these events that your family or employees involved in the management of the farm would have liked to attend but couldn't?" and "What prevented them from attending these events?"

Two explanations exist for reporting no missed events; (i) identifying one or more events worth attending and attending them all, and (ii) not identifying any events worth attending. Failure to attend any training combined with no worthwhile training 'missed' is failure to identify suitable training. Whilst it is possible that no training relevant to a given farm is available, examination of the characteristics of farm businesses which fail to identify worthwhile training will establish whether there is any pattern relating to education or other farm characteristics.

1.2.2 Tasmanian interview survey

The Tasmanian survey provides more information about influences on the decision-to-change process than the Agricultural Financial Survey. It also provides data on how training programs impact on the decision making process, and allows comparison of those who attend courses of several sessions with other farm businesses.

The method used is a semi-structured face-to-face interview. The interviewer asked farmers to trace the history of their farm over the last three years, highlighting the highs and lows, and major changes that have occurred. Farmers were asked why decisions to change were made ('triggers') and information about who gave support when the changes were made.

For each of their two most important changes, farmers were asked how they became aware of the strategy, action or technology, what other factors influenced them to change, and what was the critical factor in making the decision to change.

The survey asks about training, other advice received, productivity and profitability, and about future training intentions. Those who had attended one of the three courses were asked what they liked and did not like about the course, and what could be improved. A copy of the questionnaire and financial details question form appears as an Appendix to Final Report of the project (Kilpatrick, 1996).

Sample

The unit of interest to this study is the family farm management unit. Retired farmers, hobby farmers and those who did a course with the intention of farming in the future, or for other reasons, were not included in the survey.

There are four sample groups. The first three are participants in one of three courses held since 1990, and together form the 'course sample'. The fourth sample group consists of farm businesses units who have not participated in one of these courses since 1990. This group is the 'non course sample'.

The three courses are Farm Chemical Accreditation, Dairy Farm Management and Intensive Pasture Management. Sample selection was restricted to course participants since 1990 for accuracy and ease of recall on questions about the course and changes made to farm management practice as a result of the course.

The three courses are each run by a different body, as described below. They were chosen as being courses which were designed to meet identified training needs by the farmer, educational and development bodies which sponsored this project.

Intensive Pasture Management course

This course is targeted at dairy farmers. It consists of a three day course with a half day follow-up nine months later. It has been run in several locations in north and north-western Tasmania by the Department of Primary Industries and Fisheries. Some funding is provided by milk processing companies. All dairy farmers who receive low interest loans from Tasmania Development and Resources, the state government development body, are expected to attend this course. The course aims are: to increase participants' knowledge and understanding of the pasture/animal/ productivity/ management system, to increase farmer confidence in decision-making and to foster change in farming practices toward increased productivity (Nettle 1992).

Farm Chemical Accreditation course

This course is offered by TAFE and facilitated by the Tasmanian Rural Industries Training Board. Successful completion of the course and its final examination is expected to become a requirement for purchase and use of certain chemicals. The course aims to reduce chemical waste and incorrect use and storage of chemicals.

Dairy Farm Management course

This course was run by TAFE at two locations in the North West of the state and one in the North East in the relevant time period. It consists of weekly sessions, each on a different topic of relevance to dairy farmers.

Other farmers

The Tasmanian Farmers and Graziers Association (TFGA) membership list was used to select a sample of "other" farmers. Any person or business who sells agricultural produce is automatically included on the membership list. Only those farmers who are not on one of the above three course lists are eligible for inclusion in this category.

Chapter 2

What impact has training had on farm profitability?

This chapter analyses education and participation in training at a national level and in the Tasmanian survey. It examines the profitability of farm businesses according to education and participation in various types of training, taking into account other factors which influence farm profit.

Profit is generally measured as gross operating surplus in this report. Gross operating surplus is defined as turnover, less expenses but before interest on debt is deducted. In some cases here cash operating surplus is also used. Cash operating surplus is gross operating surplus less interest payments. Depreciation is not deducted from either measure.

2.1 Education

Farm businesses were asked to nominate the highest level of educational qualification of those involved in the management of the farm. It is left to the individual farm business to decide who is in the management team.

The Agricultural Financial Survey shows that 15 per cent of Australian farm businesses had a member of the management team with post-school agricultural qualifications, while 19 per cent had no member with year 10 or better (see Table 2.1).

Table 2.1
Highest educational qualifications in the management team
(AFS) (per cent)

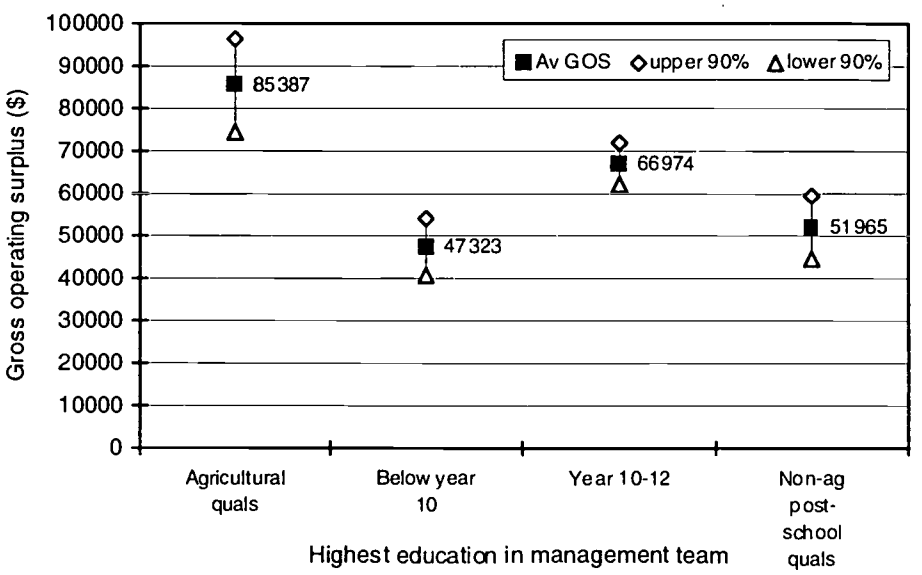
Below year 10	19
Year 10 to 12	43
Non-agricultural post-school qualification	22
Agricultural post-school qualification	15

The farm businesses which have agricultural qualifications present in the management team have an average (mean) gross operating surplus in 1993-94 of

$85 024 compared to $58 768 for other farm businesses (this difference is statistically significant at the 95 per cent confidence level).

Figure 2.1 gives the average gross operating surplus for the other education groupings, and shows that farm businesses with agricultural qualifications have a (statistically) significantly higher average gross operating surplus than each of the other education groups, and those with highest qualification year 10 to year 12 have a significantly higher average gross operating surplus than those with lower education and those with non-agricultural post-school qualifications.

Figure 2.1
Education level and gross operating surplus (AFS)



Values are read from the mid point of small shapes representing the average and upper and lower confidence limits for gross operating surplus (GOS) in all Figures such as this one.

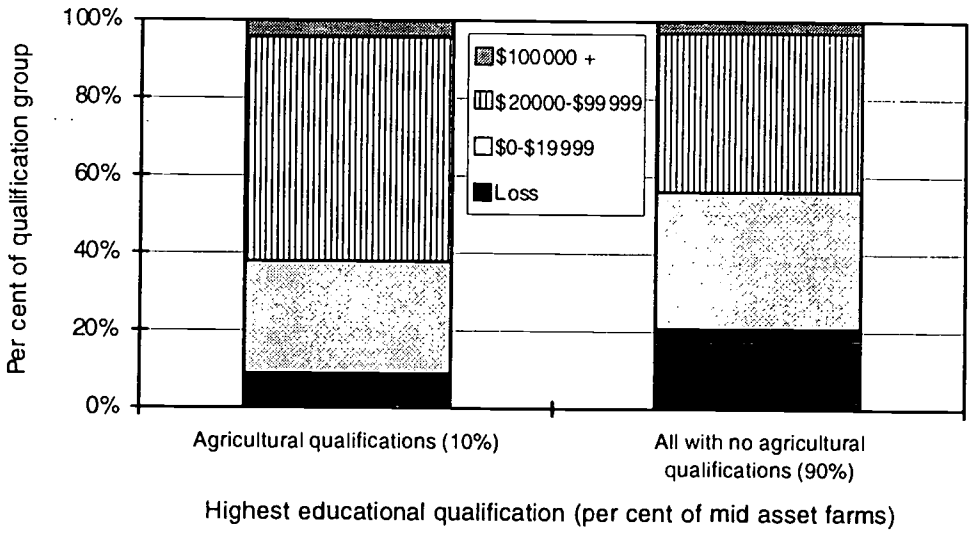
Gross operating surplus is positively correlated with the value of the assets of the farm business (Australian Bureau of Statistics, Agricultural Financial Survey, 1993-94, unpublished data). Figure 2.2 divides farm businesses into three categories by value of assets; less than $500 000 (29 per cent of farm businesses), $500 000 to $999 999 (35 per cent of farm businesses) and $1 million or more (37 per cent of farm businesses).

Farm businesses withagricultural education in the management team are more likely to earn a higher gross operating surplus in the lowest and highest asset categories. Farm businesses in the mid asset group which have someone with agricultural qualifications are more likely than other farm businesses in this asset group to earn

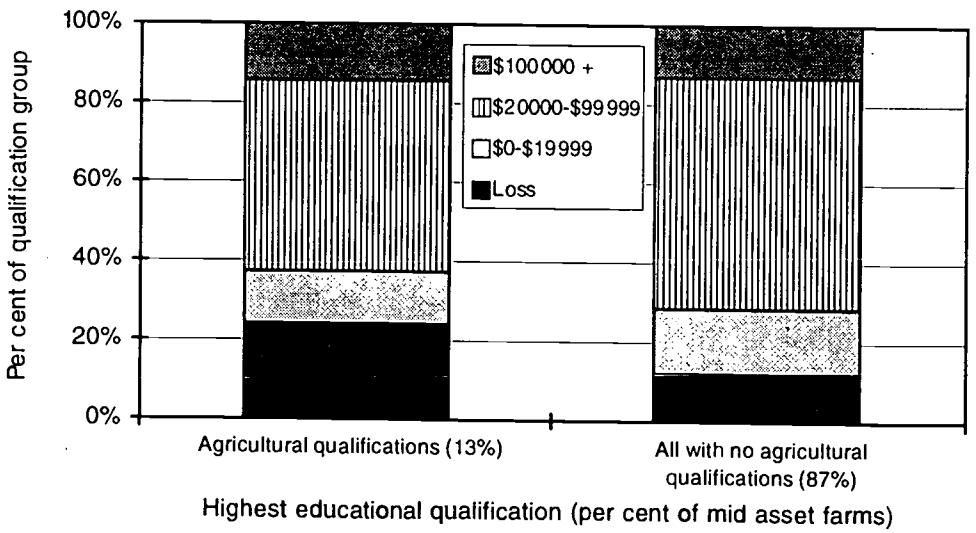
a gross operating surplus of more than $100 000, but are also more likely to be making a loss. Further research is required to determine why the mid asset group performs differently to the other two groups. For each asset group (Figure 2.2 A, B and C), the proportion of farm businesses with and without agricultural qualifications is shown in brackets.

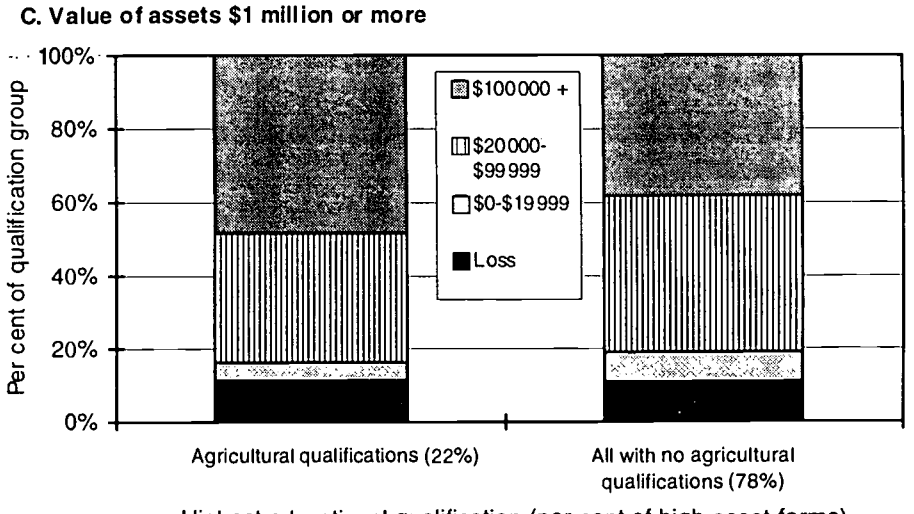
Figure 2.2
Education level, assets and gross operating surplus (AFS)

A. Value of assets less than $500 000



B. Value of assets $500 000 to $999 999





Chi squared distribution probabilities for each asset category for agricultural qualifications group compared to no agricultural qualifications group have probability less than 0.00001 per cent.

The Tasmanian interview survey shows that those farm businesses with at least one member of the management team who has a TAFE, agricultural college or university qualification in agriculture have a higher average profit, measured by both gross and cash operating surplus, than those where no one has formal agricultural qualifications (Table 2.2). This is true even when other factors such as value of assets (land and capital improvements) are taken into account in multiple regressions. The Final Report (Kilpatrick, 1996) discusses the multiple regressions and contains some examples.

Table 2.2
Agricultural qualifications and profit measures (Tasmania) (dollars)

Qualifications of management team	Number	Mean gross operating surplus	Median gross operating surplus	Mean cash operating surplus	Median cash operating surplus
No agricultural qualifications	26	28 493* **	10 072*	20 474	3 691*
Agricultural qualifications	28	62 655* **	46 322*	34 680	28 756*
T/chi squared test		T 1.9456625	chisq 10.484	T .9804879	chisq 4.6593
(probability < critical value)		(0.0571)	0.0012	(.331474)	(0.0309)

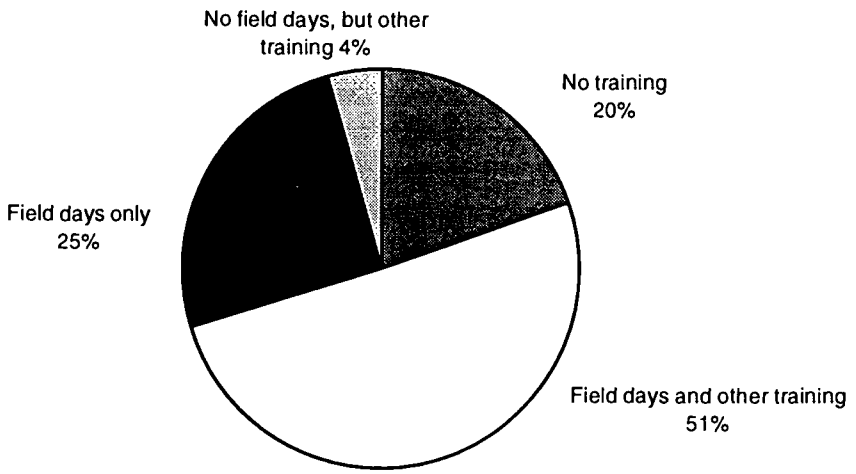
* Difference is significant at 90 per cent confidence level.
**Difference is significant in multiple regressions.

The Tasmanian sample is biased toward those with TAFE qualifications (as stated in the Methodology section of Chapter 1, 19 of the 65 surveyed were selected because they had completed a TAFE course). The profit results of those who had taken each of the courses are examined in section 0 below.

2.2 Participation in training (Australian data)

The extent of Australian farmer participation in training depends on how training is defined. If the definition of training is limited to formal award courses run by universities, TAFE institutes and other accredited providers, then only three per cent of Australian farm businesses have someone participate in training in a twelve month period (AFS). However, if a broader definition which includes informal training at seminars, conferences, industry meetings and field days is used, 80 per cent of farm businesses participate in training. Figure 2.3 shows the distribution of participation in training.

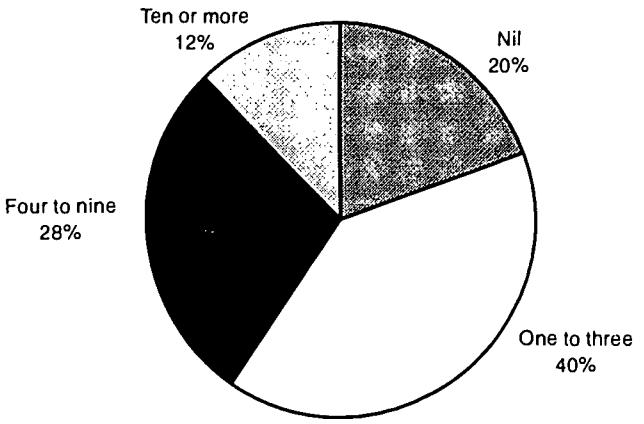
Figure 2.3
Distribution of farm business training behaviour (AFS)



Field days are the most popular form of training, being attended by 76 per cent of all farm businesses, followed by seminars and workshops (38 per cent) and conferences and industry meetings (19 per cent).

Forty-one per cent of farm businesses attend more than three training courses, seminars, workshops, conferences, industry meetings, or field days (hereafter called training 'events') during a twelve month period, while 40 per cent participate in between one and three 'events' (Figure 2.4).

Figure 2.4
Number of training 'events' attended (AFS)



Some of the characteristics of those who attend various types and quantities of training, such as value of farm business assets, influence farm business profitability. These characteristics are explored in the following section.

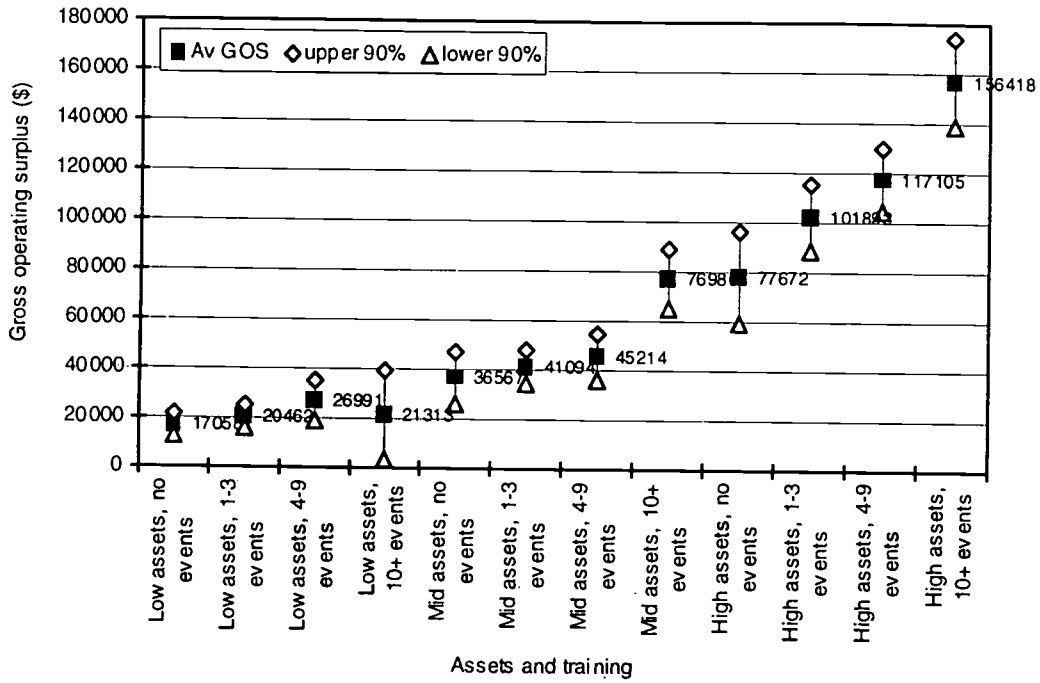
2.3 Profit and participation in training

Farm businesses which participate in at least one training 'event' in a twelve month period have a higher gross operating surplus than those which do not ($68 102 for 'training' farm businesses compared to $39 788 for 'non-training' businesses; the difference is statistically significant at the 95 per cent confidence level).

The average gross operating surplus varies with value of assets, as well as with training. Figure 2.5 shows this variation and also compares farm businesses within asset groups by the number of training events attended.

Farm businesses with assets from $500 000 to $999 999 and $1 million or more, which had people attend 10 or more events in twelve months, had a significantly higher gross operating surplus than those with similar value of assets, but where people participated in fewer training events. Also, farm businesses with assets of $1 million or more whose managers attended between four and nine training events had a significantly higher gross operating surplus ($117 105) than those which attended no training ($77 072).

Figure 2.5
Training and average gross operating surplus by low, mid and high value of assets* (AFS)



Value of assets: low less than $500 000, mid $500 000-$999 999, high $1 million or more.

2.3.1 Industry

Farm businesses in the fruit, vegetable, grain and grain-sheep-beef industries which attend at least one training event in twelve months have a higher gross operating surplus than those which participate in no training (see Table 2.3).

2.3.2 State

Table 2.4 shows that farm businesses in all States except New South Wales and South Australia which attend at least one training event in twelve months have a higher average gross operating surplus than those which do not.

2.3.3 Field days

Farm businesses which participate in at least one field day in a twelve month period have a higher gross operating surplus than those which do not ($68 955 compared to $42 280 for 'no field day' businesses; the difference is significant at the 95 per cent confidence level).

Table 2.3
Profit and training by industry (AFS)

Industry	Per cent of farms training	At least one training event			No training events		
		Average Gross Operating Surplus ($)	Relative Standard Error	Lower 90 per cent confidence limit ($)	Average Gross Operating Surplus ($)	Relative Standard Error	Upper 90 per cent confidence limit ($)
Fruit*	79	48 839	0.1385	37 678	29 026	0.1641	36 885
Vegetable*	76	100 080	0.1141	81 238	27 567	0.2933	40 908
Grain*	88	92 709	0.0621	83 210	38 121	0.238	53 091
Grain-sheep-beef*	83	71 773	0.0723	63 211	38 417	0.2351	53 320
Sheep-beef	83	55 418	0.1139	45 003	55 996	0.2238	76 674
Sheep	85	46 130	0.09	39 280	21 864	0.9041	54 480
Beef	70	53 308	0.1377	41 196	38 773	0.2067	51 997
Dairy	81	80 516	0.0896	68 613	53 305	0.2628	76 419
Pigs	65	70 387	0.3023	35 278	83 792	0.2659	120 554
Poultry	81	59 569	0.154	44 433	38 062	0.2298	52 494
Sugar	87	75 645	0.1776	53 478	53 189	0.1814	69 109
Cotton	94	322 644	0.1552	240 021	735 915	0.4285	1256 225
Other	73	43 580	0.2319	26 905	16 377	0.6825	34 820

* Difference of means of training and non-training farm businesses is significant at 90 per cent confidence level.

Table 2.4
Profit and training by State (AFS)

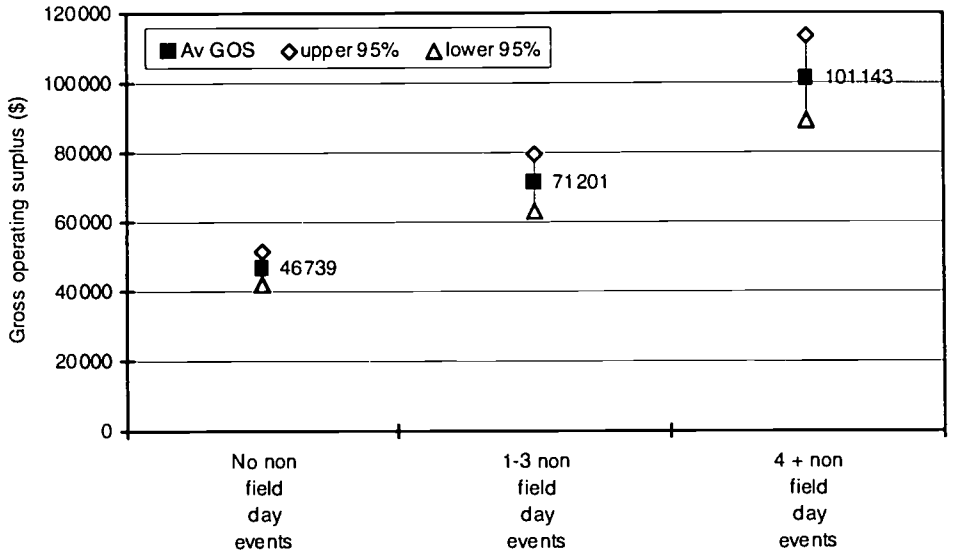
State	Per cent of farms training	At least one training event			No training events		
		Average Gross Operating Surplus ($)	Relative Standard Error	Lower 90 per cent confidence limit ($)	Average Gross Operating Surplus ($)	Relative Standard Error	Upper 90 per cent confidence limit ($)
NSW	81	72 800	0.0602	65 569	53 903	0.1333	65 759
Vic*	79	58 837	0.0726	51 789	23 978	0.2931	35 574
Qld*	77	59 076	0.0937	49 943	30 165	0.1953	39 886
SA	84	46 327	0.1126	37 720	31 484	0.2569	44 830
WA*	85	124 668	0.0567	113 005	76 249	0.1914	100 329
Tas*	88	42 638	0.0998	35 617	16 964	0.3534	26 856

* Difference of means of training and non-training farm businesses is significant at 90 per cent confidence level.

2.3.4 Training other than field days

Farm businesses which participate in training other than field days, that is attend courses, seminars, workshops or industry meetings, are more profitable than those which do not. The 'other than field day' training group have an average gross operating surplus of $80 993, compared to $46 739 for those who do not train, or attend only field days. Average gross operating surplus increases significantly with the number of training 'events' other than field days attended (see Figure 2.6).

Figure 2.6
Profit and participation in training other than field days (AFS)



2.4 Training and profit - Tasmanian survey

The Tasmanian survey asked about training behaviour over the past three years, instead of a one year period as in the Agricultural Financial Survey. This allows examination of patterns of training behaviour over time.

All but two farm businesses in the sample participated in at least one training event in the past three years. Ninety-one per cent of those surveyed agree that education and/or training is important to the profitability, productivity and/or long term viability of their farm. Eighty per cent believe that training or expert advice received in the last three years have improved the profitability, productivity and/or long term viability of their farm.

2.4.1 Courses

Seventy-seven per cent of the Tasmanian survey farm businesses had taken at least one business management, agriculture or technical course (consisting of several sessions held over more than one day) in the last three years. This percentage is high because 43 of the 65 farms surveyed were included through their participation in the Farm Chemical Accreditation, Dairy Farm Management or Intensive Pasture Management course. Thirty-six farm businesses, or 55 per cent of all those surveyed, had taken more than one course.

Of the other farms surveyed, only five of the TFGA sample, plus the two farms selected for the TFGA sample but later found to have taken the Intensive Pasture Management and Farm Chemical Accreditation courses, or 32 per cent, had taken a course over the period. This figure is likely to understate the percentage of farms where courses are studied because those identified on one of the three course participant lists were excluded when the survey sample was drawn from the TFGA membership list.

Other courses include Tasmanian Rural Industries Training Board financial management modules, feeding for profit, artificial insemination, advanced pasture management, a private agricultural consulting company's marketing course and grazing for profit.

Table 2.5
Farm businesses taking courses in the last three years (Tasmania)

Number of courses	One	2 to 5	More than 5	Total farms	Per cent of sample
TAFE or university agriculture *	20	11	1	32	49
Other agriculture **	17	12	2	31	48
Whole farm planning (Property management planning)	8	0	0	8	12
Computer or record course	7	3	1	11	17
Other business management	4	0	0	4	6
All courses	**15**	**27**	**8**	**50**	**77**

* Includes Dairy Farm Management and Farm Chemical Accreditation courses.
** Includes Intensive Pasture Management course.
n = 65

When seminars are included with courses, 38 per cent of farm businesses undertook some business management training. This includes the 17 per cent of farm businesses which had someone take a computer or record management course.

The relationship between the three survey courses and profit is considered in section 2.4.2 below. The small number of those in the TFGA sample who studied courses, the diverse nature of the courses and the spread of courses across industry sub-sectors make it statistically inappropriate to analyse profit data by industry and for individual courses other than Dairy Farm Management, Intensive Pasture Management and Farm Chemical Accreditation.

2.4.2 The three survey courses

Farm businesses which have a member of the management team who has taken one of the three courses included in the survey record better profit results than farms in the same industry sub-sector which do not. Farm businesses in the course sample have a higher average profit (gross operating surplus) even when value of assets is taken into account in multiple regressions. For more information on the multiple regressions see the Final Report (Kilpatrick, 1996).

Table 2.6
Profit and courses (Tasmania)

Dairy farms	Number	Average gross operating surplus
Dairy Farm Management Course	10	$57 630**
Other dairy farmers	19	$51 401**
T test *(probability < critical value)*		T 0.2198 (0.8286)
Intensive Pasture Management Course	14	$62 206**
Other dairy farmers	15	$45 469**
T test *(probability < critical value)*		T 0.6245 (0.5397)
Crop and livestock farms		
Farm Chemical Accreditation Course	13	$81 670**
Other crop and livestock farms	25	$31 660**
T test *(probability < critical value)*		T 2.1488 (0.0448)

**Difference is significant in multiple regressions.

The Dairy Farm Management course is positive and significant in explaining both gross and cash operating surplus for dairy farms (in multiple regressions). The Intensive Pasture Management course is also targeted at the dairy industry. This course is associated with a higher dairy gross operating surplus (in multiple regressions).

Farm businesses in the crop industry which completed the Farm Chemical Accreditation course have a higher average gross operating surplus, and the course is positively associated (in multiple regressions) with both gross and cash operating surplus. Multiple regressions which also include making a change to chemical use reveal that the change to chemical use is more significant than having done the course; nine of the eleven crop farms which took the course also made a change to chemical use.

2.5 Training participation over time

As stated at the start of section 2.4, the Tasmanian interview survey data allow examination of farm business training patterns over time. Recent training participation and past training participation are strongly correlated. Table 2.7 shows that farm businesses which attended no or very few training events in the period one to three years ago also attended no or very few events in the last year. Similarly, farm businesses which attended more than five events in the last year, tend to have participated in a large number of training events in the previous two years.

Table 2.7
Training participation over time (Tasmania)

	Number of training events 1 to 3 years ago					
Number of training events in the last year	**Nil**	**1 or 2**	**3 to 5**	**6 to 15**	**More than 15**	**Number of farms**
Nil	2	4	1	0	0	7
1 or 2	0	7	6	5	1	19
3 to 5	0	0	6	14	0	20
More than 5	0	0	0	12	7	19
Number of farms	2	11	13	31	8	65

Correlation coefficient r=0.913255

2.6 Discussion

Specific agricultural post school education is related to higher profit. The project also confirms the findings of many studies in agriculture and other industries that formal education improves profitability and/or productivity (for example, Phillips, 1994; Jamison & Lau, 1982; Welch, 1970).

There is also a clear association between recent participation in training of all forms and higher profit. There is evidence from the Tasmanian interview survey that the pattern of past training participation is similar to recent training behaviour. If education and training do contribute to higher profit, as the results suggest, then farm businesses with recent training are likely to have had the benefit of earlier training. It is very likely that this past training has contributed to present profitability.

Education has an impact on profitability and productivity via decision making, particularly in relation to changes to practice and adoption of innovations. Education assists in selecting quality inputs and allocating inputs between competing uses. Welch (1970), in a seminal study which is based on United States agricultural data, finds that education can affect productivity in two ways:

- via a worker effect which is due to improved quality of labour which increases production from a given set of non-labour inputs, and
- via an allocative effect which is due to improved ability to process information, select inputs and allocate inputs across competing uses.

The ability to process information, select inputs and allocate inputs across competing uses is related to the process of making changes to practice. The next chapter examines changes on farms which are intended to improve farm business profitability, including the relationship between education and training and change, and the relationship between changes to practice and profitability.

Chapter 3

What 'triggers' farm managers to make major changes to their farming practices?

This chapter first reviews the number and types of changes made to farm management practice. It then examines the characteristics of those making changes, starting with the relationship between change and education and training, and moving on to financial and other characteristics. Results about influences reported by respondents on the change process follow, and the section concludes with findings relating to the relationship between change, training and profit.

3.1 Agricultural Financial Survey

Only 62 per cent of all farm businesses made one or more changes to practice in the last three years designed to improve farm profitability. Table 3.1 shows that a change to agricultural practice is the most common type of change made by farm businesses, being made by just under half of all farm businesses. A change to agricultural practice is identified as the most important change in the last three years for 38 per cent of all farm businesses. Whilst 14 per cent of businesses made a change to financial management, only 5 per cent rated this change as the most important one made.

Table 3.1
Changes to practice by type (AFS)

Type of change	Made a change (per cent)	Was most important change (per cent)
Financial	14	5
Marketing	11	5
Agricultural	48	38
Land management	25	13
Other	5	1
Nil		38
n = 104 766		

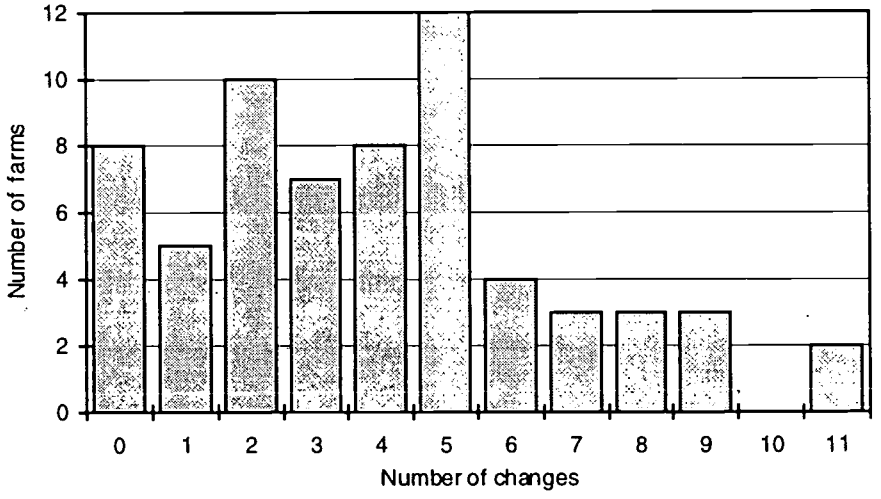
3.2 Tasmanian survey

The Tasmanian survey permits examination of *all* changes in the last three years which are considered to improve the profitability or long term viability of the farm business. Compared to the Agricultural Financial Survey results, a larger proportion of the Tasmanian survey made at least one change. All but 12 per cent of these farm businesses have made at least one change to their farming practice over the past three years which they consider has improved or maintained the long term profitability or viability of their farm. Individual farm businesses report up to eleven changes, the average being 3.9 (see Figure 3.1). Over half (57 per cent) made between two and five changes.

Most changes are to pasture planning (51 per cent of farms) and land management (49 per cent of farms). This is not unexpected given that 29 per cent of those surveyed had attended the Intensive Pasture Management or Dairy Farm Management courses. One third made changes to chemical use. Again the presence in the survey of sixteen farm businesses which had someone take the Farm Chemical Accreditation course may be an explanation for the relatively large number of farms reporting a change to this practice.

Pasture planning and land management changes are also most numerous when farmer managers rank changes made in order of importance to profitability and long term viability (Table 3.2).

Figure 3.1
Number of changes per farm business (Tasmania)



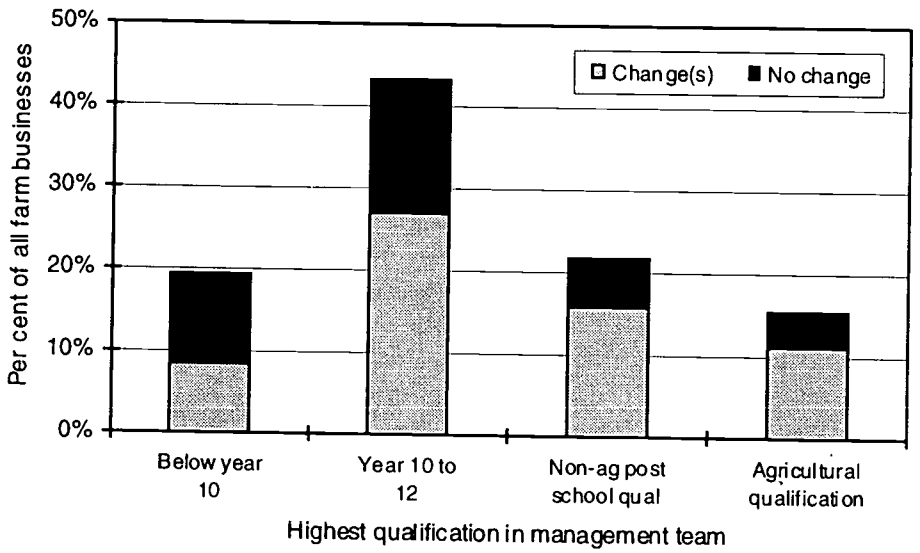
n=65 *farms*

Table 3.2
Two most important changes made (Tasmania)

Type of change	Per cent of changes	Per cent of farms
Pasture planning	20	34
Land management	20	34
Production mix or level	15	25
New equipment or technology	12	20
Chemical use	9	15
Animal management	7	11
Skills	6	9
Other management	5	8
Increase farm size	3	5
Workforce	2	3
Financial management	2	3
Record keeping	1	2
Total changes	100	88

n = 65 (some farms made only one change)

Figure 3.2
Change to practice and educational qualifications (AFS)



Chi squared test probability for distribution of change/no change at each education level compared to Year 10 to 12 is less than 0.000001 per cent

3.3 Education and change

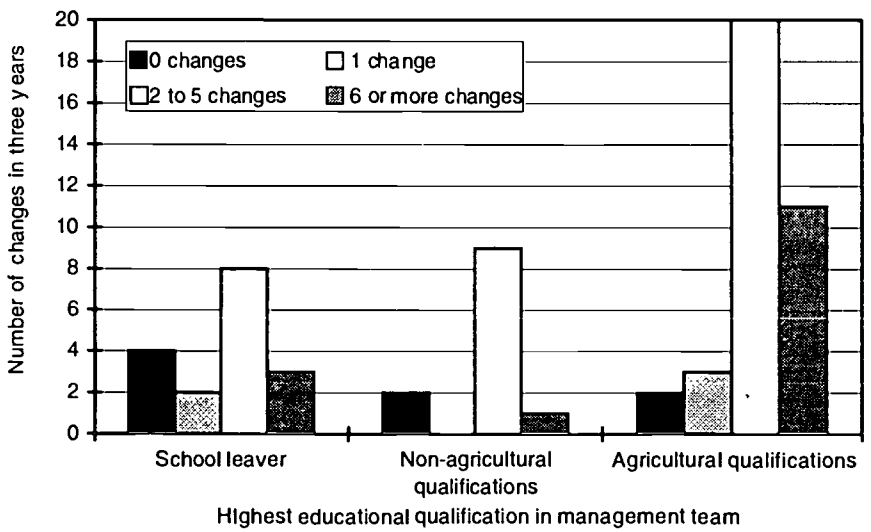
From the Agricultural Financial Survey, farm businesses with no one in the management 'team' having education to year 10 level are the least likely to make a change to their practice (56 per cent made no change to improve profitability in the last three years). Only 28 per cent of farm businesses with someone with agricultural qualifications made no change. Figure 3.2 shows that the likelihood of making no change to practice is greater for those without post school qualifications than for those with post school qualifications. Farm businesses with a highest education level of year 10 to 12 comprise 43 per cent of all farm businesses. This group makes changes at the average rate for the farm business population (62 per cent make a change).

Farm businesses with better educated managers are more likely to make changes in all four categories (financial management, marketing, agricultural practices and land management).

Taking only businesses which do make changes, farm businesses with agricultural qualifications make more types of change (an average of 1.86 categories), while farm businesses with the lowest educational qualifications make fewer types of change (an average of 1.28 categories). The average for all education levels is 1.57 change categories.

Tasmanian data also show that farm businesses with agricultural qualifications in the management team are more likely to make changes, and are more likely to make two or more changes (Figure 3.3). Highest education level below year 10 is not shown separately as only four farm businesses are in this category.

Figure 3.3
Number of changes and education level (Tasmania)

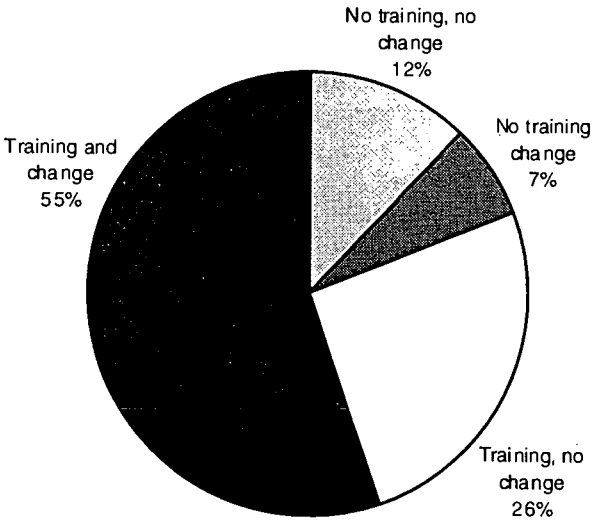


Chi squared probabilities for distribution of education levels compared to agricultural education: school leaver 0.00153961, non-agricultural post school qualifications 0.00041137.

3.4 Recent training and change

Twenty-six per cent of all Australian farm businesses have attended at least one training event in the past twelve months but made no change to their practice in the three year period. Only 7 per cent of Australian farm businesses make a change to practice but have done no training in the past twelve months (Figure 3.4).

Figure 3.4
Training and changes to practice, Australian farm businesses (AFS)

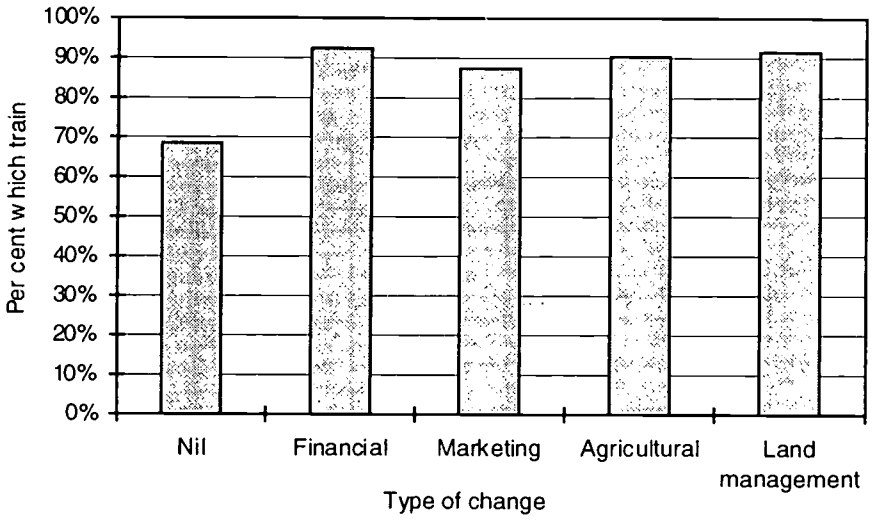


3.4.1 Types of change and training

Farm businesses which make each type of change to practice are likely to train. Between 87 per cent and 92 per cent of those farm businesses which make each of the four types of change to practice attend some training, compared to less than 70 per cent of those which do not make changes (Figure 3.5).

As discussed in Methodology in Chapter 1.2, it is unlikely that the training has influenced the changes. However, it is possible to say that those farm businesses which make changes to practice are also likely to train. If training behaviour in the past twelve months is typical of the pattern of training behaviour over a longer period, then training may have influenced change. Chapter 6, Future Training, considers the relationship between recent training attendance and future training intentions.

Figure 3.5
Proportion of those making a change by type which train (AFS)



It is possible that some of the 26 per cent surveyed which trained, but made no change to practice (Figure 3.4) may make a change in the future which is influenced by that training. The interview survey of Tasmanian farmers found that 62 per cent of those who attended a course made a change which was influenced by the course (see section 3.4.4 below).

3.4.2 Number of training events and change

The more events attended, the greater the chance that there has been a change to practice. Figure 3.6 shows that 84 per cent of those Australian farm businesses which participate in ten or more training events make some change to practice, compared to 58 per cent of those attending between one and three events and only 37 per cent of those which do not train.

3.4.3 Training methods and change

When each training method is considered separately, the proportion of participants which make a change is larger than the proportion of those which do not participate in that type of training but make a change (Table 3.3). Those training methods which attract larger farm businesses, such as conferences and seminars, have a greater proportion of participants who make changes. This is also consistent with larger farm businesses' greater propensity to make a change.

Figure 3.6
Proportion of those attending training which made a change (AFS)

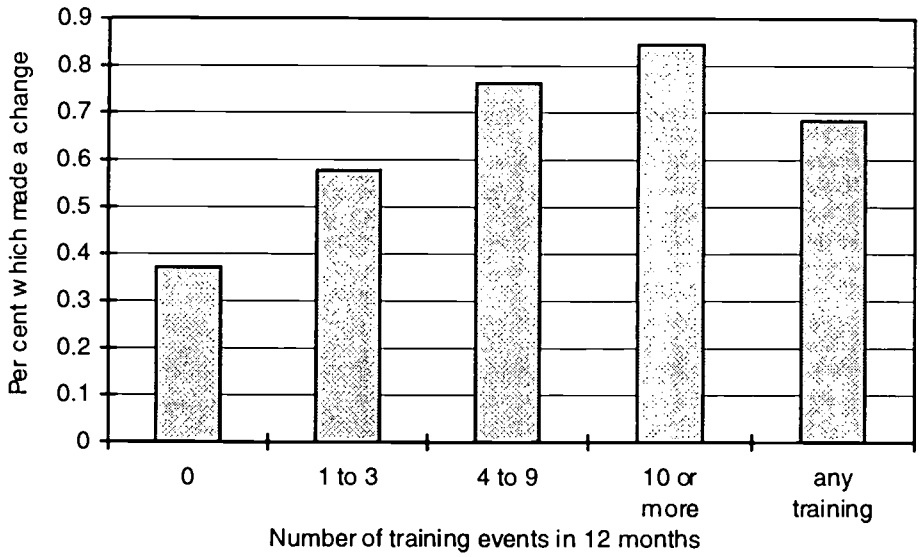


Table 3.3
Training method and farm businesses which make a change (AFS)

Training method	Per cent which make a change
At least one field day	68
No field days	*44*
At least one seminar	78
No seminars	*53*
At least one conference	80
No conferences	*58*
At least one agricultural course	75
No agricultural courses	*62*
Some non-field day training	76
No non field day training	*50*
Any training	**68**

3.4.4 Tasmanian courses and changes to practice

Almost two-thirds of participants in the three survey courses made at least one change to their farming practice as a result of attending one of the courses. Changes are planned on two other farms. All but two of the farmers believe that these changes have or will improve the profitability or long term viability of the farm. (One of these two made a change for safety reasons, the other for legal reasons.)

Twenty per cent of all the farmers who attended one of the courses became aware of a new practice or management strategy at the course and subsequently implemented that practice or management strategy. One of the courses was the 'trigger', or critical factor, in the decision to make the change in almost half of cases. One quarter of the course-influenced changes were rated the most or second most important change made on the farm over the past three years (Table 3.4).

Table 3.4
Changes to practice influenced by courses (Tasmania)

Impact of course on change	Dairy course participants	Pasture course participants	Chemical course participants	Proportion of all course participants (per cent)
Made a change influenced by course	8	12	9	64
Became aware of the change at course	2	5	2	20
Course was trigger for change	4	5	3	27
Change was one of two most important made on farm in last 3 years	3	3	1	16
Total participants	13	16	16	45 people

The types of change made as a result of the Dairy Farm Management and Intensive Pasture Management courses are largely changes to pasture planning or land management (these two changes comprise 85 per cent of all changes from the two courses). Not surprisingly most of the changes as a result of the Farm Chemical Accreditation course are to chemical usage (56 per cent).

The most frequently reported reason for not making a change related to the course is that the course reinforced the appropriateness of existing practices (especially the Farm Chemical Accreditation course). Only three people gave reasons related to the way the course was delivered.

Table 3.5
Reason for making no change as a result of a course (Tasmania)

Reason	Chemical participants	Dairy participants	Pasture participants	Per cent of non changers
Reinforced existing knowledge	4	2	1	44
Didn't apply to my farm	2	1	0	19
Course too theoretical	0	1	1	13
Prefer existing way of doing things	0	0	2	13
Not enough capital to implement changes	0	1	1	13
Too soon, changes planned	0	1	1	13
Course delivery problems	0	1	0	6

n = 16, some gave more than one reason.

3.5 Other characteristics and change

3.5.1 Industry

From the Agricultural Financial Survey data, the proportion making a change on an industry by industry basis varies from 40 per cent for sheep to 74 per cent for poultry. However, the only industry which is statistically significantly different from the average is the sheep industry. The sheep industry, which represents 16 per cent of all farm businesses in Australia, has been experiencing low prices in recent years. Lack of financial resources may partly explain the low percentage of 'changers'. As well, farm businesses which have diversified into other broad acre enterprises such as grain or beef would be classified as grain-sheep-beef or sheep-beef.

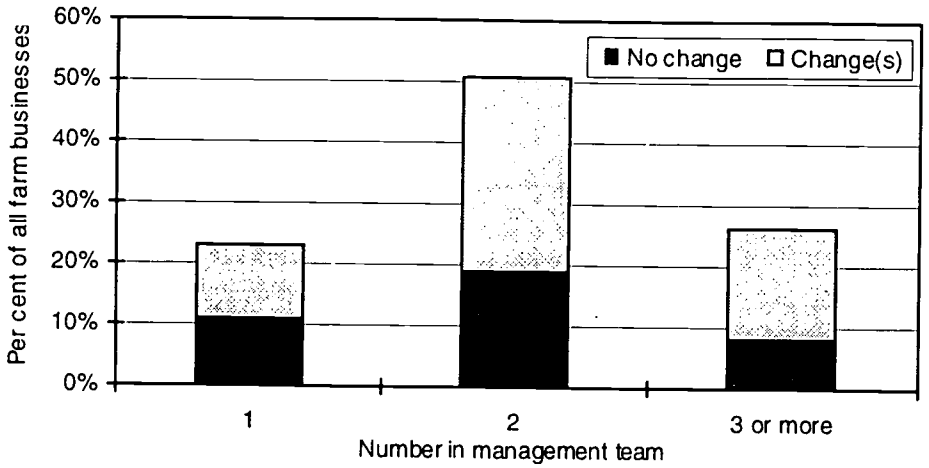
3.5.2 State

Farm businesses in New South Wales make changes at a significantly lower rate than the national average (52 per cent made a change), while those in Western Australia are significantly more likely to make changes (71 per cent made a change). The national average is 62 per cent.

3.5.3 Size of management team

Australian farm businesses with a single manager are least likely to make a change to practice, and farms with two managers are less likely to make a change than those with larger management teams (Figure 3.7). This pattern also applies for each type of change.

Figure 3.7
Number in management team and changes to practice (AFS)



Chi squared test probability for distribution of change/no change for 1 and 3 or more managers compared to 2 managers is less than 0.000001 per cent.

3.5.4 Value of assets

From AFS data:

- larger farm businesses (by value of assets) are more likely to make a change to practice in all change categories, except marketing where only those with assets of $1 million or more are more likely to make a change (Table 3.6).
- farm businesses with assets of less than $500 000 comprise less than 30 per cent of all farm businesses, yet are the largest group of those which make no change to practice.
- these low asset farm businesses comprise 36 per cent of all farm businesses which make no change to practice.

Table 3.6
Value of assets and type of change to practice (AFS) (per cent)

Assets	All changes	Financial	Marketing	Agricultural	Land management
less than $500 000	53	10	10	37	17
$500 000 to $999 999	63	11	9	50	27
$1 million or more	69	20	14	55	28
All	62	14	11	48	25

Chi squared test probability for distribution of change/no change at asset levels less than $500 000 and $1m or more compared to $500 000 to $999 999 is less than 0.000001 per cent for all changes and for each type of change.

The average value of the assets of farm businesses which both train and make changes to practice is higher than the average of other farm businesses. Those which neither train nor make changes have a significantly lower average value of assets than those which make changes.

3.5.5 Indebtedness

Farm businesses with no debt are less likely to make any type of change than farm businesses with equity between 76 per cent and 99 per cent (Table 3.). Equity is defined as value of assets less debt expressed as a per centage of value of assets. Farms with equity of more than 50 per cent and up to 75 per cent are more likely to make all types of change. The small proportion of farm businesses with equity of 50 per cent or less have a likelihood of making a change that bears more resemblance to the 76 per cent to 99 per cent equity group than the next lowest equity group. If this group is excluded, the probability of making a change falls as equity rises. One possible explanation is that many changes require capital expenditure which typically requires borrowing, and hence farms which make changes are likely to incur debt.

Approximately one quarter of Australian farm businesses are debt free. Almost half of these have made no change to their practice to improve profitability in the last three years (Table 3.7).

Table 3.7
Equity and type of change to practice (AFS) (per cent)

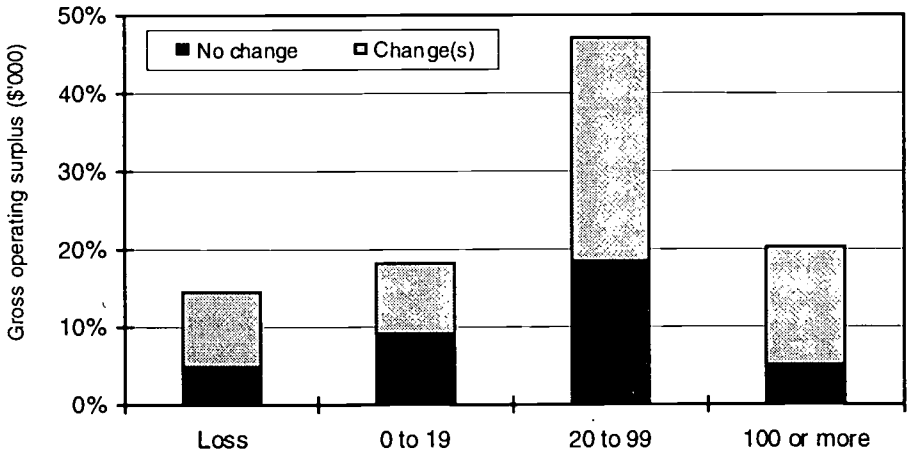
Equity	Financial	Marketing	Agricultural	Land management	No change	Per cent of all farms
50 per cent or less	19	15	49	21	36	6
51-75 per cent	22	20	60	32	25	14
76-99 per cent	14	11	48	26	37	56
100 per cent	7	6	41	17	47	24
All	14	11	48	25	38	

Chi squared test probability for distribution of change/no change for equity categories compared to 76-99 per cent is less than 0.000001 per cent in aggregate and for all four types of change.

3.5.6 Profit

Australian farm businesses which make a small, but positive, profit are less likely to make a change than more profitable farms, and those making a loss. Half of farm businesses with a positive gross operating surplus of less than $20 000 have made no change to practice to improve profitability in the last three years. In contrast, only one quarter of farm businesses with a gross operating surplus over $100 000 have made no change to practice (Figure 3.8).

Figure 3.8
Profit and changes to practice (AFS)



Chi squared test probability for distribution of 'change/no change' for other profit categories compared to $20 000 to $99 000 is less than 0.000001 per cent.

Farm businesses making a loss make changes to practice at a rate between that of the two highest profit categories (see Figure 3.8). A possible reason is that recent major changes are unlikely to have a positive impact on profit, and may even have a short term negative impact. Another possible reason is that those businesses making a loss are more likely to be motivated to search for changes which may improve profitability than farm businesses 'in the black'.

The average gross operating surplus for those farm businesses which made at least one change to practice is $70 621, which is statistically significantly higher than the average of $49 240 for those which have made no change in the last three years (AFS data, see Table 3.8). The Tasmanian data confirms that businesses which make a change have a higher profit.

Table 3.8
Gross operating surplus and changes (AFS and Tasmania)

	Agricultural Financial Survey ($)	Per cent	Tasmanian survey ($)	Per cent#
Change	70 621*	62	60 390*	82
No change	49 240*	38	11 096*	18

**Difference significant at the 90 per cent level.*
#n=50

For farm businesses with a positive gross operating surplus, the likelihood of making a change increases as profit increases for all four change types, see Table 3.9.

Table 3.9
Profit and changes to practice (AFS)

Gross operating surplus ($'000)	Any change (per cent)	Financial change (per cent)	Marketing change (per cent)	Agricultural change (per cent)	Land management change (per cent)
Loss	66	14	9	50	29
0 to 19	50	9	8	36	16
20 to 99	61	12	10	46	24
100 or more	75	24	17	62	30
All	62	14	11	48	25

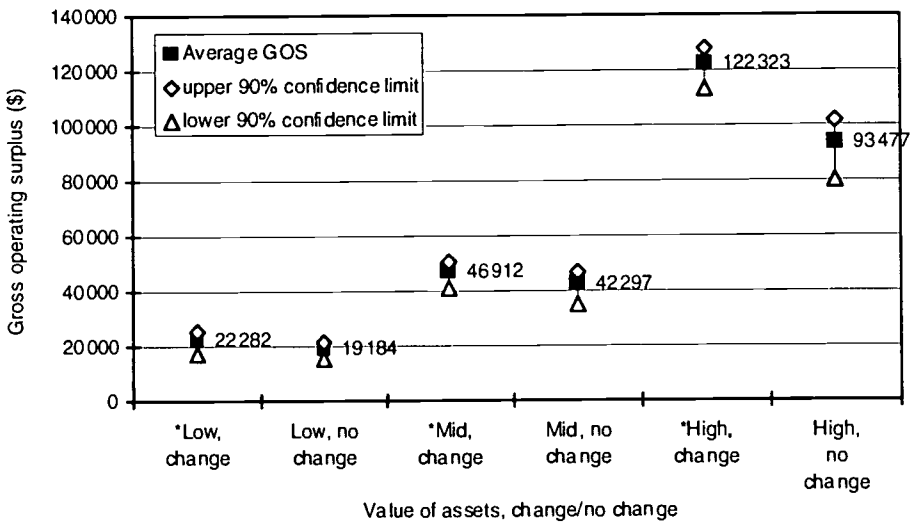
Chi squared test probability for distribution of change/no change at each profit category compared to Year $20 000 to $99 000 is less than 0.000001 per cent for all changes and for each type of change.

As noted in section 3.5.4 above, farm businesses with a higher value of assets are more likely to make changes to practice. Value of assets and profit can be expected to be positively correlated - the larger the business and the more capital improvements the larger the expected profit. It may be, then, that the relationship between profit and change is merely a reflection of the relationship between assets and profit.

The average gross operating surplus is greater for those farm businesses which make a change than for those which do not for each of the three asset categories, but the difference is significant only for farm businesses with assets valued at $1 million or more (see Figure 3.9).

When farm businesses are compared to others with similar value of assets, more farm businesses earning a gross operating surplus of $100 000 or more make financial, marketing, agricultural and land management changes than those with lower gross operating surpluses. Farm businesses which make a loss tend to make each type of change at a rate similar to businesses with larger gross operating surpluses rather than the rate of change of those making a small positive profit. See the Final Report, Kilpatrick (1996) for more information.

Figure 3.9
Value of assets and average profit and change (AFS)



**Low value of assets: less than $500 000, mid value of assets: $500 000 to $999 999, high value of assets: $1 million or more.*

3.5.7 Contribution to Australian farm profit

The 29 per cent of Australian farm businesses with assets of less than $500 000 contribute only 10 per cent of total farm profit as measured by gross operating surplus (GOS), while the 36 per cent of farm businesses with assets of $1 million or more contribute 65 per cent of the total (see Table 3.10). Whilst small asset value farms which make no changes to practice make up 14 per cent of all farm businesses, they represent only 4 per cent of total farm profit. The pattern of contribution to gross operating surplus is similar to the pattern of contribution to total turnover and to the value of farm production (see Australian Bureau of Statistics, 1995).

Altering the behaviour of the 11 per cent of farm businesses with assets of $1 million or more which currently make no change to practice has the potential to make a greater impact on farm profit and the value of agricultural production than altering the behaviour of smaller farm businesses.

Table 3.10
Contribution to Australian farm profit by assets and change (AFS)

Value of assets	Low (less than $500 000) (per cent)	Mid ($500 000 to $999 999) (per cent)	High ($1 million or more) (per cent)	All farm businesses (per cent)
Change				
per cent of GOS	6	16	48	70
per cent of farms	*16*	*22*	*25*	*62*
No change				
per cent of GOS	4	9	17	30
per cent of farms	*14*	*13*	*11*	*38*
All				
per cent of GOS	10	25	65	
per cent of farms	*29*	*35*	*36*	

Totals may not tally due to rounding.

3.6 Prompts for change

3.6.1 Triggers - Agricultural Financial Survey

Farm businesses were asked what prompted the change they rated as most important to improve the profitability of the farm. Table 3.11 shows that other farmers are the most frequently cited prompt, followed by 'training events', (including field days) family and staff and various classes of expert advisers. A large number of the 'other' prompts are specified as 'self', 'own idea' or 'no one'. External events such as drought, flood, hail and fire and other reasons including worn out equipment and retirement of a share farmer make up the 'other' category.

Table 3.11
Prompts for change to practice (AFS)

Prompt	Per cent of changes
Training event	17
Other farmers	18
Family or staff	13
Agricultural companies	7
Consultants (inc financial)	8
Government agencies	6
Industry organisations	7
Land management groups	2
Media	2
Financial reasons	3
Other	18

Figure 3.10 shows that:

- financial and marketing changes are most likely to be prompted by consultants, field officers, bank personnel or other expert advisers.
- agricultural and land management changes are most likely to be prompted by other farmers or family.
- training, including informal learning events such as field days, prompt 20 per cent of financial changes, 18 per cent of agricultural changes and 17 per cent of land management changes.

Figure 3.10
Prompts for change by type of change (AFS)

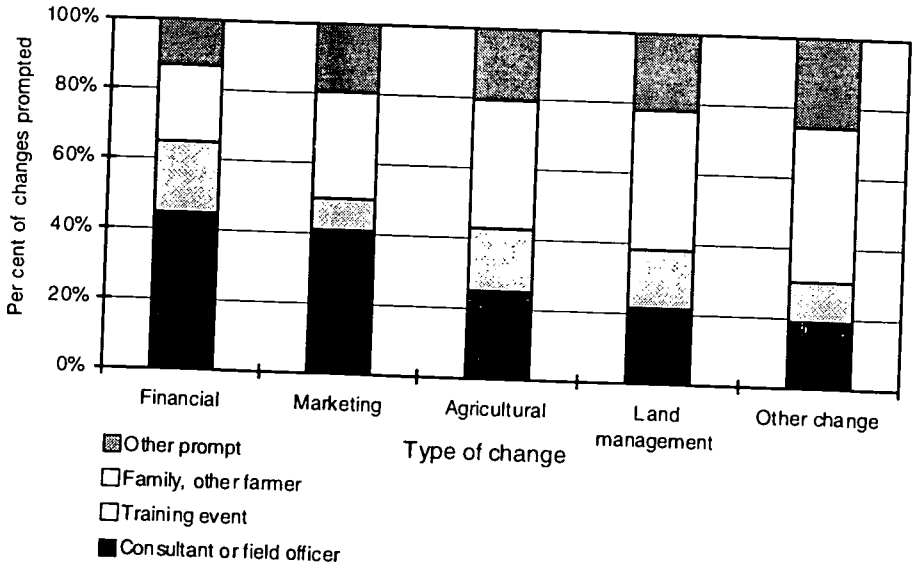


Table 3.12 gives the following information about prompts for change:

- farm businesses with assets of $1 million or more are less likely to make changes prompted by family or other farmers than smaller farm businesses.
- farm businesses with assets of $1 million or more are more likely to be prompted to change by training events.
- single manager farm businesses are more likely to be prompted by 'other' prompts than those with larger management teams.
- farm businesses with no debt are more likely to be prompted by 'other' prompts.
- dual manager farms are least likely to be prompted to change by a training event.
- the proportion of changes prompted by expert advisers (such as consultants) declines as equity rises.

Table 3.12
Prompts, assets, managers and equity (AFS)

Prompt	Assets		
	Less than $500 000 (per cent)	$500 000 - $999 999 (per cent)	$1 million or more (per cent)
Training event	16	15	19
Consultant or field officer	25	26	29
Family, other farmer	38	41	30
Other prompt	20	18	22
Chi squared probability compared to $500 000-$999 999	*0.0000*	-	*0.0000*

	Number of managers Prompt		
	One	Two	Three or more
Training event	19	14	21
Consultant or field officer	24	27	30
Family, other farmer	25	39	37
Other prompt	31	20	12
Chi squared probability compared to 2	*0.0000*	-	*0.0000*

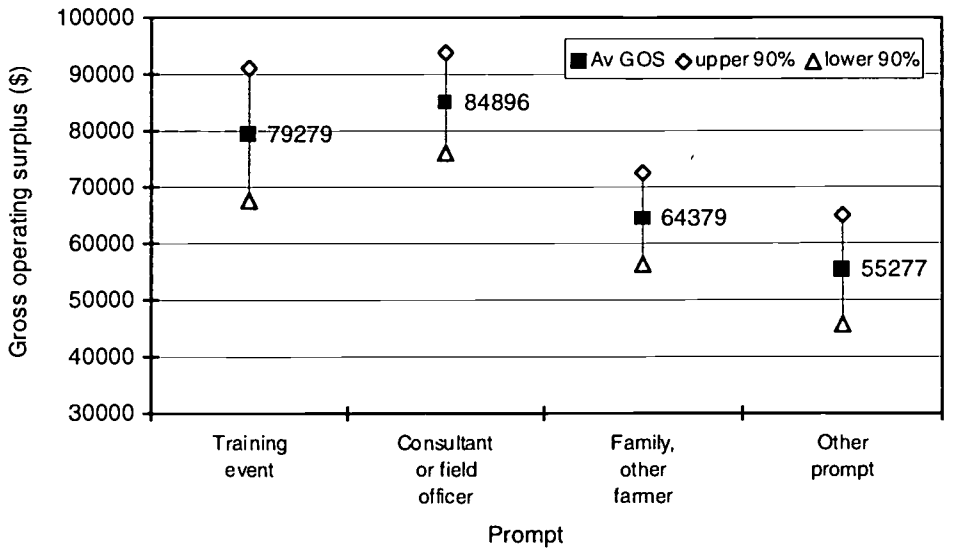
	Equity		
	75 per cent or less	76 per cent to 99 per cent	100 per cent
Training event	15	18	16
Consultant or field officer	35	26	22
Family, other farmer	35	35	38
Other prompt	16	21	24
Chi squared probability compared to 76-99 per cent	*0.0000*	-	*0.0000*

Figure 3.11 shows the following about profit and prompts:

- farm businesses whose most important change is prompted by expert advisers such as consultants have a significantly higher average gross operating surplus ($84 896) than those whose most important change is prompted by family, other farmers ($64 379) or 'other' prompts ($55 277) (which includes 'self', etc).

- farm businesses making a change prompted by training events also have a higher average gross operating surplus ($79 279) than those whose main change has 'other' prompts.

Figure 3.11
Average gross operating surplus and prompt (AFS)



3.6.2 Source of awareness for change (Tasmanian survey)

The Tasmanian survey provides more information about influences on the decision-to-change process for two most important changes. Farmers were asked how they became aware of the strategy, action or technology, what other factors influenced them to change, and the critical factor or trigger, in making the decision to change.

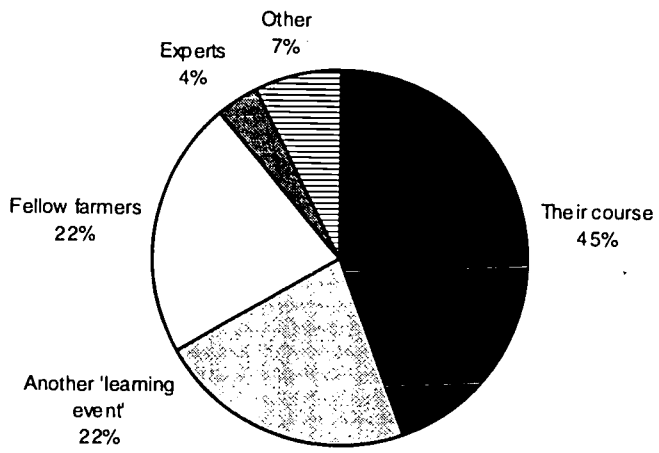
'Other farmers' are the most common source of initial information about a new strategy, action or technology. They are the channel through which one quarter of farmers become aware of strategies, actions and new technologies which subsequently become changes. Training events are the source of awareness for 19 per cent of changes and 'expert advisers' (including government agencies, private consultants and field officers of output purchasers and input suppliers) the source of awareness for 22 per cent (see Table 3.13).

Table 3.13
How farmers become aware of important changes (Tasmania)

Source of awareness	Number of changes	Per cent of changes
Other farmers	28	26
Always known it was possible	17	16
Field day	11	10
A course	10	9
The media	9	8
Government agency	9	8
Family member	8	7
Input supplier	7	6
Output purchaser's field officer	5	5
Private consultant	3	3
Industry organisation	2	2
Total	**109**	**100**

Changes influenced by 'courses' are analysed separately (the two most important course-influenced changes ranked are included in both groups). Section 3.4.4 above reports the role of the three courses in the change decision process. The most common sources of awareness for the course-influenced changes apart from the courses are peers (other farmers) and other learning events. Figure 3.12 summarises sources of awareness for course related changes.

Figure 3.12
Sources of awareness for changes influenced by courses (Tasmania)



3.6.3 Other influences on the decision to change (Tasmanian survey)

Other farmers are the most often reported influence in making the decision to change practice (37 per cent of changes), followed by low prices or high costs and external factors such as drought. The next most reported influences are government agencies (for example, the Department of Primary Industries and Fisheries and Tasmania Development and Resources (24 per cent) and the media (23 per cent). The need for extra income and higher production which leads to extra income are influences for 35 per cent of changes. Income and production were not listed as categories on the questionnaire, so were reported under the category "other". These responses are not to be confused with higher costs or lower product prices, both of which were listed as possible responses on the questionnaire.

The ranking of other reported influences (Table 3.14) is similar to the ranking of sources of awareness, presented above.

Table 3.14
Other influences for two most important changes (Tasmania)

Influence	Number of changes	Per cent of changes influenced
Other farmers	40	37
Low product price or high costs	31	17
External factors inc weather	30	28
Government agency	26	24
More income or financial survival	25	23
The media	25	23
Field day	23	21
Input supplier	21	19
Course	18	17
Family or employee	17	16
Output purchaser's field officer	14	13
Increase production	13	12
Reduce workload	13	12
Land degradation or run down land	9	8
Industry organisation	8	7
Private consultants	6	6
Other	15	13
Total number of changes	**109**	
Total number of influences	**334**	

For some farmers a factor category occurs in both the 'aware' and the other influences fields. An example is where the farmer became aware of the strategy from other farmers, and either different farmers influenced the decision to change or the same farmer(s) influenced the decision to change in other ways.

The other influences for course-influenced changes are similar, with experts, fellow farmers and other training events ranking highest.

3.6.4 Triggers (Tasmanian survey)

For many of those surveyed, identifying the critical factor in going ahead with a change, or the trigger to change, required some thought. However, after some time for reflection, all were able to name one critical factor.

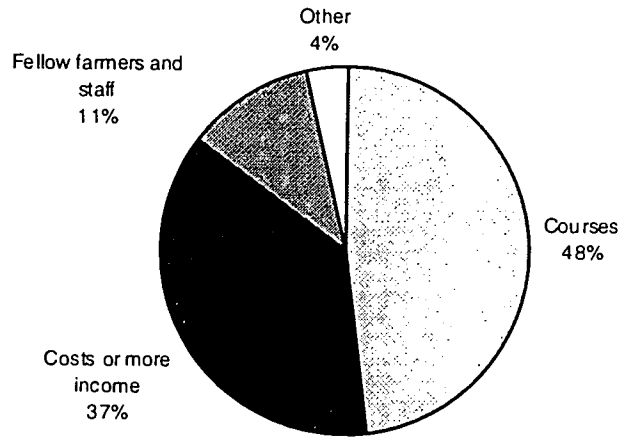
Almost one third of changes are triggered by the need or desire for extra income or by the need or desire for higher production, which generates extra income. This is consistent with either a traditional economic profit maximisation goal or with a lifestyle goal, given that achieving many lifestyle goals, such as holidays or better education for children, requires money. Reducing workload, which is also related to lifestyle goals, is the critical factor in 8 per cent of changes (Table 3.15).

Table 3.15
Triggers for the two most important changes (Tasmania)

Trigger	Number of changes	Per cent of changes triggered
More income or financial survival	23	21
External factors inc weather	13	12
High costs or low prices	13	12
Increase production	12	11
Land degradation or run down land	10	9
Reduce workload	9	8
Family or employee	6	6
Another change made	5	5
Other farmers	4	4
Input supplier	4	4
Course or field day	4	4
Government agency	2	2
Output purchaser's field officer	2	2
The media	1	1
Private consultant	1	1
Total changes	**109**	

A 'course' was the trigger, or the critical factor in the decision to make the change in almost half of the course-influenced changes, followed in frequency by income and cost reasons (see Figure 3.13).

Figure 3.13
Triggers for course-influenced changes (Tasmania)



n=27

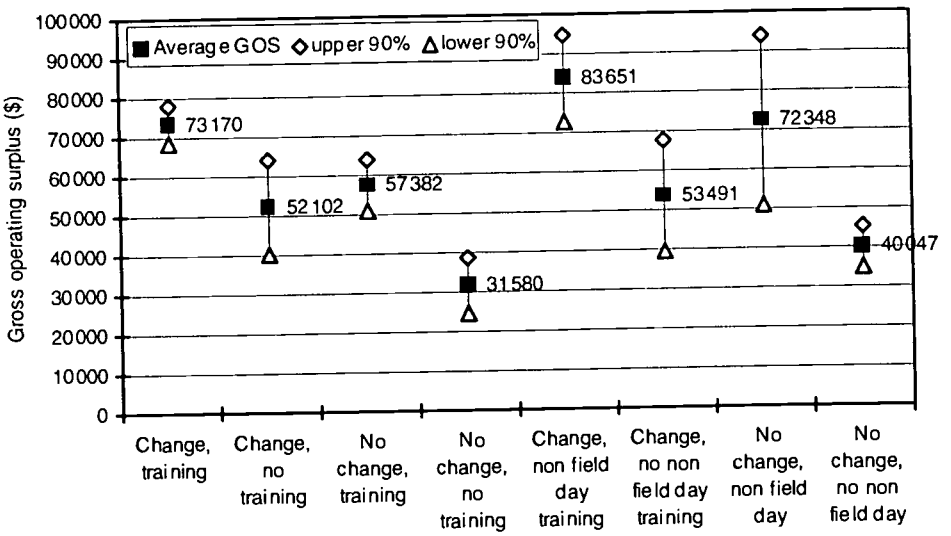
3.7 Training, change and profit

Farm businesses which both train and make changes to practice have a higher average gross operating surplus ($73 170) than other farm businesses ($55 335). Those which attend training other than field days have an even higher average gross operating surplus ($83 651). Farm businesses which neither train nor make any changes to practice have a significantly lower average gross operating surplus ($31 580) than other farm businesses. Figure 3.14 shows the average gross operating surplus and 90 per cent confidence limits for various combinations of training and change behaviour. Table 3.16 gives the proportion of farm businesses in each category.

Table 3.16
Proportions of farm businesses by training and change (AFS) (per cent)

Change and training	55
Change, no training	8
No change, training	26
No change, no training	12
Change and non field day training	35
Change, no non field day training	27
No change, non field day training	11
No change, no non field day training	27

Figure 3.14
Profit and training and change (AFS)



3.7.1 Contribution to total farm profit

- Farm businesses which both train and make changes to practice represent 55 per cent of all farm businesses (Table 3.16), but contribute 64 per cent of total farm profit (gross operating surplus), see Table 3.17.

- The twelve per cent of farm businesses which neither train nor make changes to practice contribute only six per cent to farm profit.

Table 3.17
Contribution to total farm profit by training and change behaviour (AFS) (per cent)

Training and/or change	Contribution to total farm profit
Training and change	64
Non field day training and change	*47*
Training, no change	24
No training, change	6
No training and no change	6

3.7.2 Tasmanian courses, changes and profit

The profit of the farm business which attended one of the survey three courses, measured by the gross operating surplus for the full the financial year before the survey, is significantly higher for those which make a course-influenced change to practice (Table 3.18, and see also section 3.4.4 Tasmanian courses and changes to practice).

Table 3.18
Course participants, change and profit (Tasmania)

	Made course-influenced change	Remainder of course sample	Non-course sample
Average gross operating surplus	$76 697	$34 541	$26 993
T test probability compared to course influenced change group		0.0748	0.0195
Number with financial data	23	11	16

3.8 Discussion

3.8.1 Training and change

Those funding, running, facilitating and participating in training are involved because they expect the training to influence the behaviour of participants, and hence to impact on variables such as profit and the sustainability of the farm business.

Farm businesses which both train and make changes to practice are more profitable than other farm businesses (average gross operating surplus of $73 170 compared to $55 335). As well, they contribute more than their share to total farm profit. Those farm businesses which attend training other than field days are most profitable (average gross operating surplus $83 651).

Whilst it is not possible to say that training in the past twelve months identified in the AFS data has influenced the reported changes to farm practice over the last three years, farm businesses which make changes to practice are more likely to participate in training. As discussed at the end of Chapter 2, recent training participation is a good indicator of past training. Eighty-nine per cent of all farm businesses which have made a change to practice in the last three years attended at least one training event in the past twelve months.

In all, around two thirds of Tasmanian agricultural course participants made a change to practice which was influenced by their course. The average profit of the group which made a course-influenced change (gross operating surplus $69 371) is higher than the average of course participants who did not make such a change (gross operating surplus $34 450). The most frequently reported reason given by the one third of course participants who did not make a course-influenced change is that the course reinforced the appropriateness of existing practices (especially the chemical course).

Without very detailed information about individual farms and the practices on those farms it is impossible to make a judgment about whether existing practices are more suitable for the farm business than those espoused by the courses, or indeed the same as those espoused by the courses.

Innovations are generally adapted as they are adopted (see for example Nowak, 1982 and Russell, 1990). New practices are usually trialed before being fully implemented. The trialing process allows a practice to be adapted to the particular farm situation. It also allows the practice to be adapted to the individual's context (Guba & Lincoln, 1989). Changes to practice are adaptions, rather than adoptions, of practices as they occur elsewhere.

Failure to make a change to practice following a course could be because there has not been an opportunity to trial the practice (it could be too expensive or financially risky to trial for example). It could be because it does not fit with the beliefs, values and context of the individual farm, that is, participating in the course has not caused the change of attitude necessary for a change of behaviour (Chamala, 1987; Phillips, 1987; Bennett, 1980; Fliegel, 1956).

3.8.2 Interaction with others and training and change

Change, or adaption, is a social process involving interaction and collaboration between individuals within organisations and within networks of organisations (Mathews, 1994; Lundvall, 1992). Individual farms are small 'institutions', with consequently limited opportunities for interactive learning within the 'institution'. This is reflected in the amount of change occurring in the small single and dual operator family farm businesses. These small businesses, which comprise 74 per cent of all Australian farm businesses, are less likely to make changes to farming practices than those with larger management teams.

Individual farms therefore must rely on networking with other institutions for interactive learning and change (innovation). Farmers network via farmer organisations, informal social contact with other farmers, government extension officers and rural educational institutions, in producer-purchaser arrangements with

food processing companies and retailer-consumer relationships with input suppliers (Fulton, 1994; Solutions Through Research, 1993; Phillips, 1987).

The Agricultural Financial Survey data and the Tasmanian interview survey data show that most changes to practice are influenced by interaction with, and information from, a number of sources. Training, especially informal training such as field days and discussion groups, provides an opportunity for interaction with other farmers and 'experts' such as extension officers and consultants. The interaction allows individual farmers to compare their values and attitudes with group norms, and allows farmers to gather information from a number of sources. The opportunity to alter values and attitudes in these ways increases the probability of a change to practice.

Lack of resources (discussed below) and the literature on the requirement for values and attitudes to change before there can be a change to behaviour, may give some clues about the factors which inhibit course-related changes. However, further research is needed into the group who attend training but do not alter their practice.

3.8.3 Change and resources

Thirty-eight per cent of farm businesses made no change to their practice over a three year period, which was a time of rapid change in domestic and global markets. This three year period (1991-92 to 1993-94) was a period of declining farmers' terms of trade and historically low real farm incomes (Martin, 1996, using ABARE figures).

The relationship found here between farm profitability and value of assets and making changes to practice is consistent with the large number of studies which have found that farms with more resources available are more likely to adopt innovations. Examples are Frank (1993), Frank and Chamala (1992), Cruise and Lyson (1991) and the seminal work of Rogers (1995). Lack of sufficient financial resources is also a barrier to innovation in Australian manufacturing industry (Australian Bureau of Statistics, 1995).

Two aspects of the results of this project further support the link between available resources and changes to practice. First, farm businesses whose main activity is sheep farming are less likely to make a change than those whose main activity is in other industries. The sheep industry has been experiencing low wool prices in recent years. Second, farm businesses in Western Australia, which was not affected by the drought which hit eastern Australia in the early 1990s (Martin, 1995), are more likely to make changes to practice than farm businesses as a whole.

Chapter 4

Why do farmers and their workforce participate in training?

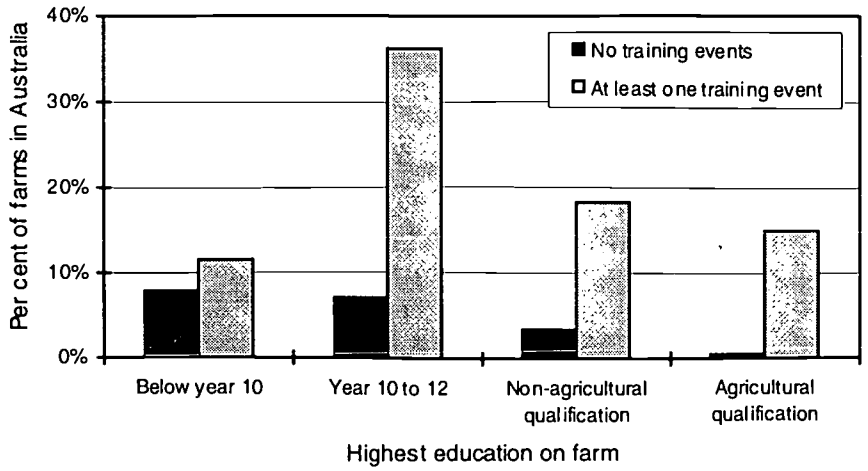
Barriers to training are identified here by examining the characteristics of those farm businesses which do not train, or attend few events, and by considering reasons given by farmers for not attending events identified as desirable for their farm business.

4.1 Education as a barrier to training

From the Agricultural Financial Survey data, farm businesses without a manager who had completed year 10 are least likely to participate in training, followed by others with no post school qualifications.

Figure 4.1 shows that those with less than year 10 education form the largest group of non-trainers, followed by those without post school qualifications. The below year 10 group are 42 per cent of all non trainers, yet make up only 19 per cent of all farm business.

Figure 4.1
Education and participation in training (AFS)

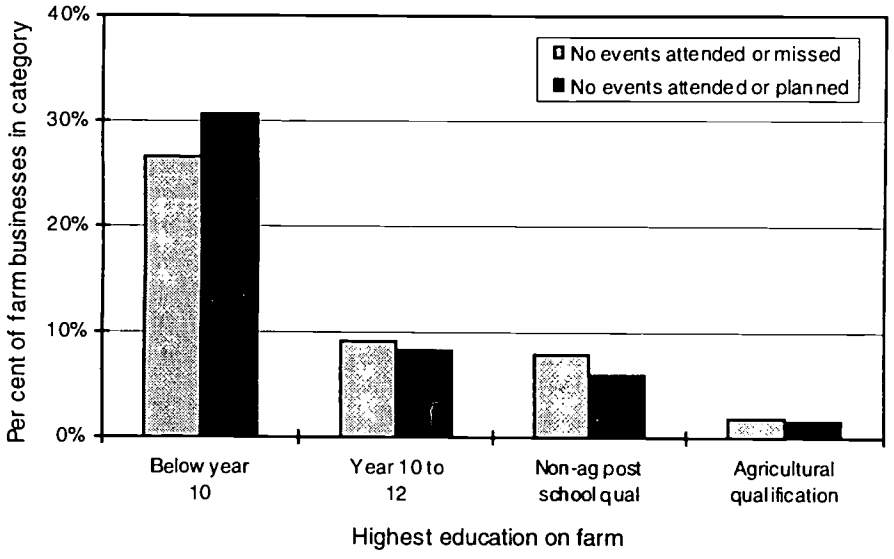


4.1.1 Does education foster further training?

Over half of all farm businesses (59 per cent) identified at least one training event they would have liked to attend, but did not. These farm businesses tend to have more educated management teams. Twenty-seven per cent of farm businesses with no one with year 10 education or beyond fail to identify any training events worth attending, compared to less than ten per cent of farm business with more education.

As well, 31 per cent of farm businesses in the lowest education category attend no training events, and plan no training in the next three years, again compared to less than ten per cent of farm businesses with higher education. Figure 4.2 illustrates these points.

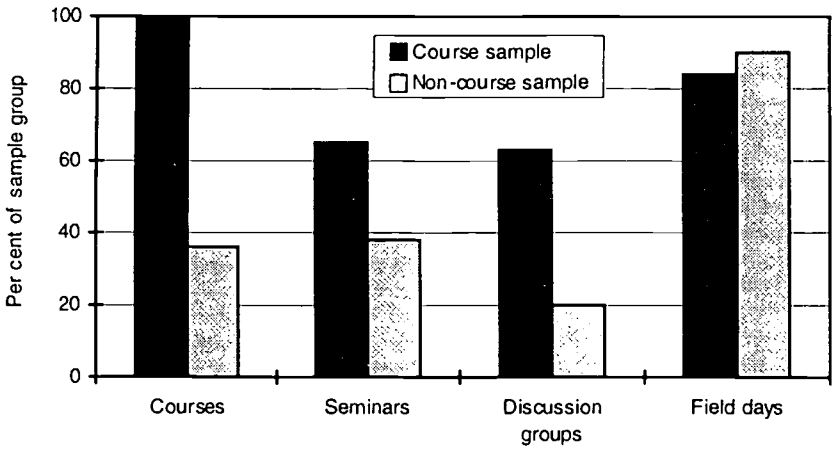
Figure 4.2
Education, identification of training and training plans (AFS)



Chi squared distribution probabilities that the proportion of each education group not attending or planning training and the proportion not identifying training is the same as for the year 10 to 12 group is less than 0.00001 per cent in each case.

Those farm businesses which attended one of the three Tasmanian courses are more likely to participate in discussion groups and seminars than the non-course sample. The non-course sample is more likely to participate in field days. This result applies to the sample as a whole, to the dairy industry, and to those in other industries. Training 'methods' chosen by the Tasmanian sample are shown in Figure 4.3.

Figure 4.3
Course attendance and other training (Tasmania)



Chi squared probabilities for participation/non participation rates of the two sample groups being the same are less than 0.0001 per cent for all types of training,. This is also true when the whole is split into dairy industry and other industries.

4.2 Industry and state

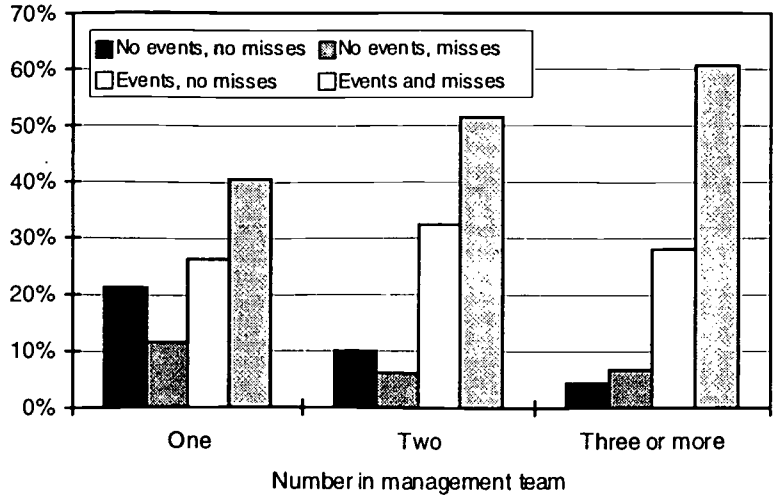
Grain farm businesses are more likely to have someone attend at least one training event (88 per cent attend) than the average for all industries (80 per cent). Beef farm businesses are less likely to have someone attend, with only 70 per cent attending at least one training event. There are no other significant differences by industry.

There is no statistically significant difference in the percentage of farm businesses participating in training on a state by state basis.

4.3 Size of management team

Single manager farms attend less training events than farm businesses with larger management teams. Thirty-three per cent of single manager farms attended no training, compared to 12 per cent of farms with 3 or more in the management team. Single manager farms are also less likely to identify training worth attending (Figure 4.4).

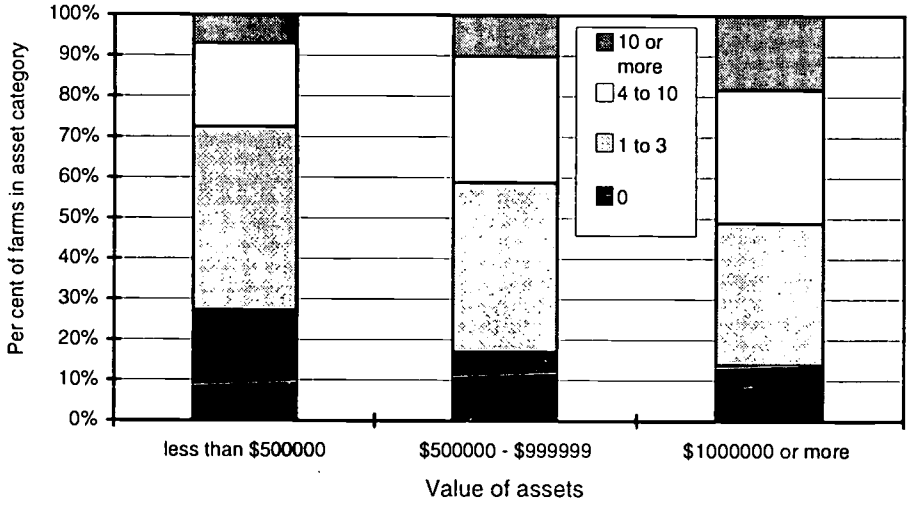
Figure 4.4
Size of management team and training identified and attended (AFS)



4.4 Value of assets

The higher the value of farm assets, the more courses, seminars, field days and other training events attended by those working in the farm business (see Figure 4.5). Twenty-seven per cent of businesses with assets of less than $500 000 attended no training, compared to only 14 per cent of those with assets of $1 million or more.

Figure 4.5
Value of assets and number of training events attended (AFS)



Chi squared probability is less than 0.00001 per cent for each category compared to the other categories.

4.4.1 Assets and training methods

Farm businesses with a higher value of assets are more likely to employ each training method (see Table 4.1). Field days are the most widely attended type of training for each group, followed by seminars and workshops, conferences and industry meetings and agricultural courses.

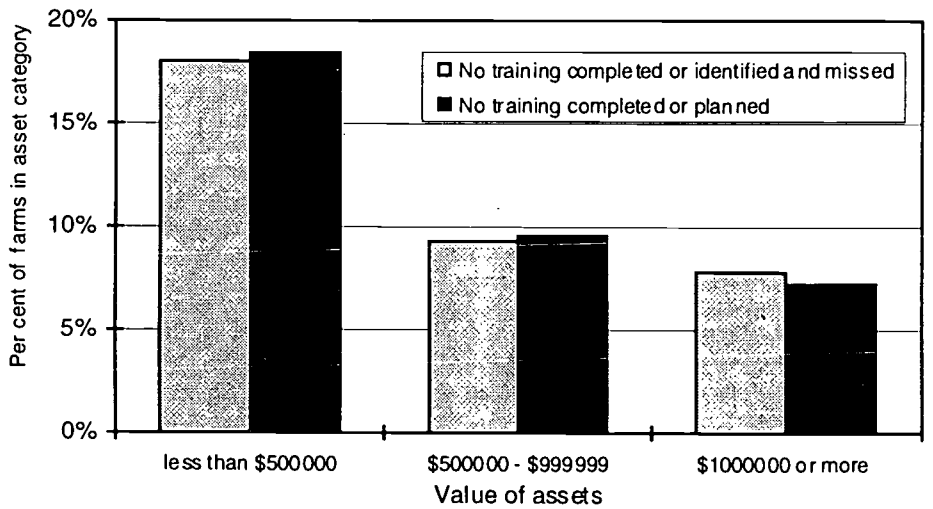
Table 4.1
Training methods by value of assets (AFS) (per cent)

Value of assets	$0-$499 999	$500 000-$999 999	$1 million or more
Field days	68	79	82
Seminars, workshops	25	40	48
Conferences, industry meetings	12	18	27
Agricultural courses	2	3	4
Any training	**73**	**83**	**86**

Probability distribution of training is the same for low and high asset groups compared to the mid group is less than 0.0001.

Almost half of farms which fail to identify suitable training events are those with assets of less than $500 000, yet this group represents only 20 per cent of all farms. Eighteen per cent of low asset farm businesses fail to identify any suitable training opportunities in a 12 month period. The same proportion do not participate in any training events over the year and also plan no training in the next three years. In both cases this compares with less than ten per cent of larger farm businesses (Figure 4.6).

Figure 4.6
Value of assets, training undertaken, identified and planned (AFS)

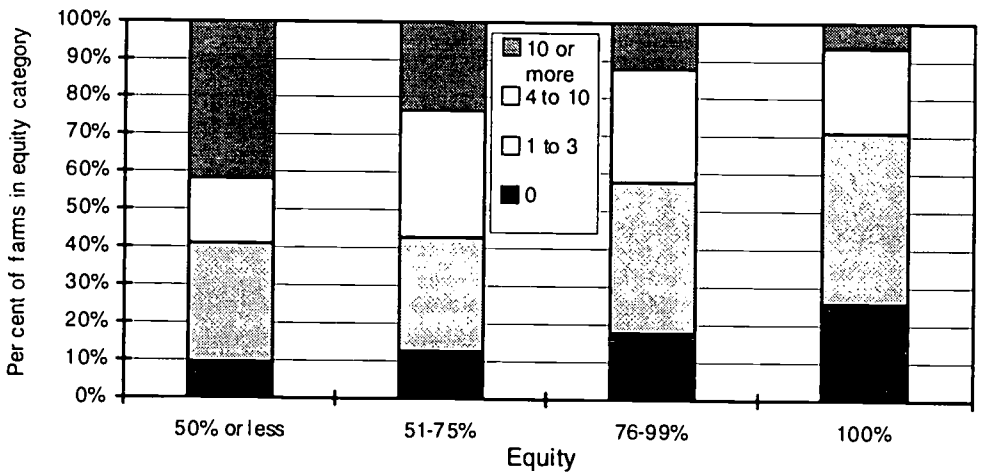


Chi squared probability is less than 0.00001 per cent

4.5 Indebtedness

Farm businesses with no debt attend fewer training events; 71 per cent attend fewer than four in one year compared to 43 per cent of those with equity between 50 per cent and 75 per cent (see Figure 4.7). Newer entrants to farming are more likely to have debt than those with longer experience. It may be that the experienced group believe they are less likely to benefit from training than do new entrants.

Figure 4.7
Equity and number of training events (AFS)

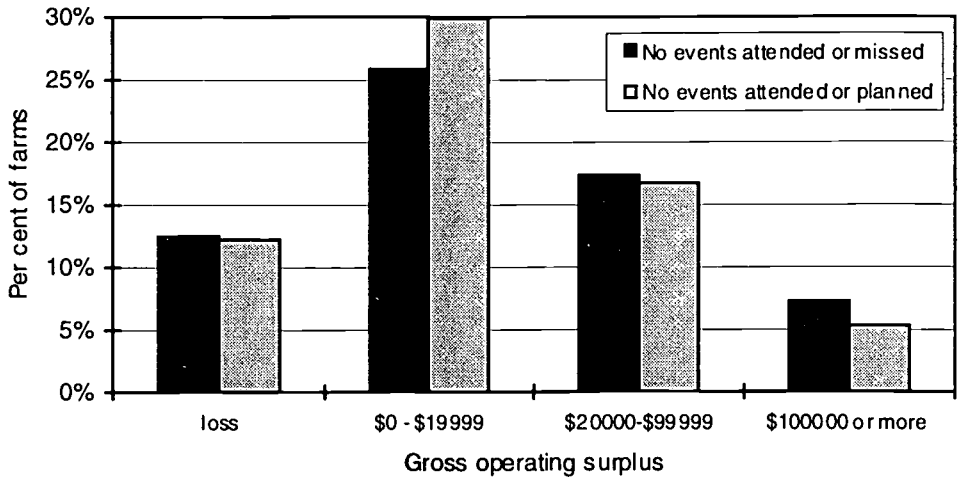


Chi squared probability is less than 0.00001 per cent for each category compared to the other categories.

4.6 Profit

Farms which are covering costs (interest payments excluded), but making less than $20 000 per year are least likely to identify and plan training. Those making a loss train and plan training at a similar rate to farms making larger profits (see Figure 4.8). Agricultural Financial Survey data shows that farm businesses making a loss have an asset distribution weighted toward the high end of the farm business population as a whole.

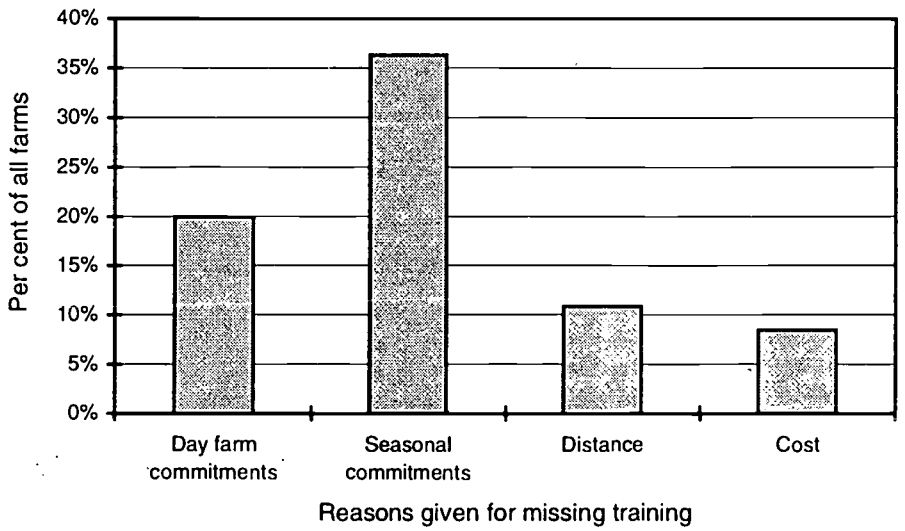
Figure 4.8
Profit and training events (AFS)



4.7 Reasons given for not attending

Most reasons given for missing training events relate to on-farm commitments, especially seasonal commitments. Figure 4.9 shows that 36 per cent of all Australian farm businesses did not attend a training event identified as desirable for the farm businesses because of seasonal on-farm commitments.

Figure 4.9
Reasons given for not attending events identified as desirable (AFS)



Respondents were able to give more than one reason.

The percentage of farm businesses giving each of the four reasons for missing training events increases with the size of the management team, value of assets and profit (although businesses making a loss behave more like those with a gross operating surplus over $20 000). Those with no debt are less likely to give each reason than those with debt.

4.7.1 Tasmanian survey

Thirty-five of those surveyed (54 per cent) recalled at least one training event which they would like to have attended, but did not. Thirteen named two events and three farms identified three events. The types of events are set out in Table 4.2 below and the reasons given for not attending appear in Table 4.3.

Table 4.2
Training events not attended (Tasmania)

Type of event	Number of missed events	Percentage of missed events
Technical seminar	12	23
Field day	8	15
Whole Farm Planning course	5	9
TAFE agricultural course	5	9
Farm Chemical Accreditation course	1	2
Intensive Pasture Management course	4	8
Other agriculture course	6	11
Business management seminar	5	9
Business management course	4	8
Computer course	2	4
TAFE business course	1	2
Total missed training events	**53**	
No missed events	30	

$n = 65$

As can be seen from Table 4.2, over three-quarters of the 'missed' events are of a technical, agricultural nature, rather than management or business related. About half the 'missed' events are one day field days or seminars and about half are courses.

People say they are unable to attend training events because they cannot get away from the farm, the events are held too far away or at a time of year when it is busy on their farm. These three reasons together account for two-thirds of all reasons for missing events (Table 4.3).

Table 4.3
Reasons for not attending (Tasmania)

Reason	Percentage of reasons given
Person needed on farm	32
Distance	19
Wrong time of year	15
Cost	12
Wrong time of day	5
Not suited to this farm	4
Personal reasons	5
Event canceled	4
Class full	1
Not eligible to enroll	1
Found out too late	1

n=65

4.8 Evaluation of the three courses

There is a positive response to all three courses. All Dairy Farm Management and Intensive Pasture Management participants found the course useful, as did 88 per cent of Farm Chemical Accreditation course participants. Those two people who did not find the Farm Chemical Accreditation course useful said that they learnt nothing new from the course.

It is interesting to note that in almost one third of cases more than one person from the farm management unit attended the same course (not necessarily the same offering). This may be to enable farm management units to make more effective joint decisions, and definitely suggests that the first participant found the course worthwhile.

4.8.1 What people liked most about the courses

About three-quarters of all those from each course cited the content or knowledge gained as the aspect they liked most. This is consistent with satisfying a general expectation that something will be learned from a course.

The practical nature of the courses and the opportunity for interaction with other farmers are mentioned by those from all three courses, with the Intensive Pasture Management course scoring particularly well on these factors. Intensive Pasture Management participants also liked the farm visits which were a part of that course.

4.8.2 What people liked least about the courses

The Farm Chemical Accreditation course attracted very little criticism. The Intensive Pasture Management course was thought to be too theoretical by three people, two found the sessions too concentrated, while two thought that some of the content was not appropriate for them.

The Dairy Farm Management course content is criticised by over half the participants. All but one of these want a higher level or more extensive content. Some said the sessions are too concentrated and a number complained that the course continued into their milking season.

A common suggestion for improving all three courses is that they be made less concentrated, with most suggesting holding shorter sessions.

4.9 Discussion

The typical profile of a farm business which is not participating in training is a small farm making a little more than break even profit, managed by a single manager with a low level of education. Farm businesses managed by people with low formal education and those with a single manager are also less likely to plan training in the next three years (see Chapter 6).

Larger and more profitable farms are more likely to participate in training events. This is consistent with overseas findings (Rogers, 1995).

The most frequently cited reasons for not attending training identified as desirable for the farm business have implications for course delivery modes, as well as for scheduling of training events. People say they are unable to attend training events because they cannot get away from the farm, the events are held too far away or at a time of year when it is busy on their farm (see Figure 4.9 AFS and Table 4.3 Tasmania). Flexible delivery modes which allow for study at or near home at times which are convenient to individuals may overcome some of these "barriers" to participating in training.

While some training barriers can be overcome by the provision of flexible delivery methods, electronic communication and provision of training 'events' in remote locations, there are also barriers in attitudes toward training and in the values which some farmers place on training, particularly those from smaller farm businesses. Some of these barriers are related to low levels of education.

The AFS data shows that 44 per cent of those who participated in no training in twelve months also could not identify any training events worth attending. Whilst

this group represents only eight per cent of the total farm population, farm businesses managed by people with low formal education are over represented. The barriers to participating in training for this group extend beyond farm business commitments and distance.

The andragogical model of adult learning (Knowles, 1990) provides some answers for the failure of formal courses to attract large numbers of farmers. The andragogical model says that adults must know why they need to learn something before undertaking to learn it, that adults want to make their own decisions, not have them imposed, and that adults will learn things they believe are directly applicable to their own situation. Farmers are independen. They do not see the experiences of 'better-off' neighbours as applicable to their situation. They are often content with the lifestyle generated by the current way of doing things, and so are not motivated to change.

The evaluation of the three Tasmanian courses confirms that farmers prefer small group learning/training environments in which they can question and debate (Carter & Batte, 1993; Moore, 1990; Riesenberg & Obel Gor, 1989; TAFE Curriculum Services Tasmania, 1984, 1986, 1987a, 1987b). They like practical demonstrations of techniques and skills. The field day format of practical demonstration and opportunity for questions and informal interaction is successful in attracting farmers (see Chapter 2) and could be used more widely to attract farmers into training.

Specific aspects of field day format that encourage participation are: the relatively short time commitment (usually one day or less), being able to see an innovation or new practice in operation, the opportunity to question experts, the opportunity to listen to and question the farmers who have trialed the innovation, the ability to compare the adopters' situation (in terms of physical characteristics of the farm and other perceived characteristics which may influence adoption on one's own), and the opportunity for interaction with peers. These are also factors which encourage the adoption of innovations. Interaction with peers allows confirmation of group norms regarding values and attitudes relevant to the innovation (as discussed in Chapter 3, Discussion section). Peers also provide support when change is subsequently undertaken (see Chapter 5).

To summarise some findings from Chapters 2, 3 and 4: Australia's relatively poorly educated farm workforce not only limits our productivity directly in the ways suggested by Welch (1970) (Chapter 3, Discussion section), but has a compounding effect by inhibiting further training, and so further limiting the capacity to be flexible, adaptable and responsive to change.

Chapter 5

What are the support mechanisms and who supports farmers as change is undertaken?

5.1 Agricultural Financial Survey

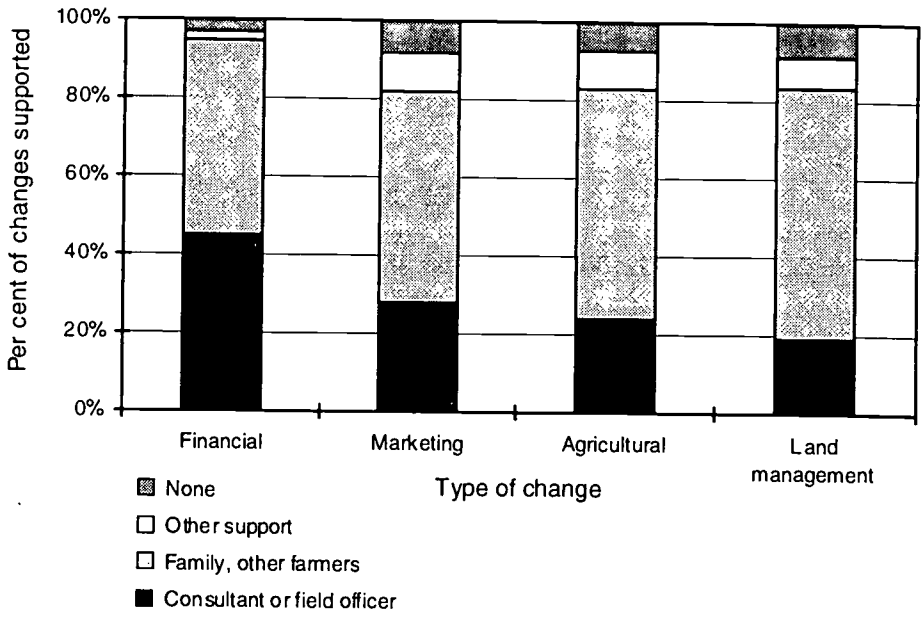
Respondents were asked "who has provided you with the most support in implementing the change identified as the most important for improving the profitability of the farm made in the last three years?" Those close to the management team or decision maker(s) are most likely to fill this role. Family or staff are the most common providers of the most support in making a change to practice (41 per cent of farm business changes), followed by other farmers (18 per cent). Expert advisers of various types provide the most support for making the change for 26 per cent of farm businesses (see Table 5.1). Only eight per cent could not identify any source of support.

Table 5.1
Sources of support for most important change (AFS)

Source of support	Per cent of changes
Family or staff	41
Other farmers	18
Consultants (inc financial)	10
Government agency	8
Industry organisations	8
Land management groups	3
Other	4
None	8

Family and other farmers are the most frequently cited source of support for all types of change. Consultants (including financial consultants) are more likely to be the main source of support for financial change than any other type of change (Figure 5.1).

Figure 5.1
Sources of support when making a change (AFS)



5.1.1 Support, financial and other characteristics

Larger farm businesses with assets of $1 million or more and those with gross operating surplus of $100 000 or more are more likely to be supported in making a change by experts such as consultants or field officers than other farm businesses. Single manager farm businesses are more likely to make changes with no support than other farm businesses. Farm businesses with 75 per cent or lower equity are more likely than other farm businesses to cite expert advisers such as consultants as the main source of support (see Table 5.2).

Table 5.2
Source of support, profit, assets, managers and equity (AFS)

A.

Support source	Gross operating surplus			
	Loss (per cent)	$0-$19 999 (per cent)	$20 000-$49 999 (per cent)	$100 000 or more (per cent)
Consultant or field officer	23	21	23	32
Family, other farmers	56	58	60	58
Other support	15	6	9	6
None	6	14	7	4
All farm businesses	15	18	47	20
Chi sq compared to $20 000 to $99 999	*0*	*0*	-	*0*

B.

Support source	Value of assets		
	Less than $500 000 (per cent)	$500 000 to $999 999 (per cent)	$1million or more (per cent)
Consultant or field officer	21	22	30
Family, other farmers	65	58	56
Other support	8	12	7
None	7	8	7
All farm businesses	29	34	37
Chi sq compared to $500 000-$999 999	*3.715E-190*	-	*3.904E-211*

C.

Support source	Number of managers		
	One (per cent)	Two (per cent)	Three or more (per cent)
Consultant or field officer	22	28	23
Family, other farmers	51	56	68
Other support	11	9	7
None	17	7	2
All farm businesses	23	51	26
Chi sq compared to 2	*0*	-	*0*

D.

Support source	Equity		
	75 per cent or less	76 to 99 (per cent)	100 (per cent)
Consultant or field officer	30	24	24
Family, other farmers	61	57	59
Other support	4	10	10
None	5	9	7
All farm businesses	20	56	24
Chi sq compared to 76-99 per cent	*0*	-	*0*

5.2 Tasmanian survey

Support from others in making a decision to change was reported for 80 per cent of changes. The Tasmanian survey asked respondents to nominate all sources of support in making a change, and to give the chronological sequence in which those sources were used, not a ranking of sources of support. Sources of support are classified into two categories; emotional and social support from those close to the farmer, for example family members and other farmers, and technical or economic support from 'expert' sources. Each category was used in 61 per cent of changes. The chronological sequence in which the sources are used varied widely.

Table 5.3
Sources of support for the two most important changes (Tasmania)

Support source	Number of changes	Per cent of changes
Family	43	39
Other farmers	37	34
Farm owner	5	5
Employee	4	4
Emotional and social support	**66**	**61**
Private consultant	31	28
Government agency	26	24
Input supplier	23	21
Output purchaser's field officer	21	19
Industry organisation	6	6
Course	3	3
'Expert' support	**66**	**61**
No source of support	**22**	**20**
Total changes made	109	

n=57 farm businesses
More than one source of support could be nominated.

5.3 Use of outside advice

Respondents to the Tasmanian survey were asked which outside consultants had been used or employed in the past three years. They were provided with a list of advisers and other types of outside service providers, and an 'other' option. Table 3.4 gives a summary of responses.

The vast majority of farm businesses use farm contractors, field officers from purchasing companies and private vets. Private agricultural consultants are used by

69 per cent of the sample and the Department of Primary Industries and Fisheries by 65 per cent. These outside experts could be expected to provide advice of a technical, agricultural nature, as could input suppliers. All farms use at least one category of 'technical adviser'.

Accountants are the most popular form of business or financial advisers (used by 94 per cent). Lawyers and bank advisers are used by about half of farms, and Tasmania Development and Resources (TDR) by less than one quarter. The use of the TDR is likely to be over-represented because all dairy farmers who received TDR loans are expected to do the Intensive Pasture Management course. All but one farm uses at least one 'business' adviser.

Farm accountants could be used as a channel for improving farm management and financial planning. Accountants are used regularly, at least once a year at tax time. The relationship between use of technical consultants and farm profitability suggests that one-to-one advice is an effective means of influencing farm outcomes. Training farm accountants in aspects of farm management may be an effective way of improving outcomes for their clients.

Table 5.4
Use of outside service providers (Tasmania) (per cent)

Accountants	94
Farm contractors	83
Field officers from output purchasing company	82
Private vets	82
Private agricultural consultants	69
Department of Primary Industries and Fisheries	65
Lawyers	55
Bank advisers	46
Tasmania Development and Resources	23
Input supplier	15
Other	11
Bookkeepers	5

n = 65

5.3.1 Advisers and profitability

Using private consultants, the Department of Primary Industries and Fisheries (DPIF) and field officers from product-purchasing companies each is associated with a higher cash operating surplus. The cash operating surpluses (COS) of farms using private consultants is more than double that for farms not using private consultants.

Those using the DPIF and field officers also have a higher cash operating surplus.

Using Tasmania Development and Resources (TDR) is significantly positively related to the cash operating surplus of the most recent year only. The use or non-use of bank advisers yields no significant results.

Information relating to use of advisers and profitability is summarised in Table 3.5.

Table 5.5
Using advisers and profitability (Tasmania)

Advisers		Cash operating surplus 1992/93 (average for each group) ($)	Average of cash operating surpluses 1990/91 to 1992/93 (average for each group) ($)
Private consultant	*- used*	35401	33371
	- not used	13164 *(0.001)*	9322 *(0.001)*
Department of Primary Industries & Fisheries	*- used*	38384	34184
	- not used	9835 *(0.001)*	9031 *(0.001)*
Purchasing company field officer	*- used*	32954	30366
	- not used	10345 *(0.004)*	5707 *(0.001)*
Tasmania Development and Resources	*-used*	58975	46975
	- not used	19824 *(0.043)**	19086 *(0.075)**

t distribution probabilities for 'using group' average not to be more than double the 'non-using group' mean in brackets.
** t distribution probabilities for 'using group' average not being greater than the 'non-using group' mean.*
n = 54

5.3.2 Other characteristics and advisers

Those using the DPIF or company field officers attend more technical or agricultural training events such as field days, seminars and formal courses than do other farm businesses. Field officer 'clients' have larger farms with more assets and larger absolute debt than the sample as a whole.

Those using private consultants attend more 'business' courses or seminars, are larger farms (as measured by asset value) and have a higher debt to assets ratio than other farms.

The number of changes made in the past three years which are perceived to have improved or maintained the long term profitability or viability of the farm is not

significantly different for users and non-users of any of the advisers; nor is the rate of return on capital (measured by the cash operating surplus to assets ratio).

5.4 Discussion

The interaction with intimates, peers and experts which occurs during the earlier stages of the decision process continues during and after implementation. (Rogers, 1995) Social support is just as important as physical infrastructure in ensuring that, once implemented, a new practice is not discontinued. Decision makers continue to collect information about an innovation after implementation and may discontinue with the innovation at any time (Rogers & Shoemaker, 1971).

Those emotionally close to the decision maker are the most important source of support in implementing decisions. Phillips (1985) also emphasises the importance of intimates in providing support for decision making. Experts also play a role, and are the most important source of support for larger farm businesses.

On-going groups such as landcare and crop monitoring discussion groups provide social support for farmers in implementing new practices. Experts associated with such groups can ensure that infrastructure is available so that implementation is feasible and is seen to be feasible by farmers. They can provide information, opportunities for skill acquisition and assist farmers to evaluate the new practice. The networks established through interaction at 'one off' courses and training sessions can also be used as sources for support in implementing change.

The earlier conclusion that farm businesses which engage in training are more likely to make changes to their practice.(C5 relating to Chapter 2), is consistent with farmers who engage in training having appropriate support in implementing new practices from networks of other farmers and experts. These networks are established or reinforced at training courses and sessions. Training which emphasises opportunities for networking and interaction will be more effective in translating decisions to change into continuing changes to practice by providing support as change is undertaken.

Several other studies have found that more profitable farms use a wide range of advisers and information sources, for example Miller (1994), Wozniak (1987), Ilbery (1985) and Bardsley (1982). Education of financial and business advisers working with farmers is a major opportunity for fostering changes to financial, marketing and other management practices. These people need skills in developing farmers' skills, skills in communication and an appreciation of rural sociology (Conley & Gray, 1990).

Chapter 6

What are the future training needs in agriculture?

6.1 Agricultural Financial Survey

Eighty-three per cent of all farm businesses intend to participate in some training in the next three years. Most intend to participate in training about agricultural practices (Table 6.1).

Table 6.1
Area of intended training (AFS)

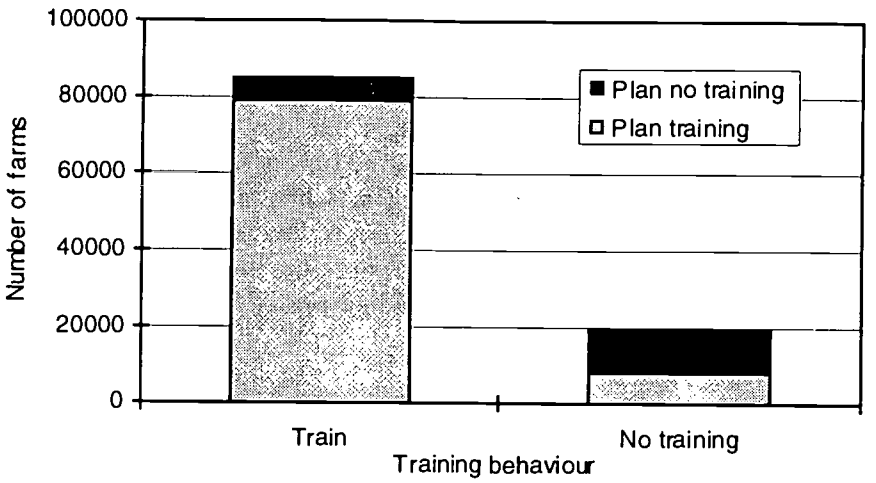
Training area	per cent of all farm businesses
Financial management	19
Marketing	20
Agricultural practices	70
Land management	29
Any intended training	**83**

More than one training area could be nominated.

6.1.1 Training behaviour and training plans

Section 2.5, Training Participation Over Time, shows that recent and past training behaviour are strongly correlated. Those who do train also plan more training in the future, while most of those who do not train do not expect to train in the next three years. Figure 6.1 shows training behaviour and future training plans. Ninety-three per cent of those farm businesses which have participated in training in the past twelve months plan more training in the next three years compared to only 41 per cent of those who have not participated in training in the past twelve months.

Figure 6.1
Training behaviour and training plans (AFS)



Chi squared distribution probability is less than 0.0001 for training planned/not planned ratios.

Looking at the data from another perspective, 66 per cent of those who plan no training in the next three years did not participate in any training in the last twelve months. These non training farm businesses comprise 11 per cent of all farm businesses.

6.1.2 Changes and training intentions

Thirty per cent of those farm businesses which made no change to practice to improve profitability in the last three years have no training intentions, compared to 17 per cent of all farm businesses.

6.1.3 Farm characteristics and training intentions

Farm businesses with higher asset values, larger management teams and more education are more likely to plan to train in the next three years. Those with a small, but positive profit (gross operating surplus) and those with no debt are less likely to plan training. Larger farm businesses are more likely to plan to train in each of financial management, marketing, land management and agricultural practices. The Final Report, Kilpatrick (1996), has more detailed information on farm characteristics and future training intentions.

6.2 Tasmanian survey

The Tasmanian data provide more specific information about future training needs and plans. Three-quarters of farm businesses identified one or more future training need.

Agricultural technical courses of more than one days' duration are the most commonly identified training need, comprising 31 per cent of all training identified, followed by business management courses (including computing courses), being 30 per cent of identified training. Thirty-one farm businesses, or almost half the sample, would like to undertake some sort of business management training in the next three years, compared to the 20 per cent which actually completed some business management training in the past three years.

Areas of identified training needs are summarised in Table 6.2 to allow comparison of the course and non-course samples within the Tasmanian interview survey data. Only one farm business identified a need for training in marketing (as one aspect of a management course). Both financial management and general management or record keeping are specifically mentioned by most of the farm businesses wanting training in computer skills and those wanting to study TAFE or other business courses.

The 45 farm businesses from the course sample identify more future training 'events' than the 20 from the non-course sample. The course sample is more likely to identify training in each of the areas listed in Table 6.2.

Table 6.2
Summary of identified training needs by course/non-course samples and area (Tasmania)

Area of identified training need	Course sample		Non-course sample	
	number of farms	per cent of sample	number of farms	per cent of sample
Agricultural practices	31	69	7	35
Business and/or financial management	25	56	6	30
Land management	12	27	2	10
Nil*	8	18	8	40
Average no. of training events identified per farm business**	1.89		0.90	

** Difference between course and non-course samples significant at 99 per cent confidence level.*
*** Difference significant at 95 per cent level (probability of not being different from t test is 0.00245).*
Number of respondents = 65, number of training needs identified =102.
Respondents were able to nominate more than one future training need.

6.2.1 Preferred delivery characteristics

Most would like their identified training needs to be delivered in face-to-face sessions, however eight farmers would prefer a total of eleven courses to be delivered by correspondence mode. Preferred delivery modes are shown in Table 6.3.

Those who have taken courses (and are in the course sample) are more likely to plan to undertake courses consisting of a number of sessions than are farm businesses in the non-course sample (see Table 6.3).

Table 6.3
Preferred delivery mode for identified future training (Tasmania)

Preferred delivery mode	Number of mentions	Course sample mentions	Per cent of course sample mentioning	Non-course sample mentions	Per cent of non-course sample mentioning
A number of face to face sessions	56	45	64*	11	40*
Seminar or workshop	26	23	31	3	15
Correspondence	11	10	16	1	5
Field day	8	5	13	3	15
No preference	2	2	2	0	0

**Difference significant at 90 per cent confidence level. T test probability of proportions being the same is 0.07568.*
Respondents were able to nominate more than one future training need.

Most prefer courses held within 80 kilometres of their farm. Eighteen per cent were prepared to travel within Tasmania, for a wide variety of training activities ranging from seminars to university courses.

Almost one quarter prefer evening sessions. One third want daytime, with a large proportion of those preferring the middle of the day. The remainder have no preference, with the exception of three who prefer the existing block arrangement for TAFE agricultural courses.

Winter is the most popular time of the year for training, followed by autumn, although one third have no preference and 10 per cent prefer spring or summer. The spring and summer preferences apply to seminars only.

About half want to do the training indicated within 12 months, and all but 8 per cent would like to undertake the course/seminar within the next two years.

6.3 Discussion

The results of this project confirm the importance of education and training for the success of individual farm business. Education and training will assist farm managers and the rest of the agricultural workforce to adapt to the changes beyond the farm gate which will inevitably impact on the farm business.

It is possible to identify the characteristics of farm businesses least likely to participate in training from the results of this project. Farm businesses which plan no training in the next three years are more likely to have a low education level, a low value of assets, no debt or a low level of debt, make a small but positive gross operating surplus and be run by a single manager.

The characteristics of those planning no training are similar to the characteristics of those farm businesses which have as well attended no training. Sixty-six per cent of those who plan no training in the next three years did not participate in any training in the last twelve months. Future intention to train is another measure of whether farms are identifying 'desirable' training events. Almost one third of those who did not train and could not identify any training events worth attending in the past 12 months also plan no future training. This represents 13 per cent of the total farm population.

6.3.1 Training area

Discrepancies exist between farm businesses' future training intentions revealed by the AFS data and the areas where skills most need upgrading according to Future Training Directions in Australian Agriculture: A Survey of Key Stakeholders (which forms part of the Final Report of this project, Kilpatrick, 1996) and other reports.

From the AFS, most of those farm businesses which do intend to train, plan training in the area of agricultural practices (from the AFS data, 80 per cent of those intending to train, being 70 per cent of all farm businesses). However, the training needs of the existing agricultural workforce are identified by Future Training Directions in Australian Agriculture: A Survey of Key Stakeholders, as being mainly in the area of management (especially financial and risk management), marketing and communication skills.

Only 19 per cent of Australian farm businesses intend to train in the area of financial management and 20 per cent intend to train in the area of marketing (AFS data). These farm businesses are more likely to be larger.

Farmer managers' need for training in management skills is common to other areas of small business. Karpin (1995) recognises a particular need for management

training for Australian small business. Farmers themselves perceive a need for improved risk management skills, specifically in marketing, financial management and sustainable production risk management (Johnston, 1994; Solutions Through Research, 1993). Blackburn (1992) also argues that farmers need better risk management skills, including knowing how to access information and computer skills for manipulating information.

Interpreting market signals and responding accordingly is an important skill (Pollard, 1992; Blackburn, 1992). Farmers need to alter their marketing techniques to reduce risk, for example by diversifying their product, using forward selling or establishing direct sales (Solutions Through Research, 1993).

Communication is important within the farm business, with other farmers, with advisers and with others in the agricultural value chain. Negotiating skills for interacting with agribusiness, other farmers and policy makers are also required. Improved communication skills will allow farm businesses to better exploit the advantages of interactive learning identified in this report.

6.3.2 Training methods

The survey of key stakeholders suggests there is no one best way of delivering education and training. Both the key stakeholder and the Tasmanian survey suggest that a variety of delivery methods and training programs should be available. Accredited training which leads to a qualification is important, especially for new entrants. Some farmers would like to take distance education or training by correspondence, although the majority prefer face to face sessions. There is a role for discussion groups, workshops and non-accredited courses in upskilling the existing workforce.

Informal learning experiences are more attractive to the large group of farmers who feel intimidated by the formal training system of TAFE institutes and universities. As emphasised in earlier chapters of this report, training provides an opportunity for peer interaction, or networking, as well for the 'delivery' of new knowledge and skills. Training which recognises, and takes advantage of, the desire for such interaction is more likely to be successful.

Future education and training in agriculture must be seen in the context of changes in the structure of vocational education and training in the economy as a whole. Deregulation of training provides opportunities for customising training to suit the needs of individual industries and for that training to be delivered by training providers selected by industry. Agriculture has started to take advantage of deregulation, particularly in entry level formal education and articulation in Tasmania. Articulated courses, with provision for recognition of prior learning done

on the job and in informal learning situations, would provide the agricultural workforce with the opportunity to acquire portable, recognised skills.

Whether training is by formal courses or other means, the challenge is to deliver relevant, non-threatening training which attracts the existing agricultural workforce. Participatory group learning in local areas is particularly suitable for these adult learners.

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